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SDG 6.1—Drinking Water Supply

HITESH VAIDYA

Director, National Institute of Urban Affairs (NIUA)

Water is the most important natural resource and needs to be used in a sustainable manner. Rapid urbanisation, coupled with no new raw water sources, poor infrastructure and inefficient water governance is leading to water scarcity and water stress in urban areas. India is also facing major issues such as depletion in groundwater levels, deteriorating freshwater resources, and lack of access to safe drinking water sources to fulfil the demands of the citizens. To end this crisis, there is an urgent need to implement effective solutions for improving the availability and accessibility to safe drinking water.

India has initiated a number of national mission and programmes in recent times to improve the drinking water supply in urban areas. The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) - Phase 1 & 2 have been launched to provide basic services like water supply, sewerage etc. to urban households, and to help in improving quality of life. In AMRUT 1.0, around 105 lakh¹ households were covered with water tap connections. While in AMRUT 2.0, target is to provide 2.68 crore² new water tap connections to all 4,700 cities and towns. The Government of India has also partnered with states to implement the scheme—Jal Jeevan Mission-Har Ghar Jal—aiming to provide potable water in adequate quantity to every household by 2024.

In October 2020, Drink from Tap mission was launched in Odisha by Housing and Urban Development Department (H&UDD), Government of Odisha and Water Corporation of Odisha (WATCO) to help the people in solving the severe challenges they were facing in terms of drinking water supply, and water supply services. NIUA has collaborated with the Government of Odisha to evaluate the efficiency and impact of their Drink from Tap mission in the urban local bodies of the state.

This issue on SDG 6.1— **achieving universal and equitable access to safe and affordable drinking water for all**—is a compilation of seven articles and four interviews related to urban water supply system and management, policy framework for urban water supply, 24x7 water supply, distribution of water supply sources, access to safe drinking water by economically weaker sections and marginalised communities.

NIUA is committed to helping Indian cities perform better. To achieve this objective, along with our own resources, we partner with media, industry, academia and other government and non-government organisations for effective research, capacity-building and advocacy outcomes. The collaboration of the National Institute of Urban Affairs (NIUA) and eGov Magazine is a demonstration of the same. Teams at NIUA and eGov Magazine have enthusiastically worked to collate a diverse range of knowledge-base on the cross-cutting issues of urban drinking water supply issues in India for this special issue. My sincere thanks to all the authors who have contributed to this special issue and shared their knowledge to make this issue possible.

1. <https://pib.gov.in/PressReleasePage.aspx?PRID=1760039>

2. <https://pib.gov.in/PressReleasePage.aspx?PRID=1760039>

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It compiles ICT-related advancements being introduced, exercised by various government organisations via the eGovernance module.

<https://egov.eletsonline.com/egov-magazine-2021/>

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Dealing with various key developments and policy-related decisions that define Indian governance style at large, this section throws light on the most important aspects.

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> EVENT REPORTS

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It deals with in-depth detail of various projects being implemented in any part of the country, worth inspiring others in providing solutions.

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> INTERVIEWS

This section highlights various stakeholders, bureaucrats and policy makers influencing governance in the country.

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Drinking Water for All in India! It's Work in Progress...

"Water water everywhere, not a drop to drink" the popular phrase from Samuel Taylor Coleridge's poem - The Rime of the Ancient Mariner - is an apt description of India's water scenario. India is a land that is blessed with abundant water resources but a bane in disguise is the inequity of water distribution. The country experiences floods and droughts in different areas at the same time. This is a persistent issue that has been a major root cause of the country's water conundrum.

For 16 per cent of the world's population that India houses, the country possesses only 4 per cent of the world's freshwater resources. To add to the issue, a 2017 report from the Central Ground Water Board brought to light that 256 of 700 districts in the country have 'over exploited' groundwater levels. And, considering the groundwater scenario in India, the subcontinent tops in the extraction of groundwater, accounting for 25 per cent of the total. This mammoth extraction is actually more than the total groundwater extraction by China and the United States together.

However, all is not grim. The Government of India has been actively working to address the grave situation. From constituting a dedicated ministry to water - Ministry of Jal Shakti - to launching flagship programmes like Jal Jeevan Mission, Har Ghar Jal, Namami Gange, and more, the Centre has taken major steps to answer water woes in the country. As per the Ministry's data, around six crore rural households have received tap water connections under the Jal Jeevan Mission. Moreover, 100 districts in the country are now 'Har Ghar Jal'. Another flagship programme of the Ministry is 'Catch the Rain - Where it Falls, When it Falls'. This campaign is playing a key role in setting up rainwater harvesting structures across the country to tap as much rainwater as possible and reduce the runoff.

Alongside the schemes, the Government is also holding conferences and events like Jal Jeevan Samvad to brainstorm on water issues with the experts and come up with effective solutions. Also, these conferences help in sensitising the people about the real-time situations and spread a word on best practices to be followed for improving the situation.

This issue of the eGov Magazine, in partnership with the National Institute of Urban Affairs (NIUA), is an attempt to draw the spotlight on how India is faring on the global Sustainable Development Goal (SDG) 6.1 which says 'by 2030, achieve universal and equitable access to safe and affordable drinking water for all'. It is a compilation of enriching articles and insightful interviews on the theme from senior policymakers, experts and academia.

Do keep a copy of this collector's edition!

<https://egov.eletsonline.com/editorial/>



रवि गुप्ता

DR RAVI GUPTA

Editor-in-Chief, eGov magazine, and
Founder Publisher & CEO,
Elets Technomedia Pvt Ltd



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SUSTAINABLE DEVELOPMENT GOAL 6

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

UN Indicator for SDG 6.1

6.1.1 Percentage of population using safely managed drinking water services

Ministry of Statistics and Programme Implementation Indicator for SDG 6.1

6.1.1 Percentage of Population getting safe and adequate drinking water with in premises through Piped Water Supply

2 billion people i.e. 26% of the world's population lacked safely managed drinking water services

The Supply Gap in India

Average quantity of water supplied by the urban local bodies is 69.25 liters per person per day only, and the required quantity of water to be made available by the cities is 135 liters per person per day



Urban Water Scenario

India's urban population is set to grow massively over the next three decades—a major problem, since existing supplies of water are already insufficient to meet the demand

40% of India's population is projected to live in urban areas by the year 2030.

India will have a water deficit of **50% by 2030**



57% of urban households have a connection to piped water (treated and untreated combined) on premises

Source: <https://cdn.dnaindia.com/sites/default/files/styles/full/public/2021/07/12/984821-water-040318.jpg>

Drinking water supply in a slum area

Managing Safe Drinking Water for All

The erstwhile Millennium Development Goal (MDG) indicator *use of an improved source of drinking water* has been used as a proxy for 'safe drinking water' but, international consultations since 2011 established consensus on the need to better address normative human rights criteria including accessibility, availability, and quality.

India is facing severe and sustained water stress conditions. Many parts of the country are experiencing water scarcity and deterioration of groundwater and surface water resources. It is projected that India's water demand will grow 24 per cent by 2025, and 74 per cent by 2050. The situation of water in urban areas of India is further dire. By

The first target under the Sustainable Development Goal (SDG) 6 specifies "by 2030, achieve universal and equitable access to safe and affordable drinking water for all". The national-level programmes have helped in increasing access to improved water supply sources in India, the water supply sector now has to address the challenges of universal coverage, improved quality, reliability, and sustainability of services. In this article, **Hitesh Vaidya**, Director, National Institute of Urban Affairs (NIUA) brings to light the aforementioned subject and government's efforts to achieve SDG 6.1.

the year 2050, the number of people living in Indian cities is expected to be about 840 million. In order to accommodate, this ever-increasing urbanisation, India needs to explore smarter and sustainable ways of improving the situation of clean drinking water.

There are several programmes and policies that have been enacted by the Government of India to tackle the situation and overcome the challenges of drinking water in urban India. According to the WHO-UNICEF Joint Monitoring Programme report, India has made good progress thus far. In the drinking water sector, 97 per cent of urban households in India have access to *improved* water supply facilities as compared to 89 per cent in 1990.

Water supply is the responsibility of State governments in the country. The



Citizens drawing water from community taps outside premises

Source: https://union.com.mx/images/2022/abril_1122_27_1.jpg

To take concrete measures in the urban water supply sector, the Centre announced Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0 with the aim to make 4,700 towns and cities water secure.

States have delegated the power to the urban local bodies for the provision of water supply to the citizens at the city level. The first central level efforts to provide drinking water in cities and towns were undertaken through Integrated Development for Small and Medium Towns (IDSMT) (1979) and the Accelerated Urban Water Supply Programme (AUWSP, 1992). The landmark shift in the water supply including its infrastructure development occurred under the Jawaharlal Nehru National Urban Renewal Mission (2005). Under the programme, the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT)

and Basic Services for Urban Poor (BSUP) focused on providing drinking water to the urban poor. The Service Level Benchmarks (SLBs) for four sectors i.e water supply, solid waste management, sewerage, and stormwater drainage were initiated by the Government of India in the year 2008. The SLBs provided a ready reckoner for the urban local bodies to identify performance gaps and improve the service delivery.

While these programmes have helped in increasing access to improved water supply sources, the water supply sector now has to address the challenges of universal coverage, improved quality, reliability, and sustainability of services. It was projected in the **High Power Expert Committee report (2011)** that the water supply sector needs an investment of Rs 3.2 lakh crore for the period 2012-2031.

The Union Budget 2021-22 has allocated Rs 11,500 crore for measures to enhance water availability and water resource sustainability. To take concrete measures in the urban water supply sector, the Government of India announced Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0 with the aim to make 4,700 towns and cities water secure. The mission addresses water needs, rejuvenating water bodies, better management of aquifers, and reuse of treated wastewater thereby promoting a circular economy of water.



Author drinking water from a tap in Ishaneshwar slum in Bhubaneswar during his visit to evaluate *Drink from Tap Mission* in Odisha.

The ultimate goal of AMRUT 2.0 is to provide 100 per cent coverage of water supply to all households in 4,700 towns and cities, by providing 2.68 crore urban household tap connections. The mission has a reform agenda with a focus on strengthening urban local bodies and the water security of the cities. Major reforms include rejuvenation of water bodies, rainwater harvesting, reducing non-revenue water (NRW), meeting 40 per cent of industrial water demand through recycled used water, a dual piping system for bulk users through building bye-laws, unlocking value & improving land-use efficiency through proper master planning, improving credit rating and accessing market finance including the issuance of municipal bonds and implementation Online Building Permission System under Ease of Doing Business (EoDB).

The mission also promotes a circular economy of water through the formulation of a City Water Balance Plan for each city. *Pey Jal Survekshan* will be conducted in cities to ascertain the equitable distribution of water, reuse of wastewater and mapping of water bodies with respect to quantity and quality of water.

The mission also includes the use of digital technology and information, education and communication campaign to spread awareness among the citizens about the conservation of water. An Urban Water Information System through National Remote Sensing Centre (NRSC) will be developed under AMRUT 2.0 for the Aquifer Management system. Target-based capacity-building programmes will be developed for all stakeholders including contractors, plumbers, plant operators, students, women and other stakeholders.

According to the National Sample Survey (2018), only 57.5 per cent of urban households have individual water connections and 40-50 per cent of water is lost in the distribution system due to pipeline leakages and water theft. There are high costs and investments linked to water supply infrastructure and operation and maintenance. The treatment of



Unsafe sources of drinking water supply

Source: <https://video-images.vic.com>

The urban local bodies must prioritise and establish new centralised and decentralised sewage treatment plants for the treatment, recycling and reuse of grey and black water.

polluted water resources, longer pipelines for distant water and high energy consumption to pump and distribute water are expensive to invest in. Moreover, the cost recovery from city water utilities faces severe financial stress due to low and inconsistent water charges and poor recovery of water bills.

SDG 6.1 is focused on providing sufficient safely managed water, accessible at the household level, and which is affordable to citizens. The actions to be undertaken to achieve SDG 6.1 must focus on investigating more innovative technical solutions that can provide adequate quantities and improved qualities of water to urban households.

