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WATER SUPPLY POVERTY IN URBAN INDIA : KEY CHALLENGES AND THEIR MITIGATION

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Abstract

The problem of water supply scarcity in urban areas of developing countries is a major concern. The available water sources throughout the world are becoming depleted and this problem is aggravated by the rate at which populations are increasing, especially in developing countries. At the current rate of population growth in India, combined with growing strain on available water resources, India could well have the dubious distinction of having the larger number of water deprived persons in the world in the next 25 years. In India, with development, the demand of water is increasing both in rural and urban areas. This may create increased tension and dispute between these areas for sharing and command for water resources. The emerging scarcity of water as also raised a host of issues related to sustainability of present kind of economic development, sustanious water supply, equity and social justice, water financing, pricing, governance and management. Intermittent supply leads to many problems including, severe supply pressure losses and great inequities in the distribution of water. Another serious problem arising from intermittent supplies, which is generally ignored, is the associated high levels of contamination. In India Waterborne diseases also inflict significant economic burden through the loss of productivity in the workforce and through increasing national health care costs. Any reduction in water losses requires coherent action to address not only technical and operational issue but also institutional, planning, financial and administrative issues in urban areas.

Key words: Water Supply Poverty, Urbanization, Inequities in Distribution of Water, Waterborne Diseases.

Introduction

Water is a unique and increasingly scarce commodity, that raised many critical issues and questions such as how to ensure people get equitable access to water, or how to guarantee people most benefited by judicious water supply, or how to eradicate poverty and promote growth by assuring continuous water supply. The provision of clean drinking water has been given priority in the constitution of India, with Article 47

conferring the duty of providing clean drinking water and improving public health standards to the State. The government has undertaken various programmes since independence to provide safe drinking water. Pressures of development is changing the distribution of water in the country, access to adequate water has been cited as the primary factor responsible for limiting development. The average availability of water is reducing steadily with the growing population and it is estimated that by 2020 India will become a water stressed nation. Most urban households do not receive adequate water. Often, non-availability of water or water scarcity is cited as a reason. However, the major challenge, at least among the bigger cities, is huge distribution losses which account for a significant chunk of the non-revenue water in Indian cities. According to Census of India 2011, Nearly 70 per cent households have access to tap water, out of which 62 per cent have access to treated tap water. Thus, nearly 40 per cent of urban households have no access to public supply, and have to depend on other sources of water. Moreover, not all households that have access to public supply have access to it within the premises. Only 49 per cent of households have access to piped water supply within their premises. A number of researches have focused on these topics in the past years. (Dubey, 1976) in his study of KAVAL towns of Uttar Pradesh highlighted the problems of water supply and sewerage system.(Prakash, 2014) examined various problems related to urban water supply and suggested remedial measures to provide safe drinking water to urban dwellers in India. It is irony that 35 per cent of all families i.e. 18.7 million households living in cities do not get drinking water at home (Saran, 2003). Rapid population growth and economic development in recent years have made it difficult to meet the increasing in water demand with the finite water resources (Butler and Memon 2006; Wang et al. 2010). A recent research by International Water Management Institute (IWMI) showed that more than a billion people in the developing world are facing lack of safe drinking water. All countries in the Middle East and North Africa (MENA) would be experiencing absolute water scarcity by 2025 (Nicol et al. 2006). The design of water distribution systems in general has been based on the assumption of Continuous supply. However, in most of the developing countries, the water supply system is not continuous but intermittent. The Asian Development Bank has reported that, in 2001, 10 of the 18 cities studied, supplied water for less than 24 hours a day (ADB, 2004). It was reported in 2002 that about 1.1 billion people were still using water from unimproved sources, and two thirds of these people live in Asia. The number of people without improved water sources in China alone is equal to the number of un-served in all of Africa (UNICEF/WHO, 2004). The quality of water that people receive is also questionable. In India, eighty-five per cent

of urban population has access to drinking water but only 20 per cent of the available drinking water meets the health and quality standards set by the World Health Organization (Singh, 2000).

