'Journal of Research & Development'
A Multidisciplinary International Level Referred and Peer Reviewed Journal,
Impact Factor-7.265, ISSN: 2230-9578, July 2022, Volume-14 Issue-7

Urban Water Management in India: An Analysis

Dr. Tippanna B. Kolkar
Professor of Economics Govt.First Grade College, Kittur Tq: Kittur Dist Belagavi- Karnataka
Email: drtippannakolkar@gmail.com

Abstract: *Today urban area is growing very past with the challenges of infrastructure facilities, among basic facilities water is a critical natural resource for the growing urban areas. Commercial, residential, and industrial users already place considerable demands on this resource, which often requires treatment, may be located at great distance from the city, and is almost always in demand by multiple sectors. According to the UNDP 2006 report, the industrial and domestic water demand expected to double by 2050, competition among urban, semi-urban, and rural areas will likely worsen. Today the world's population has reached 7 billion, and more people live in cities than in rural areas, yet the benefits of city life are not available to all. Water Management involves the fields of Proper water supply, Maintenance of urban drainage, wastewater treatment and sludge handling. The challenges facing today's major cities are daunting, and water management is one of the most serious concerns. Potable water from pure sources is rare, other sources of water must be treated at high cost, and the volume of wastewater is growing. Urban water management is now on the verge of a revolution in response to rapidly escalating urban demands for water as well as the need to make urban water systems more resilient to climate change. At the same time, because of climate change, more frequent and extreme weather events are expected to alter the quality, quantity, and seasonality of water available to urban centers and their surroundings. Cities are facing a series of challenges: on-going urbanization, resource depletion and emissions, an ageing and deteriorating urban water supply infrastructure and the effects of climate change. To meet these challenges and to be able to drive sustainable economic growth, cities need to become smart and tap their innovation potential through the use of Information and Communication Technologies; this will allow us to create cities with a smaller water footprint overall. Urgent actions are needed to combat water stress, to remedy the vulnerability of infrastructures, and to modify water use patterns in agricultural, industrial and domestic processes.*

Introduction

Urban water management is now on the verge of a revolution in response to rapidly escalating urban demands for water as well as the need to make urban water systems more resilient to climate change. At the same time, because of climate change, more frequent and extreme weather events are expected to alter the quality, quantity, and seasonality of water available to urban centers and their surroundings. Cities are facing a series of challenges: City populations are expected to increase and have a growing share in resource consumption and emissions. According to the United Nations, city dwellers are expected to double by 2050, with most of this urban growth expected to occur in developing countries. The need to increase water efficiency and water savings by investing in resource efficiency has been widely acknowledged as one of the top research and policy priorities for the upcoming decades, in view also of the urgency to adapt to climate change. This will be achieved by optimizing the operation of water utilities, thus saving water and energy, and minimizing network leakages and non-revenue water. At the water utility level, smart pressure management and optimized operation based on smart algorithms, network intelligence, and the installation of pressure and flow sensors throughout the network can significantly improve operations, save water and energy, and successfully follow the new trends in cities. The use of relevant ICT and social computing can be instrumental in raising awareness of stakeholders on the significance of the water sector in sustainability, and can be used to change behaviors and attitudes among citizens. ICT can help water managers drive aggressive information campaigns and integrate the water sector with other city services, in order to deliver sustainable services and quality in urban life. Cities located near water bodies may be at risk of climate change-related disasters. In response to such threats, water managers are revisiting conventional practices as they search for efficient ways to ensure human well being while safeguarding the integrity of the resource base. There are many challenges to the efficient and effective operation of the water supply network, especially since leakage levels often remain high, leaking not only water but revenue at the same time, since water distribution is an energy-intensive business, with water being pumped. With an ageing infrastructure, burst rates are rising, while replacing affected network sections requires large capital investments. Given the fact that most networks are still controlled manually, the operational costs of managing these challenges are also rising. Pressure management is really a central issue in tackling the challenges of leakage, bursts and high operational costs. The dilemma faced here is: on the one hand pressure needs to be consistently high enough to satisfy customer needs providing water in adequate pressure, while on the other hand, excessive pressure drives up leakage, burst frequency, energy consumption and operational costs, while decreasing the lifespan of network assets. So, the goal of pressure management is pressure optimization, which usually follows a successful network simulation.