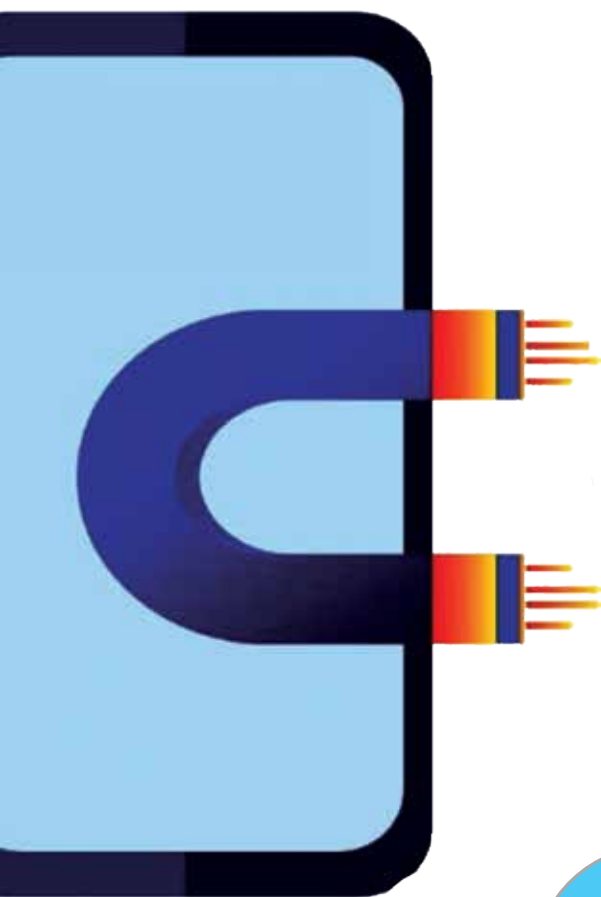
The urban local bodies must prioritise and establish new centralised and decentralised sewage treatment plants for the treatment, recycling and reuse of

grey and black water. The water distribution infrastructure must cover the peri-urban and slum areas and such upcoming spaces. While there are challenges in achieving SDG 6.1 in the urban context, there are also opportunities for new thinking, new technologies, new philosophies, and new ideas to achieve one of the most basic requirements for humankind.

NIUA is supporting the cities to localise SDG 6.1 through technical assistance, partnerships, trainings, shared learning and knowledge management. Eight projects contributing to the urban water sector: Addressing the urban drivers of river health in Ganga Basin; Assessing the Efficacy and Efficiency of the Drink from Tap; Developing an Urban Water Body Diagnostic Tool; Participatory and Inclusive Water Sensitive Urban Design for Sustainability and Resilience (PARIWAR); City Investment to Innovate, Integrate and Sustain (CITIIS); Sustainable, Healthy, Learning Cities and Neighborhoods (SHLC); Scale and Nature of Deprivation among Children in Urban India (SNDC); and ClimateSmart Cities Assessment Framework (CSCAF). The projects address complex safety, accessibility, and management of drinking water issues in Indian cities.

NIUA is committed to supporting states and cities through extensive research and policy advisories, data solutions, technology, and capacity building to align with the SDGs and initiate a renewed discourse for future directions on improving the urban water sector in India. gov.in

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Making Ganga Nirmal & Aviral

Ganga has faced atrocities from urbanisation through the years. Loads of untreated sewage and industrial effluents poisoning the river had made it imperative to take stricter actions to save it. Thus, the National Mission for Clean Ganga (NMCG) was launched in 2014 and thankfully, today, the mainstem of the river is clean while the work on cleaning its tributaries is still underway, said **G Asok Kumar**, Director General, NMCG, Ministry of Jal Shakti, in an exclusive interview with **Krishna C Mishra** of the eGov Magazine.



G ASOK KUMAR

Director General, NMCG
Ministry of Jal Shakti

river has always been a major threat to the Ganga's ecosystem. Therefore, the two major pillars of the Namami Gange were making Ganga nirmal and aviral.

To a large extent, we have achieved the first aspect which is making the river clean. The mainstem Ganga is now clean. When we compare the statistics of most polluted stretches in 2015 and 2021, we see the pollution level has slumped dramatically and the water quality is now in compliance with the standards. Also, the populace that visited Ganga for taking holy dips have increased. Ardha Kumbh, in 2019, is a great example where nearly 20 crore people participated. The Prime Minister of India also took a dip in the holy river during the religious gathering.

We are establishing 161 sewage treatment plants (STPs) and associated facilities at a cost of ₹25000 crore of which work for 75 STPs is completed. STPs are being set up to ensure no untreated sewage or waste enters the



Impact of Namami Gange - Clean waters of the Ganga flowing through Rishikesh, Uttarakhand

The core vision of 'Namami Gange' is making Ganga 'nirmal' and 'aviral'. What are some of the recent developments made by NMCG towards achieving this vision?

Namami Gange is one of the flagship programmes of the Government of India that intends to make Ganga and its tributaries clean. The revered river has religious beliefs and cultural significance associated with it.

When we speak of making Ganga nirmal, we refer to ensuring the flow of

clean water in the river which is referred to as nirmalta or sanctity of the river. While aviralta is maintaining a continuous minimum ecological flow in the river.

As Ganga flows down from Devprayag in Uttarakhand to Ganga Sagar in West Bengal, where it drains in the Bay of Bengal, it is joined by several small and large rivers that add volume to it. However, despite the huge water volume that it carries, in the dry season, the flow of the river becomes nearly nil at some stretches. And, pollution in the

river. Further, from the mainstem, we are now shifting focus to the tributaries. Also, in industrial cities & towns like Kanpur, we are setting up Common Effluent Treatment Plants (CETPs) to ensure no harmful effluents or industrial waste enter the river. The infamous Sisamau nala which used to drain over 140 million litres of sewage and waste in Ganga was diverted to STPs in 2019. Not a drop of sewage enters the river from that source anymore. With such recurring efforts to revive the sanctity of Ganga, the flora & fauna of the river's ecosystem has enriched in the past few years. The count of the famous Ganges Dolphins have also increased.

The Government is working to restore the river's minimum ecological flow. The extraction of Ganga's water is majorly done for irrigation purposes, therefore, we are eyeing for alternatives like reducing the usage of water in agriculture to ensure minimum ecological flow in the river.

Apart from being revered as a holy river, Ganga also plays a role in boosting local economies. How is the project faring on that front?

Ganga is a lifeline at the indo-gangetic plains that houses nearly 40 per cent of the country's population. Thus, rejuvenation of the holy river becomes utmost important.

Our first focus was to clean the water and therefore the setting up of STPs was done. Meanwhile, the second focus was to maintain the flow in the river. Besides this, the other important aspect was sustenance wherein citizens were engaged in the process of conservation and preservation of the Ganga ecosystem to ensure the sustainability. In the National Ganga Council Meet in 2019, the PM introduced the concept of 'Ardha Ganga' which is connecting people and

THE MAINSTEM GANGA IS NOW CLEAN. FROM 2015 TO 2021, WE SEE THE POLLUTION LEVEL HAS SLUMPED DRAMATICALLY AND THE WATER QUALITY IS NOW IN COMPLIANCE WITH THE STANDARDS.

the river through an economic bridge. With this, the river can be used to help economic development of the people and if people see economic benefit from the river, they will contribute to the sustenance of the river.


In addition, we are moving from the concrete structures of STPs to zero-waste natural farming. There are six verticals under the Ardha Ganga initiative, the first is the Zero-Waste Natural Farming. Under this, the farmers near the river will be encouraged to take up organic farming to ensure that no or least fertilizers are used and productivity is enhanced through natural processes. Also, with STPs in operation, large amounts of sludge is generated which can be turned into manure or fertilizers and supplied to the farmers. Further, treated waste water can be used for irrigation in place of fresh water.

Secondly, to support organic farming, the Government is planning to set up haats where the local farmers can sell their organic farm produce. Further, we are trying to create tourism opportunities in towns and areas on the banks of the Ganga as most of these places carry cultural, religious and historic significance. We are also trying for Institution development wherein local institutions and people could take over the maintenance of the initiatives taken under the Ardha Ganga. Citizens are being engaged actively for proper execution of the initiatives and the entire Ardha Ganga initiative is also

linked with the livelihood mission. Therefore, these six verticals will help us in the sustenance of the river.

As you have been an esteemed participant in Elets conferences multiple times. What is that one message that you would like to convey to our audience?

Being a part of Elets conferences has always been a wonderful experience. You are advocating technology adoption in governance and spreading the knowledge on various aspects of e-governance through your platform. I wish all the luck for the upcoming Elets AatmaNirbhar Bharat Summit that will open a platform for top bureaucrats, thought leaders and academia to present innovative solutions before a large audience and help build a network with industries and experts to find sustainable solutions to the issues in governance.

Alongside making India AatmaNirbhar, we also have a target to achieve a \$5 trillion economy. Considering this goal, water would be one of the most limiting factors. The techniques that NMCG is using for reuse and recycling of water and reducing the use of freshwater for industrial and agricultural use, would help conserve water and counter major issues in water sustainability in the long run. I request all the readers to respect water, use it judiciously and conserve it. 

Neutralising Inter - State River Disputes, Overcoming Water Crisis

Inequity in water distribution is one of the major causes of India's water conundrum. Issues ranging from varying rainfall patterns to inter-state river disputes, there is a lot that needs to be addressed. In an exclusive interview with **Nisha Samant of Elets News Network (ENN)**, **Dr BRK Pillai**, Member, Krishna River Management Board (KRMB) shared his views on the distribution and management of Krishna river water between Andhra Pradesh and Telangana.



DR BRK PILLAI

Member, Krishna River Management Board (KRMB)

Recently, issues of drinking water shortage in Srisaillam reservoir have surfaced. What is the genesis of such issues and how is KRMB working to resolve them?

The current water year – beginning (from 1 June 2021) with the onset of the monsoon – has been good for the Krishna basin with the Srisaillam reservoir receiving inflows of the order of 1092 Thousand Million Cubic feet (TMC) which is over one-and-half times the average annual flows of last 10 years (690 TMC). Since Srisaillam was essentially conceived as a 'carryover reservoir' by the Krishna Water Disputes Tribunal (KWDT-1), the favourable conditions of the current year should have enabled us to have enough storage even to cover shortfalls (if any) of the next monsoon. Yet, by March (2022) itself, the reservoir was depleted to a precarious level hampering its capacity to meet even drinking water needs during the summer months ahead. Undeniably, this scenario has emerged from the mismanagement of the Srisaillam reservoir.

Reasons leading to present mismanagement are rooted in the very nature of operational controls for the Srisaillam reservoir. The boundary between the bifurcated States of Andhra Pradesh and Telangana passes through the Srisaillam dam and its reservoir, and the operational controls of different outlets – involving two powerhouses, one canal head-regulator, and three lift irrigation schemes – are divided amongst two States. Both States are engaged in a heightened (bad) competition for water, which inevitably leads to combined withdrawals above the sustainable limits of the Srisaillam reservoir. The water that passes through the Srisaillam powerhouse also augments irrigation coverage under the downstream projects of Nagarjuna Sagar and Prakasham Barrage. However, the unchecked operation of the Srisaillam powerhouse – not in tandem with the irrigation demands of downstream projects – often leads to the spilling of unused water into the sea. In the current water year, about 500 TMC of Krishna water was spilt into the Bay of Bengal, of which the substantial quantum could

have been put to beneficial use.

Focusing on the key issue of operational control, KRMB in its 15th Board meeting (in October 2021) has taken a consensus decision whereby direct outlets of the Srisailem (and, also Nagarjuna Sagar) reservoir are required to be handed over by respective States to the KRMB. The Government of Andhra Pradesh has issued needful orders in compliance with this decision; the cooperation of Telangana is now needed for the meaningful implementation of the decision.

KRMB was created under the Andhra Pradesh Re-organisation Act 2014 to play a vital role in managing the water resources of the Krishna basin. What measures KRMB is taking to fulfil this role?

Allocation of water between the States of Maharashtra, Karnataka, and erstwhile Andhra Pradesh in the 2060 TMC (75 per cent dependable flows) of Krishna River was carried out by Bachawat Commission (KWDT-1) in 1973. The erstwhile Andhra Pradesh, being the terminal State, was also allowed to make use of any (surplus) water in excess of the 75 per cent dependable river yield. The bifurcation of erstwhile Andhra Pradesh has opened up new issues of division of water between the newly formed States of Andhra Pradesh and Telangana. At the time of bifurcation, the second Krishna Water Disputes Tribunal (KWDT-2) was already relooking into the allocation of Krishna waters amongst riparian States, and the AP Reorganisation Act (2014) further mandated KWDT-2 to carry out project-wise allocation of Krishna water between bifurcated States. The decision of KWDT-2 is awaited.