Objectives

The main objectives of the present study are:

- To identify the urban water supply poverty in India
- To analyse the key challenges in urban water supply
- To suggest remedial measures for clean urban water supply

Methodology

The present study is based on the secondary sources of data. Data regarding the state wise availability of water supply is obtained from Census of India, 2011. Collected data analyzed in MS.Excel. ArcGIS 10.1 software was used to create maps for state wise distribution of water supply in the country. The original map of India was scanned and registered/geo-referenced to specify its location by inputting coordinates.

Study Area

India is a country of great geographical extent. It sprawls from the snowy ranges of the Himalayas in the north to the shores of Indian Ocean in the south. It belongs to Asia which is the largest continent of the world. It forms a part of south Asia and is separated by the Himalayas from the rest of the continent. India extends from $8^0 4'$ north to $37^0\ 6'$ north latitude and $68^0\ 7'$ east to $97^0\ 25'$ east longitude. Thus, its latitudinal and longitudinal extent is about thirty degrees. Away from the main land of India, the southernmost point of the country in the Andaman and Nicobar Islands, the Pygmalion Point or Indira Point is located at $6^0\ 45'$ north latitude (Fig.1).As per 2011 census the total population of the country was 1,21,08,54,977 in which 62, 32, 70,258 are males and 58, 75, 84,719 are females. The density of population is found to be 382 persons/sq km. About 73.0 percent of the population of the country is literate of them 80.9 percent are male literates and 64.6 percent are female literates. The sex ratio of the country was found to be 943 females/1000 males. It shares land borders with Pakistan to the west, China, Nepal and Bhutan to the northeast; and Myanmar and Bangladesh to the east. In the Indian Ocean, India is in the vicinity of Sri Lanka and the Maldives. India's Andaman and Nicobar Islands share a maritime border with Thailand and Indonesia.

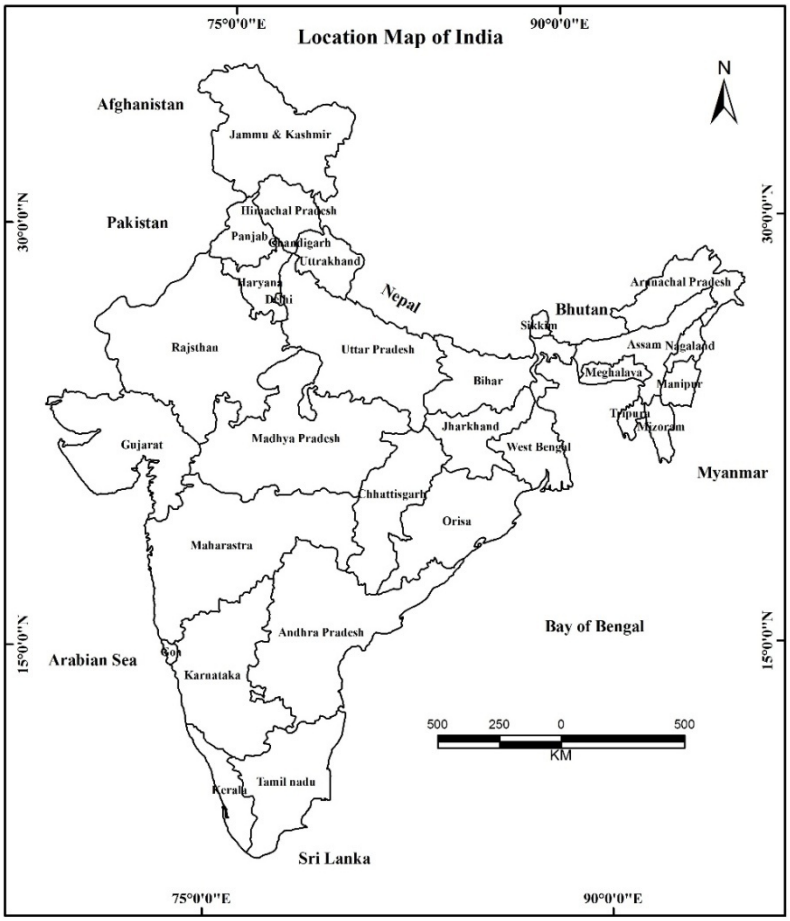

Fig.1

Table. 1 : Access to Improved Urban Water Supply

Year	Population (Million)	Urban population (%)	Total Improved (%)	Piped (%)	Other Improved (%)	Unimproved (%)
1990	862	26	90	52	38	10
2000	1042	28	93	50	43	7
2008	1181	29	96	48	48	4
2011	1210	31	84	62	2	16

