

SAFE DRINKING WATER

DRINKING WATER SECURITY IN SOUTH ASIA – SCALING FOR INDIA'S SWACHCHA BHARAT ABHIYAN (Clean India Drive)

»»» By Dr. Anil Kumar Gupta



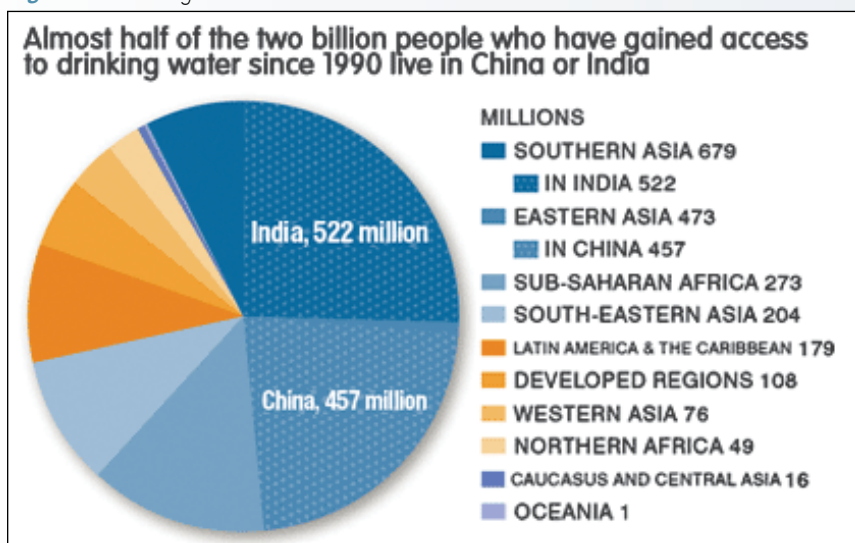
WATER AND DEVELOPMENT

"Flame of Life Burns in Water" – a teacher said while teaching ecology, and proves true as water connects us in the most fundamental ways of

our life, survival and development. Moreover, water is intrinsically linked to the most immediate challenges of current times, including food security, health, climate change, urban expansion, industrialization,

economic growth, and poverty alleviation. It is estimated that by 2030, only 60 % of the world's population will have access to fresh water supplies (McKinsey Quarterly 2010). Thus, about 40 % of the world

Figure 1: Drinking water access since 2010



Source: Progress on Drinking Water and Sanitation. 2012 update. UNICEF/WHO JMP, March 2012

population or about 3 billion-people would be without a reliable source of water. Most of them inhabit in the impoverished, conflict prone and water-stressed areas like South Asia.

Water is already forms extremely contentious and volatile issue in South Asia. With increasing population, dependence on water for various needs the region continues to multiply by leaps and bounds. Countries in South Asia, by their sheer number of people and demand for food and water, figure high on the list of such critical regions. The availability of clean, unpolluted water, and its management and the willingness, or reluctance, to find a cooperative mechanism to face the crisis will, in more ways than one, is obvious and are certain to influence geo-strategic policies in South Asia. The region hosting a number of global and international institutions including United Nations agencies, financial institutions and iNGOs besides academia and policy advocacies, is certain to place water on critical agenda table in international dialogues, financial

and cooperation strategies, climate change, disaster risk reduction and sustainable development related negotiations.

Fresh water scarcity is a common across the borders but situation is particularly acute in Pakistan and India (John 2011). Both countries have a high rate of population growth, wide-spread poverty, declining food production and a rapidly rising demand of water for domestic, agricultural as well as industrial uses (John, 2011). But, despite of the looming threat of water scarcity, there has been a persistent reticence in working together to reduce the impact of the impending crisis on the people of the region. Water is treated as a political feature with the corresponding shorthand on rights, volumes and ownership describing the narrative. The reasons could vary but almost all the countries, barring perhaps Bhutan, face the problem of water availability and more specifically the seasonality of water availability against the requirements.

Drinking water is a basic requirement for life and a determinant of standard of living. However, besides government efforts, supply and demand side factors of both surface and groundwater determine the level of drinking water available to people. The supply and demand factors increase with the natural and human factors like pollution. This is known to limit drinking water supply provisions and raise the delivery costs. Decline in groundwater table and availability of surface water, particularly in summer months, has put large number of people in risk for drinking water. Poor water quality problem has also been observed in more number of habitations. Inadequate resource management and institutional system seems to be the major causes for the present problems.