KRMB is essentially a joint body of the officials of the Andhra Pradesh and Telangana Governments and the Central Government, and the issues before the board are required to be resolved largely through consensus. Since the allocation



Srisailem dam on Krishna river Source: <https://upload.wikimedia.org/>

The river boards should evolve as active platforms for cooperation building thereby subduing antagonism (if any) amongst party States.

of Krishna water between bifurcated States is yet not affected, the key challenge is in administering amicable sharing of Krishna's dependable flows as well as its surplus waters. Since larger conflicts are centred around the common-pool projects of Srisailem and Nagarjuna Sagar, the Board has decided by consensus for the transfer of direct outlets of these two projects to KRMB. The KRMB is also establishing a robust network of data collection for monitoring the distribution of Krishna water across two States.

As per you, what are some of the best practices that KRMB and other river management boards should

adopt to help tackle the water crisis in the country?

Issues of river water sharing between States emanate from three factors, namely: asymmetry of resource distribution; ambiguity in the shared data or information; and antagonism rooted in the past. Effective and timely interventions of river boards can mitigate these (3A) factors thereby helping the country in overcoming the most ticklish component of its water crisis.

The factor of antagonism is the most difficult to handle because of its political connotation. However, the river boards should evolve as active platforms for cooperation building thereby subduing antagonism (if any) amongst party States. For the fulfilment of this intent, the river boards should also become transparent and media-friendly disseminating positive vibes about their roles and functions. The ambiguity in data should be eliminated altogether with the boards directly gathering data (as primary source) using state-of-the-art technologies and archiving them systematically for long-term use. Unlike the present situation of KRMB (and also of GRMB), the fundamental issues of asymmetry of resource distribution generally stand



Source: <https://www.team-bhp.com/>

settled (by awards of river tribunals) before the formation of river boards. Nevertheless, new issues of asymmetry also emerge because of the ever-increasing demand for water. Relying on the strengths of unambiguous data the river boards should impress upon party States about the futility of supply-driven competition for water in stressed river basins and thereby channelise their energies towards improving demand-management. River boards should explore the possibilities of establishing water tradability amongst party States so as to incentivise the demand-management, and also generate good competition for water.

What are the climate change-related challenges that the country is facing and what could be some of the urgent reforms needed to address these challenges?


Water is essentially a stochastic resource – whose availability can at best be guessed but not assured – and therefore India's water resources are developed for probabilistic estimates of dependable river flows. With climate change, the rainfall patterns in future years are likely to undergo a large variation in the extent as well as frequencies of extreme events

The river boards are essentially conceived for the purpose of deficit management; however, in the emerging conditions of climate change, they will be required to develop capacities for surplus management as well.

(i.e., droughts and floods).

The emerging conditions are thus likely to undermine the estimates of dependable flows in the rivers of the country, thereby denting operations of dam reservoirs built on these rivers. At the same time, greater dependency on the waters of these reservoirs will be called for because of the increasing demand for frequent irrigation (as

agriculture fields will encounter higher losses of soil moisture with increasing temperatures). The condition of water stress coupled with variation in estimates of dependable river flows may also open up new issues of river water conflicts amongst riparian States. Such issues will have to be addressed timely by the river boards, wherever existing. The deficit management will require interventions of supply-side management (through the restoration of depleted storage, creation of new storage, and efficient operation of storage projects) as well as demand-side management (through micro-irrigation, reuse of waters, volumetric pricing, etc.).

Apart from issues of acute water stress, the country may also face extreme and frequent flood events. This will call for interventions of surplus management involving coordination in operations of cascading reservoirs, improved dam safety, creation of flood cushions in dam reservoirs, management of flood plains, and improved flood forecasting. The river boards are essentially conceived for the purpose of deficit management; however, in the emerging conditions of climate change, they will be required to develop capacities for surplus management as well. 

Visualising Newage NBFCs WITH RESILIENT TECHNOLOGY & FINANCIAL INCLUSION

Non-banking financial businesses (NBFCs) are expected to demonstrate faster growth in 2022, in line with the improvement in the economy, as well as a stronger balance sheet, higher provisions, and improved capital positions. Research reports underline, NBFCs in India would see a normalisation of business activity and a 14 percent increase in loan book year over year in FY23. The Elets NBFC 100 tech Summit series, which has a history of spotlighting trends, innovations, challenges and opportunities in the NBFC industry, is back for its 11th edition this year. The summit's 11th chapter with the theme Visualising Newage NBFCs with Resilient Technology & Financial Inclusion, would be held in Chennai.

Points of Discussion

- The Importance of Digitization in Reviving NBFCs
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India's Water Conundrum



India is geographically located such that equity of water distribution becomes a major problem. Moreover, the rising demands and depleting groundwater reservoirs weigh on the woes. Sharing insight on this, **Suneel Kumar Arora**, Advisor, National Water Mission, Ministry of Jal Shakti interacted with **Nisha Samant** of **Elets News Network (ENN)**.



SUNEEL KUMAR ARORA
Advisor, National Water Mission,
Ministry of Jal Shakti

Despite surplus rainfall, immense natural water resources, groundwater reserves and perennial rivers, why India is considered a water-stressed country? Where do we lack?

Firstly, we do not have the water available where we need it and when we need it. The rainfall, for example, is distributed unevenly in space and time across the country. We see cases where some regions experience floods while others see drought, often at the same time. Secondly, the rate of increase in demand has significantly outstripped the rate of supply. India extracts the most groundwater in the world which is more than the groundwater extracted by USA and China combined.

The third key issue lies in how we manage

the available water, especially in urban areas. India is going through a major economic restructuring from agriculture to the service and manufacturing industry. However, city administrators continue to face a lot of challenges in delivering basic public services like water supply and sanitation. There is an overlap of responsibilities between multiple institutions and limited technical and managerial capacity to optimise the full spectrum of resource-infrastructure-stakeholder connections. It is estimated that we lose 40-50 per cent of our water while supplying and only less than 30-40 per cent of the wastewater is treated before safely discharging. Fees for water and sanitation services and their collection efficiency have remained low which, in turn, affects the quality of service delivery.

The Government of India has been spearheading a host of measures to improve the capacity of local institutions in ensuring a sustainable, financially secure, and technical prudent system of water management. Jal Shakti Ministry, furthermore, has remained keen on increasing the participation of the community in managing their local water resources, and in this pursuit, has launched the Atal Bhujal Yojna which aims to involve local villagers in scientifically managing their groundwater resources. The Ministry is also prioritising people's participation in managing the irrigation infrastructure through the formulation of water user associations to undertake operations and maintenance of irrigation assets. Just like urban water supply infrastructures, irrigation networks also face the challenge of poor water use efficiency, and it is believed that through the strengthened base of WUAs which is empowered to collect and retain service fees and carry out systematic operations and maintenance, the system efficiency can be increased to ensure water is used wisely and every farmer has sufficient water to irrigate his/her field.

“Jal Shakti Abhiyan: Catch the rain” is a flagship mission of the Ministry. Since its inception, what has been the progress and how much reduction in water run-off has been recorded?

The “Jal Shakti Abhiyan: Catch The Rain” campaign with the theme “Catch the Rain, where it falls, when it falls” was launched by Prime Minister Narendra Modi on 22 March 2021, World Water Day via video conferencing.

It was taken up in all 734 districts of the country during the pre-monsoon and monsoon period to “nudge the stakes and stakeholders to create and maintain appropriate Rain Water Harvesting Structures (RWHS), suitable to the soil strata and climatic conditions of the area,



Source: <https://www.deccanherald.com>

with people's participation, before the onset of monsoons so that they are ready to “catch the rain, where it falls, when it falls”.

The unique campaign focuses to create and maintain RWHS with a total participation of the people. For this, funds from all water conservation-related schemes of the Centre and State governments, funds mobilised locally and from corporate sectors, were converged. The campaign implemented under the National Water Mission (NWM) has the following focused interventions:

- Water conservation & rainwater harvesting
- Enumerate all existing waterbodies/ Water Harvesting Structures based on old revenue records and using remote sensing images from NRSA and GIS mapping.
- Jal Shakti Kendras in all district headquarters.
- Afforestation drive taken up to plant saplings to increase green cover.
- Spreading awareness among the masses to make Jal Andolan a Jan Adolan.

The National Water Mission, with the help of NIC, has developed a portal for monitoring the progress of the campaign. Under the campaign, Nehru Yuva Kendra Sangathan (NYKS) and its youth clubs have engaged over 2.90 crore people through their activities like rallies, Jal


Choupals, quizzes, debates, slogan writing competitions, wall writings, etc. NWM has conducted over 150 webinars on the subject to build awareness and capacities of various stakeholders and NGOs/ INGOs.

NWM has developed IEC materials in regional languages on water harvesting and conservation by professional agencies and uploaded in the official website for the use of stakeholders.

Major outcomes of Jal Shakti Abhiyan: Catch the Rain campaign

Since the launch, till 31 December 2021, both urban and rural areas put together, 10,64,929 water conservation and RWHS have been completed while 5,58,028 works are ongoing thus making a total of 16,22,957 WHS. 1,79,242 traditional water bodies have been renovated while 1,17,716 works are ongoing; 8,31,268 reuse and recharge structures were created/under development while 19,18,395 watershed development activities have been undertaken/ongoing.

As reported by the Ministry of Rural Development, over 2.03 lakh Gram Panchayats (GPs) out of the 2.69 lakh GPs have prepared water conservation plans.

A reduction in water run-off and rise in watertable countrywide due to successful implementation of the “Catch the Rain” campaign is acknowledged by those who monitor it for their cause. 

Taking Piped Water to Grassroots

India's drinking water conundrum is a major concern to improve the quality of life of citizens. The Government of India has rolled out some major schemes to address the situation. Meanwhile, State governments have also taken serious initiatives in this direction. Sharing her insights on how Gujarat is making strides to achieve the "drinking water for all" target, **Dr. Jincy Roy**, CEO, Water & Sanitation Management Organisation, Gujarat interacted with **Hemangini Kanth Rajput of Elets News Network (ENN)**.



DR. JINCY ROY

CEO, Water & Sanitation Management Organisation, Gujarat





It is known that to harness an initiative like AatmaNirbhar Bharat, smart rural water supply ecosystems are needed with quality service delivery. How is WASMO faring on this front?

We have constituted 'Pani Samitis' at the village level to cater to all the drinking water needs of a village. These Samitis are headed by the village Sarpanchs. Most of the villages have multiple sources of drinking water. Pani Samitis take over the work to supply/distribute drinking water to the villagers and make their own schemes. They execute the works, collect the tariff, and take care of the maintenance works and

We have constituted 'Pani Samitis' at the village level to cater to all the drinking water needs of a village. These Samitis are headed by the village Sarpanchs.

all the water conservation structures that have been developed in the

villages. Meanwhile, WASMO provides all the technical help that is needed. As of now, we are in a good position as the village schemes are headed by the villagers, executed by the villagers, and maintained by the villagers.

What are the challenges that you face while providing piped water supply to tribal & rural areas? What are the solutions that you are implementing to address the situation?

A multi-pronged approach is the need of the hour. In Gujarat, we do have tribal areas, we have plains and other terrains as well. Therefore, a multi-



pronged approach is needed. Our learnings have been helpful in overcoming administrative hurdles and making better decisions suitable to the people residing on a particular terrain. In Gujarat, some of the tribal areas are hard to reach and thus it becomes difficult to ensure last-mile connectivity in terms of providing water supply. Therefore, we adopted multiple approaches wherein we increased the diameter of the pipelines, and optimised operations of pumping stations, among others to ensure that the last village gets adequate water supply.

Further, we have realised that the Government cannot reach out to all the villages by itself therefore we have roped in NGOs who work on the field and handhold Pani Samitis to execute their tasks. Pani Samitis are the ones working to cater to all the drinking water requirements in the villages. Also, they provide interactive programs on how water is supplied through taps. The major issue is that of ownership. Once you are aware that there is a source of drinking water available in a village then only they understand the efforts that go


We will ensure that quality should be the focus alongside the quantity of the water supplied. We also have another ambitious plan to install water meters in the villages.

behind the entire process of providing drinking water, especially in difficult terrains.