Source: JMP, Census, 2001, Census 2011

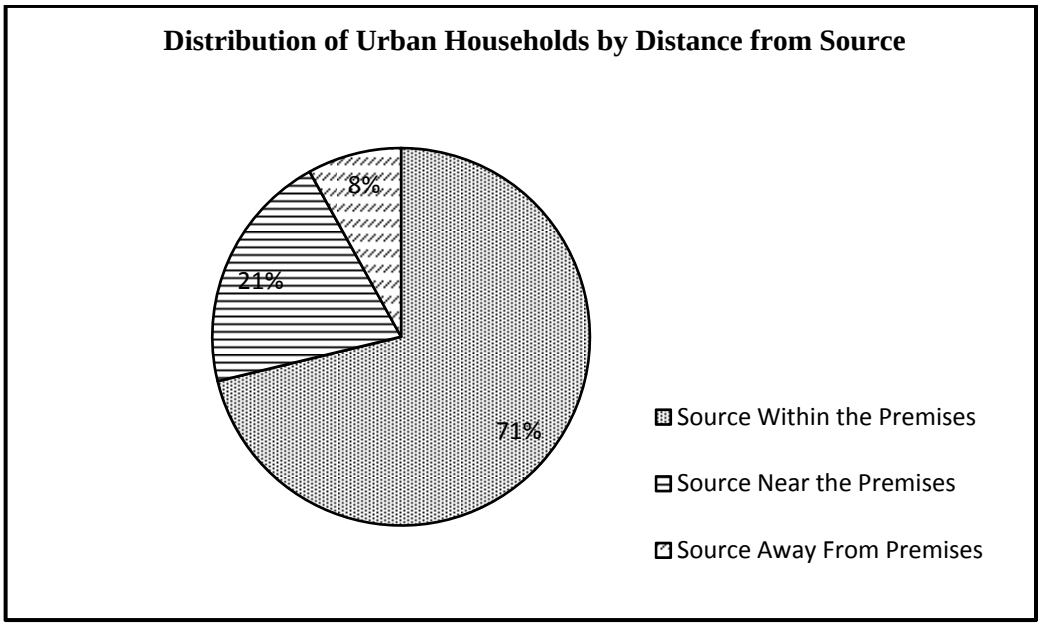

Fig. 2 : Distance of Water Source from Premises

Table.1 shows the percentage of households by access to water supply over the past two decades. The figure illustrates that there was a gradual increase from 1990 to 2008 in the percentage of households with access to 'improved' drinking water, but then a decline in 2011. However, this decline is due to the availability of fine-grained data. Earlier all tap water was taken as 'improved' whereas disaggregated data has become available in 2011 for treated and untreated tap water categories. Similar is the case with water from wells. If untreated tap water and uncovered wells are included in the improved category, then the proportion of households which have access to improved sources would be 98 per cent in 2011.

Comparing Census 2001 and 2011, one can see that nearly 18 million additional households have obtained access to tap water whereas the overall share across different water sources appears to have changed only marginally. It has to be highlighted here that this data indicates the source of drinking water, and hence does not indicate whether the households have access to water for other non-potable uses, including water for hygiene.

In addition to a large percentage of households not having access to piped water supply, a large percentage of households do not have access to water within the house. Figure.2 shows the distribution of households according to the distance between water source and houses. Nearly two-thirds of the households do not have access to water

within the house, and 8 per cent of households need to fetch water from more than 100 meters away from their households.