ASIA CONTEXT

Water problems in Asia are intense — one out of five people (700 million) does not have access to safe drinking water and half of the region's population (1.8 billion people) lacks access to basic sanitation. As population growth and urbanization rates in the region rise, the stress on Asia's water resources is rapidly intensifying. Climate change is expected to worsen the situation. According to the Intergovernmental Panel on Climate Change (IPCC), more than one billion people in Asia alone are projected by 2050 to experience negative impacts on water resources as a result of climate change. It is also projected that reduced access to fresh water will lead to a range of consequences including impaired food production, loss of livelihood security, large-scale migration within and across borders, and increased geopolitical instabilities.

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Drinking water in Asia is something of a success story. The population with access to improved drinking water infrastructure increased from 72% in 1990 to 87% in 2006. This represents improved access for 1.15 billion people, an increase of 53% over the 2.1 billion who had access in 1990. South Asian region has a population of 1.5 billion out of the total world population of approximately 7 billion. The region has the highest incidence of poverty not only in terms of absolute numbers but also as a percentage of the population, compared to any other regional group of countries in the world.

Thus, in South Asia, as much as 43 percent of the population lives in absolute poverty, compared to 14 percent in East Asia (excluding China), 24 percent in Latin America and 39 percent in sub-Saharan Africa. That places the number of poor, according to these estimates, between 480 million to 645 million, more likely on the higher side. If it is taken at the 40%, then nearly 525 million poor would have been living in the rural areas and 120 million in the urban areas. Urban poverty is, to a considerable extent, a spill over of the rural poverty.

The region faces some of the greatest population pressure on the

land in the world. This has resulted in unprecedented stress on natural resources and ecosystems, causing sustained degradation of forest, soils, wetlands, rivers and aquifers. With a three-fold increase in human population since 1950, South Asia's per capita water availability is down to one fifth of what it was 60 years ago. Likewise, the availability of arable land for those dependent on agriculture has declined from over 1 hectare per person at the beginning of the 20th century to less than 0.1 ha today. As a region, Asia is also very vulnerable to earthquakes and flooding. Typhoons, cyclones, floods and other water-related disasters are on the rise, according to the World Bank evaluation, increasing by as much as five times in 2010 alone, with tremendous loss of life, livelihoods and property.

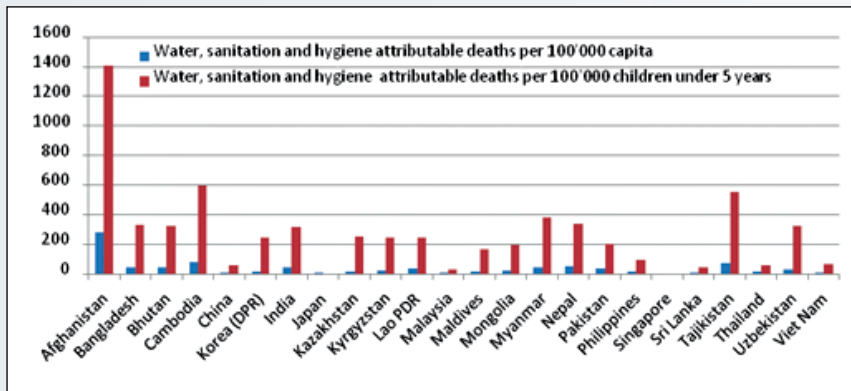
WATER SCARCITY CHALLENGES IN SOUTH ASIA

With the current rate of annual progress the countries like India, Nepal, Bangladesh and Pakistan are expected to achieve their MDG target in 2047, 2030, 2029 and 2028 respectively. Currently 211 million in the region do not use improved water facilities. The overall picture also masks regional as well as

urban-rural disparities. Availability of adequate quantity of water is a huge challenge. So too are the challenges around water quality and the sustainability of services. Minerals including fluoride and arsenic have been found in several regions of India, Pakistan and Bangladesh. Disposing urban sewerage as well as industrial waste has heavily polluted surface water rivers, lakes and canals, factoring in the water quality may change the improved water use figures or deter progress claimed.

Depleting ground water, pollution of surface water, and source sustainability and security are the major future challenges in fulfilling the right to water in this region. Impacts of climate change are known to aggravate the problem as coastal ground water is being mixed with brackish seawater due to sea intrusion; and floods and cyclones are affecting water and sanitation infrastructure. With increasing population and subsequent rise in energy and food demands, more water will be required for agriculture. The current water and sanitation crisis in this region indicates towards a chronic problem of inequity and unequal power relationships prevailing in this part of the world. Often poor and marginalized groups are filtered out from accessing the services.