We are also training Pani Samitis for quality assessment. As an example, the tests for tracking the presence of bacteria in a particular water sample are also conducted by Pani Samitis. We have trained the members of the Samitis to conduct chemical tests, especially the female members have been trained for this job.

What is your future roadmap to achieving access to clean & safe drinking water for all?

We are right now focussing on providing functional tap connections in all households. While working for the initiative and executing the water supply works, we have our share of learning so far. The Government of Gujarat has an ambitious plan to achieve the target of providing tap water connection to all households by the September of this year. However, the Central Government has kept the target to be achieved by 2024.

Once we have achieved the target of providing functional tap water connectivity to all households, the next target for us would be to provide surface water to all villages. Also, we will ensure that quality should be the focus alongside the quantity of the water supplied. We also have another ambitious plan to install water meters in the villages. This is also important to ensure proper implementation of the Water Act. 



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Mr. Arnab Pratim Dutta
Senior Editor,
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Last date of submission:

16th May 2022

Result declaration:

15th June 2022

Award distribution and exhibition:

July 2022



Water for All

Roadmap for Water Management & Conservation



Source: <https://missionbox.org>

Water management is the most crucial challenge in India. Water, a precious resource of humanity, is under constant threat of exploitation with rising population, increasing urbanisation, and changing climatic trends, write **Avinash Mishra**, Adviser, Water Resources, Environment & Climate Change Division, NITI Aayog and **Madhubanti Dutta**, Young Professional (Natural Resources, Environment & Climate Change Division), NITI Aayog.



AVINASH MISHRA

Adviser, Water Resources,
Environment & Climate Change
Division, NITI Aayog



MADHUBANTI DUTTA

Young Professional (Natural
Resources, Environment & Climate
Change Division), NITI Aayog

There is acute stress on freshwater availability as it is projected that the per capita average water available will dip to 1434 cubic meters in 2025 and further to 1219 cubic meters by 2050. Also, it is projected that by 2030, the country's water demand will be twice the available supply, if business as usual continues, implying severe water scarcity for hundreds of millions of people and about a 6 per cent loss in the country's GDP. If indiscriminate exploitation and poor management continue the way it is happening, India may become one of the top six Water Scarce Countries by the year 2025. Dependence on groundwater is 80-85 per cent in rural India, whereas in urban India it is 55-60 per cent¹.

1. India Groundwater: A Valuable but Diminishing Resource, The World Bank- March, 2012

Water insecurity plays a driving role in conflicts and famines around the world, while water pollution and scarcity pose long-term economic threats to developing and developed nations alike. And institutional investors around the globe have noticed: Water ranks among their top three environmental, social, and governance (ESG) concerns, according to the 2019 RBC Global Asset Management Responsible Investment Survey². All industries rely on water in some way. A company's water footprint can be seen in four key areas of its value chain: raw materials, suppliers, direct operations, and product use. As McKinsey's 2009 report *Charting Our Water Future: Economic Frameworks to Inform Decision-Making* made clear that climate change, population growth, and changing consumer habits are increasing water stress for many regions.

The recent McKinsey Global Institute report *Climate Risk and Response: Physical Hazards and Socioeconomic Impacts* notes that many of the world's basins could see a supply decline of around 10 per cent by 2030 and up to 25 per cent by 2050. By 2050, according to UN estimates, one in four people may live in a country affected by chronic shortages of freshwater. The World Bank estimates that the crisis could slow GDP by 6 per cent in some countries by 2050 as well. As the world embraces the importance of environmental sustainability, organisations must place a greater emphasis on addressing the global water crisis and minimising the impact on themselves and the planet. Water stress is a risk multiplier. Alone, it is a major risk with the potential to upend socioeconomic and ecological systems. When compounded with other risks, such as those related to food and energy systems, politics, and infrastructure, it becomes detrimental.

Challenges lie in managing the water resources among the various competing demands of drinking water, agriculture,



Source: <https://statista.com>

We need to recover the service fee instead of providing it free of cost, as the prices comprise of two elements: one for resource cost, another for the service fee.

industry, power, ecology, etc., and also establishing a balance between the economic development and sustenance of natural resources. The cropping pattern and allocation of water share among various crops should be scientific and rational. To date, 85 per cent of irrigation water is being provided to paddy and sugarcane. So, the need of the hour is to cover a large area under Micro-Irrigation.

We need to recover the service fee instead of providing it free of cost, as

the prices comprise of two elements: one for resource cost, another for the service fee. Therefore, resource costs may be free but service components should be charged for better system management. Our use in the agricultural sector is close to 90 per cent whereas in China it's around 63 per cent³. We must adopt the use of more innovative technologies to better manage the use of water, which would further help in managing scarce water resources sustainably.

Key Government Initiatives & The Future Outlook

The higher agricultural growth is expected to contribute directly to overall GDP growth and even more as an inclusive growth. Since more than half of the population still derives its income from agriculture, faster agriculture growth is perhaps the most effective instrument for reducing rural poverty. It would mean raising farm income for land-owning farmers and wage income for landless farmworkers. The growth in the agriculture sector depends largely on irrigation as this is an important

2. Drip, drip, drip: Water is a leading ESG concern, GreenBiz, February, 2020.
3. The State of China's Agriculture, Debra Tan, China Water Risk, April, 2014



Source: <https://doi.org/10.1016/j.landurbman.2016.06.001>

component of agriculture to develop. If indiscriminate exploitation and poor management continue the way it is, then India may become one of the top six Water Scarce Countries by the year 2025. Annual per capita availability of water will reduce to 950 cubic metres and the total demand is expected to increase to 1050 billion cubic metres by 2025. Demand for water in the industrial sector is increasing by 8 per cent per annum and will reach 191 billion cubic metres by 2025.

The Government of India is committed to accord high priority water conservation. In this context, the Government of India conceived Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) with the objective of extending the coverage of irrigation in a focused manner with an end-to-end solution on source creation, distribution, management, field application, and extension activities. The Cabinet Committee on Economic Affairs chaired by the Prime Minister has accorded approval of PMKSY in 2015. The scheme has been formulated by amalgamating ongoing schemes viz. Accelerated Irrigation Benefit Programme (AIBP-PMKSY), CAD

There is a need for water regulatory authority to make efforts to create such management of water resources basin-wise. This will create the roadmap towards Integrated Management of Water Resources.

development & waterbodies, Har Khet Ko Pani of the Ministry of Jal Shakti, Integrated Watershed Management Programme (IWMP) of the Department of Land Resources (DoLR), and the On-Farm Water Management (OFWM), i.e. Micro Irrigation of the Department of Agriculture and Cooperation (DAC).

Conclusion

There is a need for allocation of water share among four sectors i.e. agriculture, drinking including livestock, industry, and ecosystem. There is a need for water regulatory authority to make efforts to create such management of water resources basin-wise. This will create the roadmap towards Integrated Management of Water Resources.

Therefore, there is a dire need to rejuvenate, renovate and reclaim these valuable water bodies to make cities peacefully livable. Urban India is the new norm and with certain advancements in technology, the rise in urbanisation will accumulate limited resources for unsustainable use. Hence, there is a pressing need to think and plan for a future urban India where cities are smart, sustainable, accessible, and livable⁴. Moreover, moving forward in smart urban India with an aim of accessible potable water, there is an urgent need for complete transformation and renovation of water utilities and related infrastructure through long-term Investments in water management which can also ultimately

4. World Urbanization Prospects- The 2018 Revision

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India's Water Security

A Roadmap to Achieving SDG 6.1 & AMRUT 2.0

The Sustainable Development Goal (SDG) 6.1 aims to 'achieve universal and equitable access to safe and affordable drinking water for all' by 2030. It can be seen as a stimulus for governments to take necessary actions to improve the equity of water distribution across the country, write **Monika Bahl**, Senior Advisor, Sustainable Urban Development-Smart Cities II, GIZ and **Shriman Narayan Sai Raman**, Technical Expert, Sustainable Urban Development - Smart Cities II, GIZ.



MONIKA BAHL

Senior Advisor, Sustainable Urban Development-Smart Cities II, GIZ



SHRIMAN NARAYAN SAI RAMAN

Technical Expert, Sustainable Urban Development-Smart Cities II, GIZ



Recycling wastewater post-effective treatment could improve water availability in the country

In India, the Atal Mission For Rejuvenation And Urban Transformation (AMRUT 2.0), a national Mission of the Government of India, aims to provide water security through a 24x7 water supply with a drink from the tap facility in 500 AMRUT cities. Water security has been defined as "the reliable availability of an acceptable quantity and quality of water for health, livelihoods and production, coupled with an acceptable level of water-related risks".¹ In this context, this article identifies the challenges and explores opportunities to overcome such challenges within the context of AMRUT cities in India.

1. Water Security & Nexus, United Nations University
<https://unu.edu/projects/water-security-nexus.html#outline>

AMRUT 2.0

AMRUT 2.0 is a step towards AatmaNirbhar Bharat to make the cities 'water secure' and provide functional water tap connections to all households to achieve a 24x7 water supply. This will be achieved through a circular economy of water by effective water source conservation, rejuvenation of water bodies and wells, recycling/ reuse of treated water, and rainwater harvesting by involving the community at large. AMRUT 2.0 focuses on empowering States/ Union Territories (UTs) and cities for efficient implementation of projects in the spirit of cooperative and competitive federalism by providing flexibility to the States/ UTs to formulate, plan and implement the projects.

AMRUT 2.0 has a reform agenda for achieving financial sustainability and water security of ULBs by meeting 20 per cent of water demand through recycled water, reducing non-revenue water to less than 20 per cent, and rejuvenating water bodies. It is thus the policy of the Government of India to work towards universal 24x7 supplies. This requirement is also recognised in the UN Handbook on water and sanitation as a human right (De Albuquerque 2014) because unsustainable systems result in a loss of supply and thus a loss of a human right.

Translating the vision of AMRUT 2.0 into reality and meeting SDG 6.1 requires serious efforts to be channelised into addressing existing bottlenecks from the policy perspective. Operational efficiencies can only emerge within the existing institutional frameworks with decentralised functions and ringfenced approaches to resources. The below non-exhaustive list can

help address such challenges and help achieve sustainable and efficient water supply systems that can cater to 24x7 water supply.

Sustained Political Commitment

The water assets in the capital-intensive water sector outlive an electoral democracy that encourages short-term decision-making. To ensure the sustainability of the interventions made in the water sector, emphasis has to be laid on managing the water assets with a much longer-term in view, beyond 2030 to achieve the goal of universal

AMRUT 2.0 is a step towards AatmaNirbhar Bharat to make the cities 'water secure'

access to safely managed service levels, as highlighted in AMRUT 2.0. This requires coordination and collaboration through integrated planning as well as all political factions agreeing to continue the set direction and policies.

Availability of Reliable Data

The reliability of data on supply systems, on water abstracted and treated, and on population served becomes a crucial indicator for achieving the Sustainable Development Goals. Reliable data also determine what has to be done, how it will be financed, human resource requirements and developments, and realistic improvement delivery planning. Achieving reliable baseline data and putting in place effective management and operational database systems require planning

and investment. Included in the data system would be responsibilities for reporting to the JMP on progress and the processes for collecting, analysing and verifying the performance data.

Integrated Investment Planning

If planning is annual as part of annual budgeting with independent decisions on large infrastructure projects, the short vision does not allow for integrated investment decisions and the focus is diverted towards obtaining budget approvals and associated government subsidies. In contexts where countries focus on detailed design plans for infrastructure for 20 years or more in the form of master plans, they are expensive, not water-consumer service driven, and do not provide flexibility to address unpredictability; nor do they allow for the benefits of future improved technology.

Therefore, the requirement is for long-term strategic plans and short-term delivery plans. With SDG 6.1, a strategic plan leading to achieving that goal in 2030 would be appropriate where it describes the 'what' and the 'when' expressed in terms of service delivery standards. Reflecting water service reform laws stated government policies and the responsibilities of the various stakeholders, and an indication of investment and funding. On the other hand, the delivery plans focus on "delivery" intended to improve the situation technically and operationally over a fixed timeline, with human and financial resources ringfenced for monitoring and reporting.



Source: Government/ GIZ reference/pic

Water costs are dominated by water distribution with infrastructure construction and life costs around 65 per cent of total supply costs.