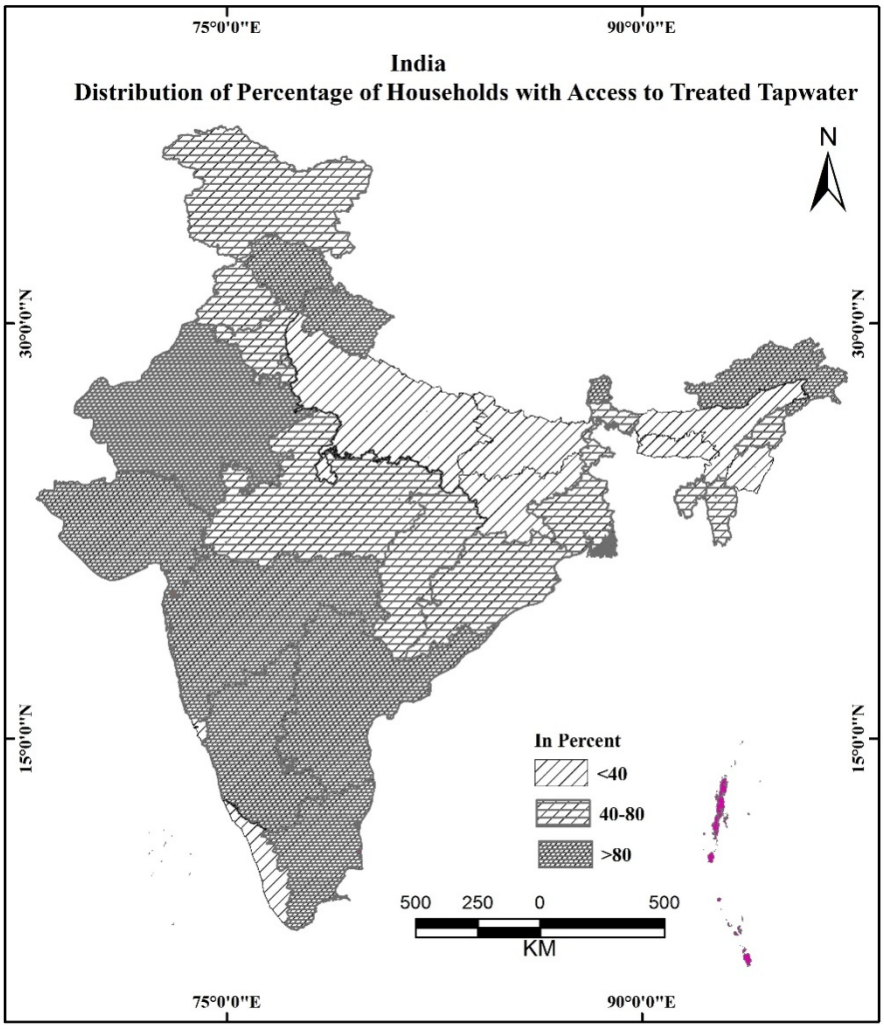

Fig. 3

Distribution of Percentage of Households with Access to Treated Tapwater

Most cities in India are water stressed, with no city having 24/7 water supply. According to the Ministry of Urban Development (MoUD), 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. In India, cities of Rajasthan, Gujarat,

Maharashtra, Karnataka, Tamilnadu, Andhra Pradesh, Himachal Pradesh, Uttarakhand, Arunachal Pradesh and Sikkim have more than 80 per cent household with access to treated Tapwater supply. Urban households of Madhya Pradesh, Odisha, West Bengal, Tripura, Mizoram, Nagaland, Punjab, Haryana, Jammu and Kashmir and Delhi have between 40–80 per cent with access to treated Tapwater supply. Lowest percentage (<40%) of households with access to treated tapwater supply was found in cities of Uttar Pradesh, Bihar, Jharkhand, Assam, Kerala, Goa, Meghalaya and Manipur states in the country (Fig.3).