Goal of urban water management

About 30% of people in India live in cities that are expected to double in population by 2050. With a growing economy and changing lifestyles the pressure on already strained water resources is increasing. The government has shown an interest in Integrated Urban Water Management (IUWM) as a new framework and approach for the nation. Some cities already face acute water shortages and deteriorating water quality. The goals of urban water management are to ensure access to water and sanitation infrastructure and services; manage rainwater, wastewater, storm water drainage, and runoff pollution; control waterborne diseases and epidemics; and reduce the risk of water-related hazards, including floods, droughts, and landslides. All the while, water management practices must prevent resource degradation. Conventional urban water management strategies, however, have strained to meet demand for drinking water, sanitation, wastewater treatment, and other Most cities in India are water stressed, with no city having 24/7 water supply. According to the Ministry of Urban Development, 182 cities require immediate attention in regards to proper water and wastewater management. According to official statistics, the coverage of sanitation has increased but resource sustainability and slippages are very common in that coverage. Moreover, in cities with more than one million people, the official water supply after 35% loss in leakages is just 125 liters/day per capita which is considerably lower than the demand of 210 liters/day per capita. Infrastructure development and regulations have not kept pace with population growth and urbanization and as a result wastewater management has become a major challenge. Government has made significant efforts to reduce surface water pollution but they remain jeopardized by the lack of wastewater treatment. An estimated 160 million latrines and septic tanks contribute to 80% of the pollution of the national surface waters.

Situation of Girls pumping from water from communal pump

Effective water governance with an IUWM perspective encompasses many aspects with the main following key elements: adopting a new mind set, a holistic and cross sectoral approach linking urban water management with overall urban planning; adjusting some of the policy and legislation concerning the use of water and reuse of waste water; analyzing aspects of centralized and decentralized management; assessing the economic and financial impact of adopting an IUWM approach; building the capacity of technical and managerial staff; and sharing information with the public and users.

Potential solution for India

So why is IUWM right for India? The IUWM approach is a paradigm shift for urban water management. It is not a prescriptive model but a process that invites existing cities and emerging ones to adjust their current planning and management practices, given their own priorities, in a hydrological, environmental and socio-economic context. It is based on the following key concepts. There is also major groundwater exploitation in urban India as many towns and cities depend on groundwater for their supply. Reform is needed which reduces non-revenue water, groundwater exploitation, considers waste as a resource, and looks at the water cycle in a holistic way. with population growth and urbanization and as a result wastewater management has become a major challenge. Participation of key stakeholders coming from the public, private and social sectors representing different socio-economic activities that have an interest in water in urban areas. There can be many stakeholders involved but an agreement needs to be reached with the representatives of local government who remain the main convener. Not all have the same role and responsibility, but all need to be aware and contribute.

Wastewater Management

Urban wastewater represents a significant pollution load. Where sanitation facilities are inadequate, all available channels become a means for wastewater disposal example, waterborne sanitation systems and pollution mitigation facilities may not be sustainable. World Health Organization guidelines (WHO, 2006a) provide an integrated preventive management framework for safety along the chain from wastewater generation to the consumption of products grown with the wastewater and excreta and recognize that wastewater treatment is one possible component in an integrated risk-management approach. Strict and expensive treatment technologies, however, are not universally feasible or reasonable. Urban water security through a holistic approach implies managing water resources and its waste in a new integrated way, with a focus on: considering the whole urban water cycle as one system within the watershed; aiming for water security through diversity and optimum use of all potential sources of water and matching water quality with purpose of use; aiming for a better utilization of natural systems for water and wastewater treatment; considering storm water/rainwater catchment systems as a potential source; better managing use of water, effluents and water demand and hygiene behavior; strengthening leakage management and maintenance; strengthening resilience of urban water systems that are facing drought or floods. Wastewater is a resource that can be used productively. Grey water can be reused for irrigation, urban agriculture and industrial processes, treated or untreated depending on the purpose of its use and its legislation; nutrients in wastewater can be used for energy production and fertilizer production.

Water quantity

Worldwide, irrigated agriculture may account for 70–80 percent of water withdrawals. Industrial use amounts to an estimated 20 percent of total water use, although this is increasing in urbanizing economies. The proportion of domestic water use is approximately 10 percent of the total. With industrial and domestic water demand expected to double by 2050 (UNDP, 2006), competition over water sources will escalate. Given the pressure on the water resource base, use of existing supplies must become more efficient. Service providers lose large volumes of water to leaks in the distribution system, an estimated 32 billion cubic meters per year worldwide; and illegal connections or shortcomings in water billing account for another 16 billion cubic meters per year (Kingdom et al., 2006). The difference between the amount of water that goes into the distribution system and the amount that eventually reaches – and is billed to – the customer is referred to as nonrevenue water.