Spatial Planning to Secure Water Resources

Water storage becomes even more important with apparent greater uncertainty for rainfall due to climate change. In addition to increased lake and reservoir capacity, the storage capacity of aquifers requires greater attention. Over-abstraction causes water quality problems and lower groundwater levels suggest that there is much unused underground storage capacity. Controlled runoff through creating 'contour bunding' has benefits of groundwater recharge, reduced soil erosion, improved irrigation and improved water quality. This can be done on a

large scale. It costs very little in areas where people are pleased to provide labour. Rainwater harvesting from roofs and other hard surfaces can add to the overall storage capacity. Storage should be considered in an integrated way.

Water Distribution & Leakage Management

The importance of leakage management is most evident in achieving continuous supply. In intermittent supplies, the safety of drinking water is at great risk through the frequent pressurisation and depressurisation of the pipes that deteriorates the system and leads to increased leakage at joints. The resulting reduction in pressure is offset by increased pumping pressure, leading to higher leakage and a cycle of decline. As a result, consumers lose confidence which impacts payments.

There is also a lack of incentive to lay or fix water distribution infrastructure instead of building water treatment plants that are politically more appealing. Water costs are dominated by water distribution with infrastructure construction and life costs around 65 per cent of total supply costs. The required investment in piped distribution systems will be

the dominant cost of achieving SDG 6.1. The neglect of distribution systems has impacted the creditworthiness of utilities for effective maintenance to be carried out which has led to high levels of leakage. Non-revenue water (including commercial and physical losses) typically ranges between 15–30 per cent. In India, leakage is not measured primarily because either supply meters are dysfunctional or distribution zone meters and consumer meters are absent where water charges are levied as a fixed sum.

Distribution Networks

What are the challenges in moving from intermittent to a continuous water supply? First, it requires a significant proportion of available investment money, phased over time. Second, the system deteriorates with new leaks as existing leaks are fixed. The solution is to form distribution metering areas (DMAs) which are small enough for an affordable rapid rehabilitation and can be maintained 24x7 as the rehabilitation progresses from one DMA to another until the whole urban area is completed. This has been attempted in the cities of Nagpur, Coimbatore, Hubli-Dharwad, Belgaum, and Gulbarga, where a part of the city was metered and networked to achieve continuous water supply before undertaking similar interventions in other parts of the city. In December 2021, the Ministry of Housing and Urban Affairs (MoHUA) with support from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH organised a Technical Conference and Exhibition to inspire cities to make efforts toward 24x7 water supply systems and adopt the principles of the circular economy for the water sector².

2. <https://pib.gov.in/PressReleasePage.aspx?PRID=1783919>




Source: <https://tapwater.co/en/wp-content/uploads/sites/13/2019/04/tap-water-in-india.jpg>

In India, over 20 cities including Puri have recently made attempts to move towards continuous systems.

In India, over 20 cities including Puri have recently made attempts to move towards continuous systems either fully or partially which were exhibited during the event. However, it was clear that it is a long journey to ensure Indian cities moved toward this system. As part of AMRUT 2.0, cities need to adopt integrated water resource management with water conservation through recycling of used water, control of NRW and rejuvenation of water bodies and also to take up 24x7 water supply projects at least in one ward/DMA. This

requires a good network analysis of the distribution system which often does not exist, moreover, the data for building models does not exist. Investment of time and resources to make data available to build the models will be essential. This will help identify leakage and make the system more efficient.

In conclusion, achieving continuous water supply requires the recognition of the 'governance' problem in addition to an 'engineering' problem that requires various stakeholders at different levels to coordinate and collaborate with a ringfenced approach to human, financial and institutional resources. Such an integrated approach will help achieve the objectives of AMRUT 2.0 and SDG 6.1 and achieve welfare goals such as eliminating hunger, reducing inequality, and ensuring good health and well-being. 

The views presented in this article are of the authors and not of the organisation.

Pathways for Achieving Drinking Water Security in Urban India

In line with the United Nation's Sustainable Development Goal 6 'clean water and sanitation for all,' the second phase of the Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0) envisages providing tap water connections to households in all the statutory towns and sewerage services in 500 selected cities in India, writes **Nitin Bassi**, Programme Lead (Water), Council on Energy, Environment and Water (CEEW).



NITIN BASSI

Programme Lead (Water), Council on Energy, Environment and Water (CEEW).

The targets under the AMRUT 2.0 translate into providing new tap connections to 26.8 million households and new sewerage services to 26.4 million households by 2026 for which an allocation of Rs 2,770 billion has been made by the Government of India, 2021.

This is an enormous challenge for water utilities in urban areas, where the existing water supply systems are unable to meet the domestic water demand due to system inefficiency and poor coverage. In some of the major cities in India, the unaccounted-for water losses, which are referred to as non-revenue water that includes leakages and non-billed consumption, vary from 40 per cent to 65 per cent of the total water production (Figure 1).

The water supply is highly unreliable and intermittent with many cities receiving water only for two-three hours a day. In many suburban areas, public water supply and sewerage infrastructure are non-existing.

Once the physical infrastructure under AMRUT 2.0 is completed, water will be required for the new connections. This will need proper planning and both water supply augmentation and water demand management interventions. Some of these are discussed henceforth.

Water Accounting and Water Balance

First of all, a city-level water account that provides the details on the amount of renewable surface water and groundwater available for supply, consumptive water use in the domestic sector, administrative and technical losses in water supply, and wastewater return flow during a particular year need to be prepared. Such exercise will help the water supply utilities in deciding the type of interventions (i.e., supply augmentation, demand management, or both) required to ensure household-level water security.

The AMRUT 2.0 has made a step in the right direction. It suggests cities prepare the City Water Balance Plans (CWBPs) which should provide the status of water sources, the quantum of water available, water demand and supply in the city, and the deficit. The ultimate aim of preparing CWBPs is to formulate projects to address the water deficit. Water supply utilities should take up preparing water accounts and water balances as a priority.

Augmenting Supplies

Due to the unregulated pumping from the aquifers in urban and peri-urban

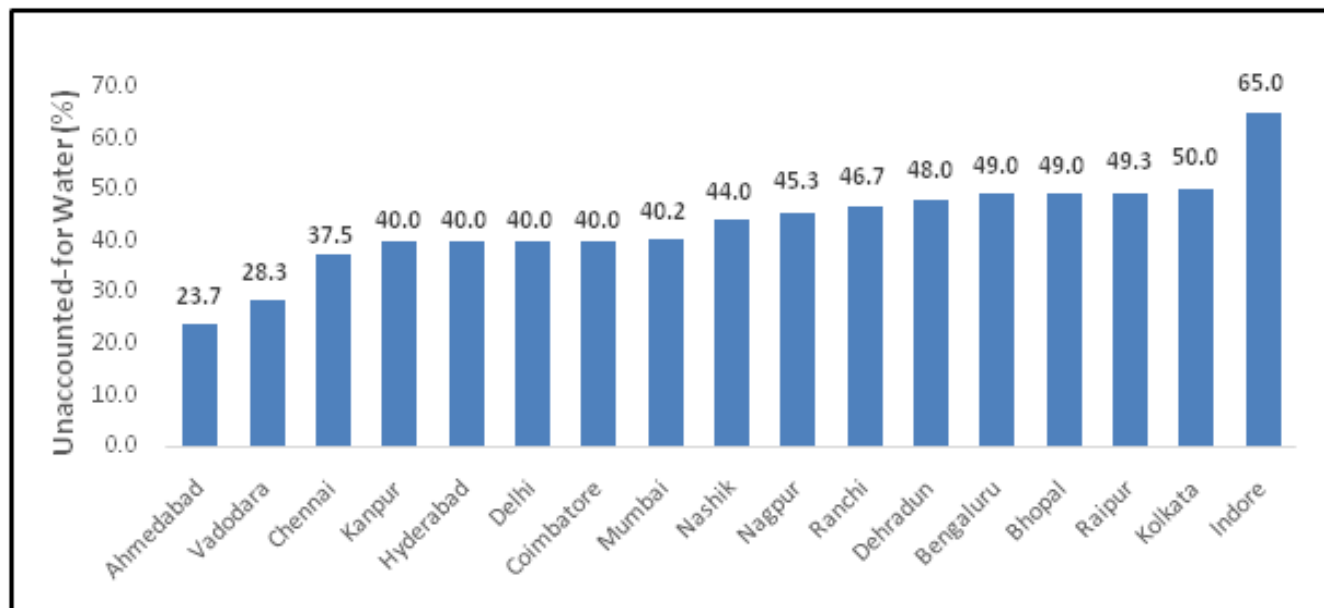


Figure 1: Unaccounted-for water losses (as a percentage of water produced) in selected cities of India (data range is from 2016 to 2021)

Source: Author's analysis using data from the urban local bodies and the Centre of Water and Sanitation, CEPT University

areas, most of the annual renewable groundwater is utilised before the onset of summer. The situation becomes critical during the dry years when the recharge itself is low. In several urban areas, groundwater is unfit for domestic use due to the presence of harmful contaminants including heavy metals. Already, many cities are dependent on surface water reservoirs located in the far-off catchments for the domestic water supply. Major parts of Delhi get water from a source which is about 220 km away in Haridwar through the upper Ganga canal; Bengaluru from the Cauvery River at a distance of about 100 km; and Hyderabad from Krishna and Godavari rivers, with withdrawal sources located several hundred kilometres away. As the cities continue to grow, the distance of transfer has only been increasing. Only a small proportion of the water supply in such cities is met by local water sources which include lakes, and wells. For instance, in Delhi, less than 10 per cent of the total water supply is from groundwater.

Thus, to ensure year-round domestic water supply to the urban households, provision needs to be made to ensure that the local water resources are augmented. Importing surface water from distant reservoirs is one option. Considering such a situation, investments are required not only for individual household connections but also for the conveyance of water from a distant source.

Sewage Treatment and its Reuse

As per the estimates of the Central Pollution Control Board (CPCB), about 72,368 million litres of sewage is generated per day from urban centres in India (CPCB, 2021). However, the capacity exists to treat only 44 per cent of this. The sewage treatment capacity in the metropolitan cities is substantially higher (51 per cent) than in Class I cities and Class II towns where it is 18 per cent and 9 per cent, respectively. Nevertheless, there is a need for expanding the treatment infrastructure, thereby increasing the

availability of treated wastewater that can be made available for reuse.

The AMRUT 2.0 envisages that at least 20 per cent of the city water demand and 40 per cent of the total industrial water demand at the state level should be met by treated wastewater. Though there is a social stigma attached to reusing treated wastewater in households, some states in India (including Chhattisgarh, Gujarat, and Haryana) have framed policies to promote treated wastewater for industrial and other non-potable purposes (public parks, gardens, etc.). Nevertheless, with highly variable rainfall and growing urban water demand, the time has come to make it mandatory for groundwater recharge (using natural lakes or artificial reservoirs as recharge structures) and for agriculture in urban areas. Subsequently, with the use of better treatment technologies, efforts should be made to bring treated wastewater to a quality that is acceptable to the community for human consumption.

Water Pricing

The AMRUT 2.0 envisages reducing non-revenue water to below 20 per cent. The need for reducing unaccounted-for water losses and promoting efficient water use through installing household water meters and pricing of water that includes resource cost, the cost of water treatment, and cost of conveyance and distribution, has been suggested in the past (Gordon-Walker and Jalakam, 2011; Bassi and Kumar, 2012; Kumar, 2014). Yet most Indian cities are struggling hard to implement them due to a lack of political commitment (fear of losing votes if domestic water is priced), the absence of an institutional framework for proper pricing, and the shortage of human resources for meter reading and billing.