Key Challenges

Some of the key challenges regarding water supply in the urban area of the country. The water supply systems in the country suffer from inadequate operations and maintenance. Lack of operations and maintenance is a major cause of distribution losses, and also affects the longevity of the system. In the country most of the households do not receive adequate water. Often, non-availability of water or water scarcity is cited as a reason. However, the major challenge, in the urban areas is huge distribution losses which account for a significant chunk of the non-revenue water in the city. These losses are both physical due to decrepit pipes and lack of maintenance, and also monetary losses, due to incomplete metering and billing. The physical losses occur in three main ways: leakages in distribution mains, leakages at storage tanks, or leakages at service connection points. One of the major problems is about the quality of water. This is because number of nallas discharges its waste in to the stream of water intake works. River water contamination is common practices by throwing human and animal dead bodies into the river. Pipe network is passing from the nallas and drain and there are chances of contamination of supply water from the damaged portions of the line. Some of the distribution lines are as old as 100 years and are deep down the ground, which are difficult to maintain and needs replacement. Sewers disposing into the rivers are contaminating the river water. Treated water gets contaminated as the distribution lines pass through sewer lines, open drains and nallas.

Major reason for the seepage is due to intermittent water supply to the city. There are alignment problems in the distribution system leading to water losses during water supply in most part of the urban area. Storage capacity is insufficient in the new extension areas of the city. In most of the cities there is no proper water supply system for slums. Leakages in the water supply network are common in number of cities of the country. Moreover, in cities with more than one million people, the official water supply after 35% loss in leakages are 125 litres/day per capita which is considerably lower than the demand of 210 litres/day per capita. Infrastructure development and regulations have not kept pace with population growth and urbanization and as a result waste water management has become a major challenge.

Summary and Conclusions

A massive urban transformation is accompanying India's rapid economic growth, posing unprecedented challenges to India's growing cities and towns particularly in the provision of infrastructure such as water supply, sanitation and sewerage meeting the needs of a future urban population of 600 million people by 2031. In Indian cities Rapid urbanization is also having a detrimental effect on water resources– both in terms of quality (pollution of rivers and groundwater) and quantity (as conflicting/ competing demands for water increase). Thus even greater attention is now needed to collect and treat wastewater, and to manage finite water resources, both surface and ground water, more effectively. In most of the urban areas of the country with increase in population there was also increase in demand for housing and it resulted into rapid expansion of illegal or unplanned and unhealthy living conditions and overcrowding. These areas are generally not served by the municipal corporation tap water connections. Storage capacity is insufficient in the new extension areas of the city and there is no proper water system for slums. In India the major challenge, in the city is huge distribution losses which account for a significant chunk of the non-revenue water in the city. These losses are both physical due to decrepit pipes and lack of maintenance, and also monetary losses, due to incomplete metering and billing. The physical losses occur in three main ways: leakages in distribution mains, leakages at storage tanks, or leakages at service connection points. The quality of service delivered is very poor with no city having access to a 24/7 water supply. Whilst the investment noted above will be needed to overcome service quality issues, it will not be sufficient on its own without significant change in the current governance arrangements. The investments in urban water supply need to be accompanied by actions to enhance the autonomy, accountability and customer orientation of service providers, improve incentives and support sector professionalization. There could be cases wherein multi municipal cooperation may provide most appropriate solution for service delivery, particularly for provision of bulk water supply, or centralized wastewater treatment facilities. Based on the above, and considering the on-going efforts of the Ministry and the State Governments, there is need to further develop the urban water supply reform program. The Regulatory Authorities, if set up, may also provide guidance on the structure for water tariffs. As the urban water supply services are becoming energy intensive, the tariff regime should include a component of energy surcharge, linked to the power tariffs, with automatic adjustments for any hikes in tariff imposed by the power distribution companies. Future investment in water supply should include elements of demand management (reducing water usage) and distribution system leakage management to help reduce intercity inequity of the quantity and quality of water supplied. Attention should be given to building, renewing and replenishing local

water sources, including groundwater, to cut the costs of water supply through investments in sewerage(to stop pollution of waterways), and in increased reuse and recycling of waste waters. Capacity should be built at all levels, including exploring institutional and management options for water and sanitation in cities. Public-Private Partnerships (PPP) needs to be conceptualized for contributing to capital investments. Private sector already plays a role in water and waste services as a contractor to the public utility to build and even operate key components of the system. This role must be recognized and encouraged. However, this partnership must be planned carefully and with full knowledge of the associated costs and benefits. Therefore, an urgent need is felt for a comprehensive water policy for city which is suitable and satisfactory to growing needs of citizens of the country.

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