Quality of Water

Water scarcity problems, exacerbated by poor water quality, may limit the volume of water available for specific uses. Degradation often results from human activity – intensive agriculture, resource-heavy industries, and rapid urbanization – that distorts natural water cycles and processes across the rural-urban spectrum. In cities, for example, the concentration of built-up impermeable areas means that less water infiltrates to groundwater. The base flows of streams are affected and the volume of surface runoff increases. The resulting storm water flows can convey greater amounts of pollutants, which reduce water quality Nonpoint source pollution can seep undetected into aquifers, damaging downstream ecosystems and drinking water sources.

Water reclamation and reuse

Reclamation and reuse are essential elements of any sustainable urban development strategy. Used water is harvested and treated to different quality standards for reuse in agriculture, industry, and other sectors. Cities can thereby improve human and environmental health, while supporting economic activities and the recycling creates a multiplier effect, whereby a given volume of water can be made more productive. In some peri-urban areas, treating and reusing reclaimed water for food production is an option for increasing food security. Farmers derive a range of benefits from the use of wastewater for irrigation, it is a reliable source that is usually free and readily accessible, and available near their urban market. In addition, wastewater tends to contain significant levels of nutrients, thereby reducing the need for chemical fertilizers. The use of wastewater in agriculture supports the livelihoods of farmers, traders, and other actors along the agricultural value chain. It reconciles the public health and environmental resource protection interests of a city with the local farming community's desire to maintain an agricultural way of life.

Rainwater harvesting

Rainwater harvesting can help address water scarcity at the household level and may be easy and cost-effective to implement. Flow- or roof-water harvesting provides a direct water supply and can recharge groundwater, 62 Integrated Urban Water Management GLOBAL WATER PARTNERSHIP while reducing flooding. Such measures may be an immediate solution to accompany long-term infrastructure improvements in water supply and drainage. To date, comprehensive documentation of the design criteria, costs, benefits, impacts, and constraints of large-scale adoption is generally lacking and would be needed to evaluate the viability of scaling up.

The Future of Urban Water Governance

Sound urban water governance is fundamental to ensuring human and environmental health. It requires robust national policies, plans, and programmes, as well as instruments to measure and benchmark progress. Urban areas need to move from a status of water users to that of water suppliers and managers. With today's technologies and management options, water quantities and qualities can be managed more effectively and efficiently for different purposes. Integrated approaches can deliver water to specific users in appropriate quantities, qualities, and at appropriate times, without compromising the availability of the resource for others. Managers can tackle existing, or prevent impending, water scarcity by promoting water use efficiency and alternative sources of water, including wastewater and storm water. New approaches to the collection, transport, treatment and management of sewage can improve resource recovery and mitigate the strain on water resources under challenges such as high population density, urban sprawl, and climate change.

Conclusion

It is need to increase water efficiency and water savings by investing in resource efficiency has been widely acknowledged as one of the top research and policy priorities for the upcoming decades, in view also of the urgency to adapt to climate change. This will be achieved by optimizing the operation of water utilities, thus saving water and energy, and minimizing network leakages and non-revenue water. At the water utility level, smart pressure management and optimized operation based on smart algorithms, network intelligence, and the installation of pressure and flow sensors throughout the network can significantly improve operations, save water and energy, and successfully follow the new trends in cities.

Reference

1. Southern economist 58th year of publication volume 58 May- 15 - 2019
2. Baxamoosa, S. 2009. Karachi Water Partnership. Review of Phase 1 (January 2007- December 2008). Hisaar Foundation. 38 p
3. Southern economist 58th year of publication volume 58 May- 15 - 2019.
4. Braga, B., Porto, M. F. A. and Silva, R.T. 2006. Water Management in Metropolitan São Paulo. International Journal of Water Resources Development. , Vol. 22, pp.337-352.
5. Danilenko, A., Dickson, E. and Jacobsen, M. 2010. Climate change and urban water utilities: challenges and opportunities. Water Working Note No. 24. Word Bank, Washington, D.C.
6. P. and Pullin, R.S.V. Wastewater-Fed Aquaculture. Proceedings of the International Seminar on Waste water reclamation and Reuse for Aquaculture. Calcutta, India, 6-9 December, 1988.
7. Dubey M.K (2000) Rural and Urban Development in India, Ajay Verma for common Wealth Publishers Published by 4831/24,Prahlad Street Davya Ganji, New Dehli.
8. Dr Soundarapandean M.,(2005) Economic Reforms and Employment Discover Publishers Private Limited., New Dehli