Though a substantial proportion of the urban households are charged for public water supply at present (except for some eastern and north-eastern India) (Figure 2), water tariffs for domestic consumption have remained highly subsidised leading to its inefficient use. Even in the National Capital Territory (NCT) of Delhi where the annual per capita income is among the highest in the country, 20 cubic metres of water is provided free to each household having metered connection every month. As a result, about 68 per cent of such households get a 'zero' bill. It is high time that water tariffs are revised and water usage is charged on a volumetric basis. The water regulatory authority should play an increasing role in setting the water tariff for various purposes including domestic water consumption. From the long-term perspective, the water tariffs should be able to cover operation and maintenance costs,

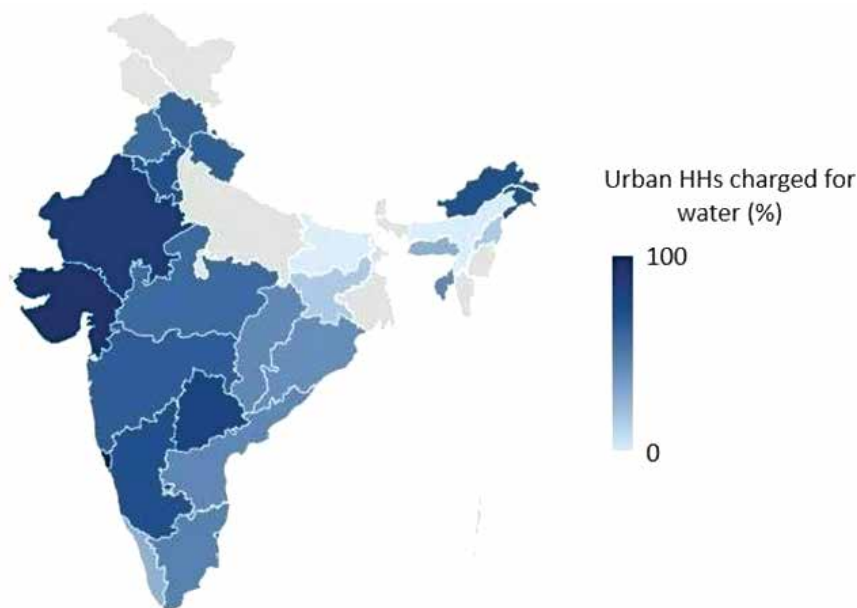



Figure 2: Percentage of urban households (HHs) that are connected to public water supply and charged for water in each state, 2017-18

water supply infrastructure repayment, and contribute to capital development. To ensure water security for marginalised households, targeted subsidies can be provided to those who are below the poverty line or in the economically weaker category once they are connected to the public water supply. Presently, many such households pay more for water as they have to depend on informal private vendors to meet their water demand.

Conclusion

Drinking water security is the foremost requirement and most crucial for the well-being of society at large. The AMRUT 2.0 has taken a step in the right direction by aiming to connect all the urban households with individual tap connections. However, given the climate variability and increasing water demand from the urban areas, the water supply sources must be sustainable to ensure a year-round supply. Preparing city-level water accounts and water balance can guide the urban water utilities on the type of

interventions that might be needed. In terms of supply augmentation, imported surface water appears to be the best bet. Further, the reuse of treated wastewater for non-potable purposes (initially) and recycled water for potable purposes (with the improvement in technologies) can reduce pressure on freshwater resources. However, the metering of water connections and appropriate pricing is crucial to encourage efficient use of water and manage the water demand. These pathways offer a great potential to realise the dream of providing a 24X7 water supply to all urban households in India. 

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Source: Prepared by the author based on data presented in Government of India, 2019. Note: Jammu and Kashmir, Ladakh, Manipur, Mizoram, Sikkim, Uttar Pradesh, and West Bengal did not report data.

Reimagining Water & Sanitation in Cities with NUDM Standards

Governments worldwide aim to make civic services accessible to the citizens in their locality and ensure efficiency, transparency & reliability of such services at affordable costs. In order to meet this objective, there is a need to integrate information across departments and organisations for better cooperation and collaboration, write **Padam Vijay**, Technical Adviser, National Institute of Urban Affairs (NIUA) and **Priya Upadhyay**, Senior Program Associate (Standards), NIUA



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An example to the aforementioned scenario could be Multifunctional Centres (MFC) in Russia¹, a program initiated to streamline and standardise activities of public and municipal services through standardisation of data entities, as per municipal legal acts by the principle of "one window" to ensure transparency of public bodies.

The government systems are generally characterised by islands of systems and therefore, standardisation of municipal services is a challenge across the world resulting in lack of interoperability (interlinking of information, systems, applications and ways of working) not only within governmental departments, but also in their interaction with the administration, enterprises, and public.

In the context of Sustainable Development Goal (SDG) 6 - ensuring availability and sustainable management of water and sanitation for all - it follows a century-long international effort by United Nations (UN) to improve water access. However most developing countries manage water and sanitation at the subnational level, yet global monitoring rarely considers local governance. Due to national assessments of the sector, many water experts disagree the results as definitions chosen, data collection and missing data, measurement and analysis strategies are highly uneven progress across regions².

Challenges to evolving sustainable, equitable and efficient management of

1. Alpatov, Y. M., Ostanina, S. S., & Avilova, V. V. (2016). Regulation and Standardization of State and Municipal Services as Imperative of Their Quality and Affordability. IEJME – Mathematics Education, 2442-2454.
2. Herrera, V. (2019). Reconciling global aspirations and local realities: Challenges facing the Sustainable Development Goals for water and sanitation. World Development, 106-117.

water resources are several. But the non-availability of adequate scientific data on quantity and quality of water, demand for water in different sectors, nature and extent and causes of water problems become major hindrances to developing sustainable water management strategies³. The Aspen-Nicholas Water Forum have recommended that the governments should take initiative in the standardisation of data particularly on how to curate, store, and make use of new streams of data that have broad societal relevance for better water management and planning.

India is leapfrogging into the Fourth Industrial Revolution, with government still at the center of that transformation. Digital India was conceived five years ago as a way to push the country's digital transformation forward and empower citizens in the process. The base of these efforts has been the government's emphasis on developing infrastructure to enable affordable internet access for all and for every Indian to possess a digital identity⁴. India has witnessed an unprecedented increase in the scale and pace of urbanisation resulting in rapidly growing problems pertaining to the delivery of basic services – access to water, sewerage system and sanitation.

With a growing economy and changing lifestyles, the pressure on existing services, specially already strained water resources is increasing. Existing data in the sector from regulatory authorities is limited in terms of quality. When different stakeholders refer to different sources of information and have different points of view, it is difficult to identify successful solutions to the increasing challenges in

provisioning of water supply and sanitation.

Although water and sewerage (W&S) data is widely available on the type and location of drinking water sources used by households, availability and safety of drinking water are available through a combination of household surveys and administrative sources including regulators, census and various other sources, yet the data entities and definitions are still to be standardised in India.

Standardisation ensures that all government agencies including ULBs, can have basic minimum provisions to enable & provide transparent, efficient, reliable and accountable services.

To solve these issues in government service delivery and bring an ecosystem with data driven approach to problem solving, the Ministry of Housing and Urban Affairs launched National Urban Digital Mission (NUDM)⁵ in February 2021 which aims to streamline and coordinate efforts of the urban ecosystem and thus to improve the ease of living for citizens by creating a national urban digital ecosystem that delivers accessible, inclusive, efficient and citizen-centric governance in India's 4700+ towns and cities.

One of the key deliverables under NUDM is creation/adoption of municipal governance standards to promote data usage, data driven governance and to enable interoperability (foundational, structural & semantic) of data, processes and systems in urban local bodies (ULBs), in a secure manner. These initiatives are being undertaken by NIUA in coordination with the relevant urban stakeholders. The following standards (in various stages of development/ adoption) are identified for NUDM:

1. Municipal Governance Reference Architecture as a reference blueprint for platforms
2. Domain Knowledge Standards with key data elements and their standardised data interpretation
3. API definitions for standardised integration with the National Dashboard
4. Security Assurance Standards for enabling data privacy controls
5. National meta-data standards for data quality enablement in State/ UT & National dashboards.

These standards are one way to ensure that different components of a large mission/ program can be built independently, in geographically different places, at different times, by different agencies and yet the components can interface, interact and transact in a consistent and robust manner, without loss of information and interpretation. Standardisation gives a way to ensure that all government agencies including ULBs, can have basic minimum provisions and methods to enable and provide transparent, efficient, reliable and accountable services.

The Domain knowledge standards, as mentioned above, are aimed to encourage data culture in ULBs as well as solve the pressing issue of semantic interoperability. The standards can further help by;

- identifying and categorizing

3. The Aspen Institute. (2015). Data Intelligence For 21st Century Water Management - A Report From The 2015 Aspen-Nicholas Water Forum. United States of America in 2015 by The Aspen Institute.

4. Gupta, A., & Auerswald, P. E. (2019). The Ups and Downs of India's Digital Transformation. Retrieved from Harvard Business Review: <https://hbr.org/2019/05/the-ups-and-downs-of-indias-digital-transformation>

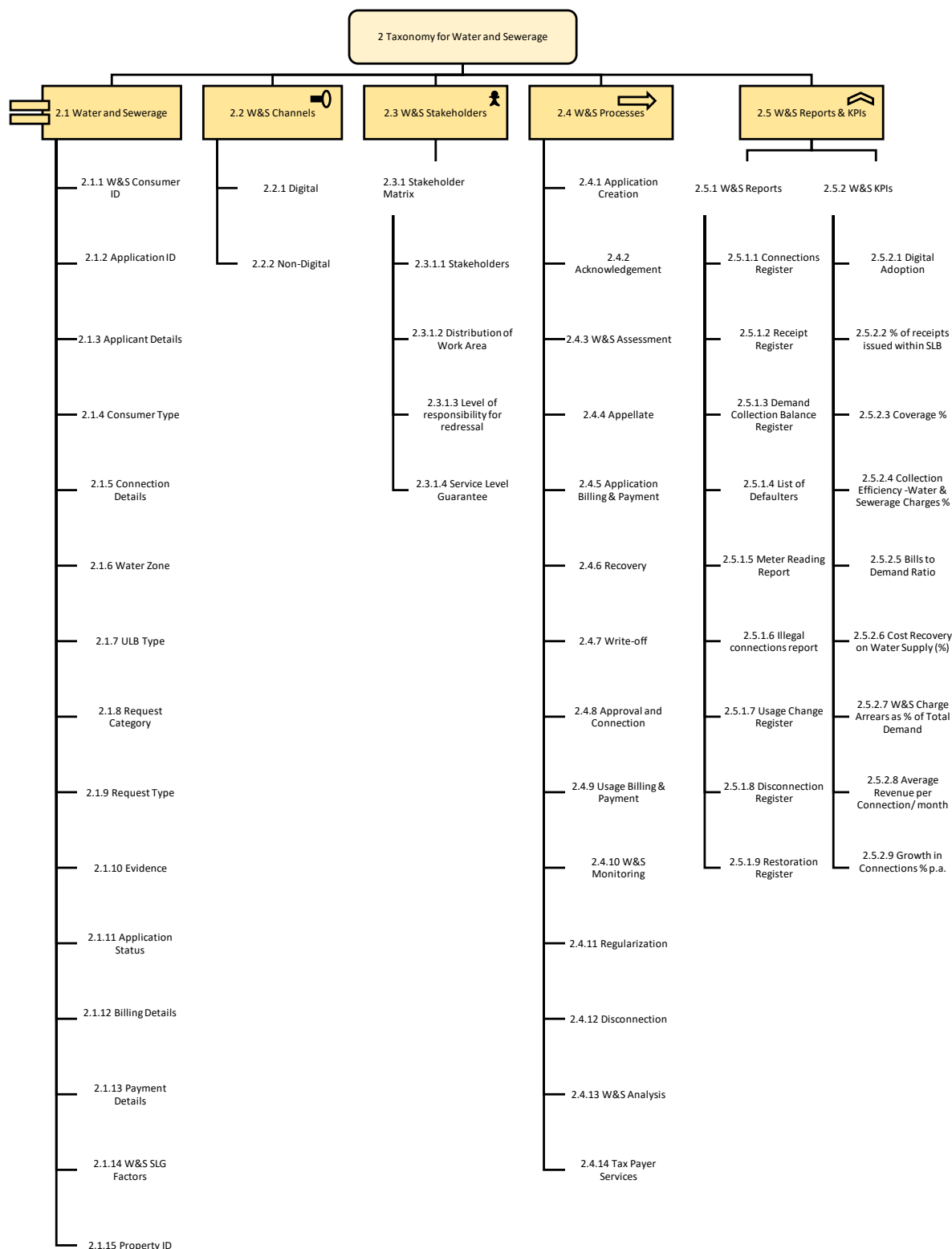
5. Ministry of Housing and Urban Affairs. (2021, February). National Urban Digital Mission. Retrieved from National Urban Digital Mission: <https://nudm.mohua.gov.in/about-what-is-nudm/>



Ministry of Housing and Urban Affairs
Government of India



National Institute of Urban Affairs



important data elements for a domain

- resolving differences in terminology for urban governance
- analyse current city domain models, processes, reports & KPIs, thus, retrofitting existing data models and methods with missing data

NIUA has recently released the DRAFT Knowledge Standard for Water & Sewerage which is under wider industry consultation. These standards have been prepared in consultation with various urban stakeholders comprising government agencies, academia, industry, citizen community, practitioners, etc. and provide a holistic approach to solve the pressing issue of data inconsistency in the domain of water supply and sewerage. It will help the ULBs to collect, collate and analyse the data in a systematic manner. The standard aim to enable common language across the service provisions which will help the governments to obtain interoperability and comparability.

Adoption of the Water & Sewerage Knowledge Standards will enable ULBs to directly apply the data elements in their day to day operations for eg; the data captured through various access channels will help in assessing the digital adoption of the service amongst users. This will also help in analysing how many users need an intervention to access services through physical or digital channels/ assess, whether the services are accessible to the marginalised section of the society.

Also, the quality of municipal service is considered as the degree of satisfaction of customer's expectations, compliance with the prescribed requirements and Service Level Guarantees (SLG), the ULBs can monitor the requests as per SLGs to plan and deliver better service. By using the data from these indicators, ULBs can implement corrective



Source: <https://images.trbunindia.com>

Safe drinking water in schools needs immediate attention

Standardisation ensures that all government agencies including ULBs, can have basic minimum provisions to enable & provide transparent, efficient, reliable and accountable services.

measures to achieve SDG 6.1 (achieve universal and equitable access to safe and affordable drinking water for all).

The standards will pave a way for better planning and decision making in W&S based on real-time data on water & sewerage demand and supply by simply analysing a number of connections, type of connection, area of connections etc. It also provides an opportunity to collect data on water conservation, land use, leakages and pollution which are some of the direct concerns in achieving the SDGs.

Adoption of the standards is not only beneficial for ULBs and solution providers, but it also provides new ways

and methods of understanding the problems in the water & sewerage sector opening a number of opportunities for innovations and solutions to solve the persisting issues in the sector.

Leveraging the use of standards will certainly help in better management of resources, planning and provision of equitable and universal access to the water supply. Also, enabling a mechanism to monitor and localising SDG 6 based on relevant data.

Domain knowledge standards are part of the many initiatives that NIUA is taking in bringing an ecosystem approach to municipal services. Going forward, we are planning to initiate work on the adoption of these standards, developing new standards for technology integration and enhancement. We strongly believe that Standards cannot be a silo approach and participation of the entire value chain in the urban domain including industry, academia, civil society and government organisations is crucial to develop something which can be put to use for efficient and effective municipal service delivery by engaging in activities such as capacity building and adoption of standards in various systems. egov.in

Source: <https://images.indianexpress.com/2018/12/groundwater-act.jpg>



Overexploitation of groundwater

Uttar Pradesh Moving Beyond Basics to Achieve SDG 6

India being the second-most populous country in the world will be a major contributor to the achievement of Sustainable Development Goals (SDGs) globally. One of the most crucial goals is SDG 6 that states - By 2030, ensure inclusive access to clean water and sanitation facilities. This article by **Farrukh Rahman Khan**, State Program Director, WaterAid intends to draw attention to Uttar Pradesh's efforts to localise SDG 6 in the State.

In 2015, United Nations (UN) member nations agreed to the UN Sustainable Development Goals – a list of 17 goals targeted to solve the problems of poverty and hunger and tackle the effects of climate change, among other challenges. The 2017 World Health Organisation (WHO)/ United Nations International Children's Emergency Fund (UNICEF) Joint Monitoring Programme Report states "Universal implies all settings, not only to households, but also schools, health

care facilities, workplaces and other public spaces. In fact, SDG 6 is of paramount importance as it is closely associated with or impacts most of the goals' targets which are ending poverty and hunger, health, food security, climate action, reducing inequalities, decent work and economic growth, responsible consumption and production, sustainable cities & livelihoods for millions of people across the globe, especially in the developing world. SDG 6 should also be viewed from the perspective of basic human

rights as enshrined in Article 21 of the Constitution of India and as It was recognised by the UN General Assembly on 28 July 2010.

India being the second-most populous country in the world will be a major contributor or influencer on global SDG performance. With over 200 million population, Uttar Pradesh (UP) is the most populated state in India as well as the most populous country subdivision in the world. Had it been an independent country the state would



FARRUKH RAHMAN KHAN
State Program Director, WaterAid

be the fifth most populous country and therefore has a critical contribution towards achieving national and global goals. While UN Sustainable Development Report 2021 ranks India 120 out of 165 member countries, In Niti Ayog's SDG index ranking of states for 2021-22, Uttar Pradesh was ranked 25th amongst 28 states for overall SDG ranking and 20th in reference to SDG 6. However, it improved its aggregate to 60 against the national average of 66 and ranked as a 'performer' state, ahead of Bihar, Jharkhand and Assam and a "Front Runner" state in reference to SDG 6.

Though the UP has undertaken several affirmative steps in the recent past towards achieving the targets under SDG 6 and indicators set for the state as outlined in the State's Vision 2030 Document and moving on the right path in terms of enabling policies and programs, the significant ground is to be covered in terms of execution and reaching the last miles. Though the state has achieved 100 per cent Open Defecation Free (ODF) target under the Swachh Bharat Mission, 12 per cent of all rural households with access to toilets had been categorised as LOBs (Left Out of Baseline) – the highest out of all states and Union Territories (UTs).

Similarly, even though the state has made significant progress in terms of tap water supply to rural households from a mere 1.95 per cent in August 2019 to 13.51 per cent covering 35,70,922 households as of date under the Central government's ambitious flagship scheme Jal Jeevan Mission, over two crore households remain yet to be covered by 2024.

Even though UP is amongst the states with the slowest urbanisation rate (22 per cent as per the 2011 census), with such a huge population, even a slight increase in the urban population will lead to drastic changes on the ground. For example, an increase of just 5 per

cent in the urban population share of Uttar Pradesh means almost a crore more citizens in the urban areas adding significantly to the demand-supply gap for water supply and safe sanitation.

It is also significant that Uttar Pradesh alone covers about 28.68 per cent area of the entire Ganga basin, which extends over 11 states of the country and comprises the most fertile and productive land, known to have vast water resources potential. However, major dependency on groundwater sources poses an imminent threat to the water crisis in the near future.

With the current rate, the projected gross extraction in the state may reach up to 70 bcm or more by 2030 and is expected to cross over the recharge/extractable resource and might put the entire UP in a stage of overdraft.

Presently, groundwater caters to about 70 per cent of agricultural demand in the state, besides fulfilling about 90 per cent of rural domestic needs and more than 75 per cent of urban water consumption. Also, groundwater meets 95 per cent of industrial, infrastructural, and commercial demands.

Amongst all the users, agriculture in the state is highly dependent on groundwater with more than 37 lakh shallow tube wells extracting about 41 bcm of groundwater annually, which is about 90 per cent of the total groundwater extraction in the state.

Another point to be noted is that 35-40 per cent of total irrigation wells in the country are located in Uttar Pradesh. With the current rate, the projected gross extraction in the state may reach up to 70 bcm or more by 2030 and is expected to cross over the recharge/extractable resource and might put the entire state in a stage of overdraft. The declining rainfall, impacting the natural recharging of aquifers, is making the situation worse. Around 30 districts in the state have reported water quality issues. High Fluoride content in groundwater has been reported from 16 districts while 29 districts have reported the presence of Arsenic in the groundwater. The state needs a water safety and security plan in place to ensure the sustainability of its water resources.

As emphasised in the opening para, the state needs to invest significantly and judiciously toward water and sanitation infrastructure and services contributing to the targets under SDG 6. Achieving this, directly or indirectly, will impact positively towards achieving the targets under other SDGs as well. Besides, the catastrophic waves of the COVID 19 pandemic have also made us realise that the importance of water and sanitation infrastructure is bound to grow as the most effective preventive measure to contain the pandemic in the near future.

Various studies and research have proved that investment in WASH facilities across the business supply chain provides the opportunity to increase workforce productivity and grows the supply security of the product. Cost savings across the supply chain are of benefit to both producers and consumers which will, in turn, increase economic efficiency. Hence, as the state government is aspiring to become a USD 1 trillion economy by 2027, investing in the improvement of water and sanitation infrastructure would be a critical and wise step. 

UP Strides For Water Security For All

The success of a government is measured by the amenities it provides to its citizens. And safe drinking water is one of the biggest factors that determines this success. Uttar Pradesh government has been working continuously towards achieving this target, specially in the drought hit and rain scarce regions of Bundelkhand and Vindhyanchal. **Tarannum Manjul of Elets News Network (ENN)** shares an in depth report.

times of Chandel and Bundela kings, but now a large number of these wells as well as ponds have dried up. Every year, new ponds and water structures are commissioned and developed, but the water crisis remains intact.

The Government of Uttar Pradesh, led by Chief Minister Yogi Adityanath, has been working to ensure drinking water for all. Adhering to the UN SDG 6, the state government has committed to provide clean drinking water to all its citizens. The Uttar Pradesh government has already made the Namami Gange and Rural Water Supply department execute schemes like Har Ghar Nal - Tapped Water in Every house - in the state.

Ensuring that no person suffers from shortage of pure water this summer, the Namami Gange and Rural Water Supply Department are working on a war footing to provide the benefits of schemes like 'Har Ghar Nal' scheme to hundreds of villages in seven districts of Bundelkhand and two districts of Vindhya, which are facing water scarcity. Owing to the sustained efforts of the CM Yogi Adityanath-led government to provide pure and safe piped drinking water in water-stressed regions, under the Har Ghar Nal scheme, potable water has reached as many as 59,202 houses, benefiting nearly 2,36,808 people.

In addition, various older schemes have also been started afresh in Bundelkhand and Vindhya. With this scheme of retrofitting, water supply is being provided to more than 1,02,445 houses and more than 4,09,780 people have benefited. The government has completed water-supply related works under the scheme in more than 60,000 villages, due to which these areas are now getting water supply in abundance.

With the efforts of the government,



Making piped water accessible to rural & remote parts of Uttar Pradesh

Uttar Pradesh is a state that has a huge disparity when it comes to water distribution. The state has issues like drought and floods at the same time in the same season. Ensuring safe drinking water to every household is an issue that raises its head time after time, yet dies an untimely death due to lack of sustained efforts.

The drought hit regions of Bundelkhand and Vindhyanchal have been the lowest when it comes to providing safe drinking water to every household. The seven districts of Bundelkhand are united by one common crisis: water scarcity. Every year, thousands of families are forced to flee the region and migrate. According to official records, there were about 10,000 ponds in the region. There are innumerable wells commissioned in the

water connections have been provided to more than 1037 houses in Jhansi. Water connections have been given to more than 5414 houses in Lalitpur, 5203 in Jalaun, 5779 in Hamirpur, 9658 in Banda, 2902 in Chitrakoot and to 11,279 houses in Mahoba. Besides, the government is also working on a mission-mode to provide functional household connections to over 17,930 households in Mirzapur and 3,21,403 households in Sonbhadra. Retrofitting schemes completed in Mirzapur, over 24,150 households were provided with clean drinking water.

In the nine districts of Bundelkhand and Vindhya, old schemes that were either incomplete or non-functional have been completed by Namami Gange and Rural Water Supply Department in a time-bound manner. Nearly 59 out of 62 retrofitting schemes have been completed in Mirzapur and more than 24,150 households have received pure water. Water connections have been given to more than 10,974 houses in Sonbhadra. While 9156 households in Jalaun, 20,969 in Jhansi, 1450 in Lalitpur and over 11,966 households in Mahoba have been benefited. Water supply connections have been provided to more than 10,554 households in Hamirpur, 835 households in Chitrakoot, and in 12,391 households in Banda.

In arsenic affected areas of Bundelkhand and Vindhya, Namami Gange and Rural Water Supply Department are working to provide drinking water supply to more than 26,900 houses, benefiting over 1,07,600 people from the scheme. Through two ongoing schemes in Jalaun, water connections have been provided to 1189 houses in Jalaun, 2400 in Jhansi, 5184 in Lalitpur, and to over 5062 houses in Mahoba. Water connections have also been given to 1686 families in Hamirpur, 1219 in Chitrakoot, and to a maximum 4596 households in Banda.



Under the Har Ghar Nal scheme, UP Government is working to provide tap water connection to each household across the State

The UP government is working on the target of providing 59 lakh tap water connections in the current fiscal, 85.40 lakh in 2022-23 fiscal and 90.01 lakh in 2023-24.

It may be noted that the Bundelkhand region receives relatively little rainfall and is a dry region. After taking charge in his first term, CM Yogi Adityanath started emphasising on the expansion of irrigation capacity and rainwater harvesting in Bundelkhand as part of his resolve to provide 'Har Khet ko Pani'. It was decided to build a total of 269 check dams and 219 ponds in the third phase of Bundelkhand package. With this significant move of water conservation, the government also aims at raising the groundwater levels to provide safe drinking water.

The Principal Secretary, Namami Gange and Rural Water Supply Department Anurag Srivastava has directed to regularly monitor the functioning of the water treatment plants as well as to check the water lines laid at various levels. He has also directed to stop the leakage and wastage of water in the waterline at any cost. Water supply works are on the verge of completion in most of the villages of Bundelkhand.

The Har Ghar Nal Yojana, which is running with the help of the Central Government, is being completed about 6 months before the scheduled time. Pure drinking water will not only help people quench their thirst, but also help them stay away from several water-borne diseases.

Significantly, under the Jal Jeevan Mission, the Government of Uttar Pradesh has so far provided 31.76 lakh water connections out of 2.63 crore families in over 97,000 villages. Not only this, the government has provided 19.15 lakh tap connections in the last financial year. The state government is working on the target of providing 59 lakh tap water connections in the current financial year, 85.40 lakh in the

financial year 2022-23 and 90.01 lakh in the financial year 2023-24.

Piped water for Bundelkhand & Vidhya to be a prime target

A total of 467 piped drinking water schemes have been implemented in 32 projects under the Jal Jeevan Mission in Bundelkhand region. Of these, 43 are surface water based schemes and 424 are groundwater based. Through these schemes, arrangements will be made for 11,95,265 functional home water connections for a total population of 72,68,705 of 3823 revenue villages. Clean drinking water will be supplied to a total of 11,95,265 households. These projects will benefit 40 tehsils, 68 development blocks and 2608 gram panchayats of seven districts of Bundelkhand region, while there are total 162 piped drinking water schemes under 17 projects under the Jal Jeevan Mission in Vindhya region. There are 22 surface water based schemes and 140 groundwater based schemes. Under these schemes, 6,69,508 functional house water connections (FHTCs) have been provided for a total population of 40,45,943 of 2,961 revenue villages and this will supply pure drinking water to a total of 6,69,508 households.

What official figures say

According to an official statement, the Government of Uttar Pradesh provided 1.915 million tap connections in the 2020-21 fiscal. While in the 2021-22 fiscal, the state planned to provide 5.9 million tap water connections. In 2022-23, the aim is 8.54 million tap water connections while in 2023-24, the final nine million taps will be provided. Amongst the districts, Baghpat in Western UP has the highest tap water coverage at 43.44 per cent, whereas the Central UP district of Sitapur has the



Rejuvenation of pond in Bundelkhand, Uttar Pradesh

Source: <https://sruvabhara.com>

Nearly 59 out of 62 retrofitting schemes have been completed in Mirzapur and more than 24,150 households have received pure water.

lowest coverage at 3.03 per cent.


The 2019 data of the Department of Drinking Water and Sanitation shows that 63 of the total 75 districts in Uttar Pradesh have fluoride present in amounts above the permissible limit of 1.5 milligram per litre (mg/l). Further, 25 districts are affected by high arsenic (above 0.05 mg/l). Almost 18 districts, including Sitapur and Lakhimpur Kheri, have both high arsenic and fluoride in their groundwater.

The state has a target of 100 per cent tap water connection coverage by 2024 across all its rural households in 97,000 villages. A press statement dated August 6, 2021, issued by the Ministry of Jal

Shakti, showed that the total assured fund available for the implementation of Jal Jeevan Mission in Uttar Pradesh is more than Rs 235 billion. The Government of India has allocated Rs 108.7 billion to the state under the Jal Jeevan Mission for 2021-22. This was the highest allocation so far to any state, stated the Ministry of Jal Shakti in its statement dated June 12 last year.

Uttar Pradesh bags the 'best state' award for water conservation efforts

Uttar Pradesh was recently lauded for its water conservation efforts, as it won the first position in the Union ministry of Jal Shakti's National Water Awards 2020 in the 'best state category'. This is the third edition of the award given for adopting a holistic approach towards water resources management in India. Rajasthan and Tamil Nadu bagged second and third prizes respectively in the best state (normal) category. The 57 awards were announced in 11 categories including Best States, District, Panchayat and Best Industries.

The Award in the north zone district category this year went to Muzaffarnagar of UP. Balua of Varanasi, Uttar Pradesh won the award for the "Best Village Panchayat" – North Zone. 



Odisha's Puri Exemplifies Achievement of SDG 6.1

SDG 6.1 focuses on the accessibility, availability, quality and affordability of drinking water supply to all households. In this article, **Nikita Madan**, Senior Environmental Specialist, National Institute of Urban Affairs (NIUA) and **Anna Brittas**, Research Associate, NIUA, bring to light the efforts of the Government of Odisha on making safe drinking water available through taps.



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Puri is a coastal town in the eastern part of Odisha, located at a distance of 65 km from the state capital Bhubaneswar and on the coast of the Bay of Bengal. It is one of the most famous religious tourist places in India. The temple town of Puri is now the first town in India where all the residents are receiving 24-hour quality drinking water directly from the tap. This means that in Puri, one can open the taps anytime and get safe drinking water. There is no need to store or filter water anymore.

The Journey of the 'Drink from Tap' Scheme in Odisha

Way back in 2015, the Government of Odisha observed that the water distribution system in the state faced significant challenges such as erratic

supply, inequity in supply, inconsistent pressure, and contamination due to the mixing of water and sewage lines. All of this led to enormous public dissatisfaction.

At that time, only 50 per cent of the households in Puri had piped water connections. The rest of the households had to rely on public stand posts, water tankers or other sources of water. The slum communities largely depended on community hand pumps and other sources, costing them a lot of time and effort in the process. Moreover, due to a lack of adequate infrastructure and metering, around 54 per cent of unaccounted water losses were observed within the system. Puri being a coastal town is also prone to cyclones, causing frequent disruption to the water supply service. Poor service coverage, poor water quality, intermittent supply and high-water losses were the predominant water supply challenges that required to be addressed.

In 2017, there was a state-wide move to upgrade the water supply infrastructure for achieving universal coverage of piped networks and transition from intermittent supply to 24x7 water supply. Between 2017 to 2020, a five-fold increase in investment in the water sector facilitated this transition, with 6000 km of new pipe network added to the existing infrastructure.

In 2020, after achieving universal coverage and 24x7 water supply across the state, the Government of Odisha moved into higher orbits in the water supply scenario, with the Mission 'Drink from Tap' (DFT), also called the 'Sujal' Scheme. The scheme aimed at providing drinking quality water, round the clock, to every household, even in the sizable slum population. Pilot testing of eight schemes in Bhubaneswar and four schemes in Puri further helped in refining the mission. In July 2021, Puri became the first city in India to provide 'drink



A water treatment plant in Puri

In 2020, after achieving universal coverage and 24x7 water supply across the state, the Government of Odisha launched the Mission 'Drink from Tap' (DFT), also called the 'Sujal' Scheme.

from tap' quality water round the clock to all its citizens.

Under the DFT scheme, the government draws water from the Bhargavi river flowing near the town. The water is then channelised to a reservoir and then sent to a treatment plant at Samang. There, it goes through several treatment processes, before being sent through a network of pipes to the Elevated Storage Reservoirs in each ward, for further distribution to the households.

This mission is unique on several grounds, such as:

- Provision of IS 10500 Quality

Drinking Water to every home, that can be used directly for drinking and cooking purposes without any further need for filtration/boiling/treatment.

- Equitable distribution of water supply with a focus on economically weaker sections/ marginalised communities, by providing taps in each slum household.
- Quality assurance by continuous testing and monitoring in state and divisional level laboratories established on PPP mode, mobile van laboratories deployed for on-the-spot quality testing, and portable field testing kits for checking the household water samples. Sensor-based 'Automatic Chlorine Dosing System' helps in maintaining the appropriate chlorine level to ensure drinking water quality.
- Implementation of IoT driven 'Smart Water Management System', for real-time operation & management of the system, by means of data capture, analysis, decision making and public reporting. This is a one-of-its-kind city-wide deployment of an industrial IoT solution, in the water supply sector in India.
- Enhancing community partnership by involving local women's self-help groups such as 'Jal Sathis', to connect with consumers. They are primarily responsible for facilitating new connections, reading water meters, generating water bills and collecting user charges, sensitising people on water conservation, supporting consumer complaint redressal and household water quality testing.
- Generating public awareness by installing real-time digital display of water quality information in strategic locations, and running a strong IEC campaign called 'Pure for Sure'.
- Reducing the non-revenue water by metering each individual household connection. The new fixtures and fittings installed also reduce the chances of leakage.
- Conducive policy measures and a

hassle-free process for procuring water connections helped in strengthening the community support for the scheme. The implementation by the Water Corporation of Odisha (WATCO) eased the process by treating the household connections as public work, which is served by the agency.

- Building capacities of the technical staff. All the installation and maintenance works are undertaken by plumbers who are trained, certified and empanelled.
- Efficient complaint redressal system with an IVRS based Centralised Customer Care Centre for complaint logging, and deployment of quick response teams for immediate maintenance.
- GIS-based mapping of all the assets and consumers.
- Installation of water fountains at prominent public locations, to minimise the use of plastic bottles and reduce the waste generated in the city.
- Elimination of household investments in private overhead water tanks or underground reservoirs, motor pumps, and RO-based water filters.

Challenges Faced in Implementing DFT

While the discourse on 24x7 or round-the-clock water supply has been ongoing in India for quite some time, ULBs and Water Utilities have not been able to adopt many scalable initiatives to date. The lessons learned from Puri's journey can serve as a useful reference for other cities. Several technical challenges were faced, such as plugging information gaps related to existing infrastructural provisions and consumer databases, ensuring a steady source of water supply, overcoming frequent power outages and reducing the existing physical losses.

Another vital challenge was to convince the public to get connected to the water



Drink from Tap Mission in Puri

Source: Author

The Drink from Tap Mission has been instrumental in saving the time spent by women earlier in collecting water which serves as a key driver in achieving gender parity.

supply system because most households had private borewells. Even after getting DFT connections, a fraction of the residents were sceptical about the quality of the water supply. The special features of this scheme steadily answered a majority of the challenges faced in its implementation. In addition, further improvements are still being made for a smooth complete transition into the new system.


The DFT Mission is further planned to be upscaled, covering each household in all the 114 Urban Local Bodies (ULBs) of the State in a phased manner.

Role of DFT in supporting Odisha to make a mark on SDG 6.1

While the eight global targets of SDG 6

are universally applicable, it is up to the Centre and State governments to decide how they can be incorporated into state-level policies and strategies. The Government of Odisha sets a precedent by envisioning and implementing the DFT mission, keeping in mind its regional context and capacities.

The Drink from Tap Scheme has indisputably supported Odisha to make a mark on SDG 6.1. As per the United Nations and NITI Aayog, SDG India - Index and Dashboard¹, Odisha's performance against SDG 6 has improved from a score of 46 in 2018 to 85 in 2019, and further to 86 in 2020 (scores are out of 100). A visible sign of this advancement is the improved source of drinking water supplied to the households.

Achieving SDG 6, specifically target 6.1 also means supplying water even to those who lack the basic services. By prioritising the urban poor, this mission honours a key tenet of 'equitable' access to water. It has also been instrumental in saving the time spent by women earlier in collecting water which serves as a key driver in achieving gender parity. It is envisaged that the state will further improve its performance of the SDG 6 Indicator, once the scheme is upscaled in other cities. 

1. <https://sdgindiaindex.niti.gov.in/#/state-compare?goal=6&area=IND021&timePeriod=2020>



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