Figure 2: Water, sanitation, and hygiene related deaths in Asia. Source: WHO (2008)



Many countries in South Asia share trans-boundary rivers. In the wake of increasing energy and water demands, the tension may be increased over control of water, which can further affect the already sensitive political environment in the region. The challenge is to provide sustainable and safe drinking water services to all the citizens in South Asia also as a public health intervention. Access

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to safe water, adequate sanitation and improved hygiene are critical to human development and well-being, reducing disease burden and deaths, increasing economic benefits, contributing towards human dignity – especially of women – and protecting the environment. The lack of access to water and sanitation has deleterious effect on human health, exacerbating poverty and undermining economic development. Approximately 4 billion cases of diarrhoea each year cause 2.2 million deaths, mostly among children under five – about 15 % of all deaths of children under the age of five in developing countries. The problem of demand and supply of water is most acute in Pakistan and India (John, 2011).

There were several policy initiatives that refer to drinking water and related issues in South Asia:

- ❑ The General Comment 15, adopted by the Committee on Economic, Social and Cultural Rights in 2003 clarifies the content of the right to water and sanitation and outlines states' obligations in relation to this right as follows: *The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses*
- ❑ The 1994 Programme of Action of the Cairo Conference on Population and Development,

unanimously endorsed by 177 States, and the 1996 Habitat Agenda, unanimously endorsed by 171 States, recognize that the right to an adequate standard of living includes water and sanitation.

- ❑ In December 2007 at the 1st Asia-Pacific Water Summit, 37 countries from the region endorsed the "Message from Beppu", which recognizes "the people's right to safe drinking water and basic sanitation as a basic human right".
- ❑ The South Asian Association for Regional Cooperation (SAARC) has recognised the importance of safe drinking water and sanitation as mentioned in the SAARC social charter. Paragraph four of article III of the SAARC social charter states: *States Parties agree that access to basic education, adequate housing, safe drinking water and sanitation, and primary health care should be guaranteed in legislation, executive and administrative provisions, in addition to ensuring adequate standard of living, including adequate shelter, food and clothing.*
- ❑ Third South Asian Conference on Sanitation (SACOSAN) held in Delhi in November 2008 acknowledged the right to water and sanitation as follows: *Recognize that access to sanitation and safe drinking water is a basic right, and*

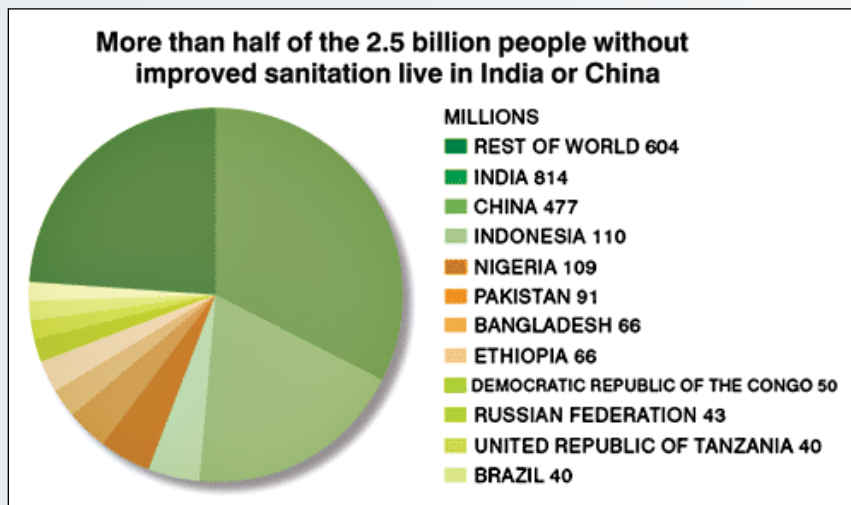
Dublin principles on water (1992)

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be participatory, involving users, planners and policymakers at all levels.
3. Women are central to providing, managing and safeguarding water.
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

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Figure 3: Lack of sanitation facilities



Source: Progress on Drinking Water and Sanitation. 2012 update. UNICEF/WHO JMP, March 2012

according national priority to sanitation is imperative

- The Global Water Partnership's "Framework for Action" (GWP 2000) asserts that the causes of the world water crisis are mainly social and institutional, while the physical and technical manifestations are more the symptoms. The Framework for

Action states: *The water crisis is mainly a crisis of governance. The present threat to water security lies in the failure of societies to respond to the challenge of reconciling the various needs for, and uses of, water.*

Southern Asia still struggle with low coverage of 41%. In Southern Asia, the proportion of the population

using shared or unimproved facilities is much lower, and open defecation is the highest of any region. Although the number of people resorting to open defecation in Southern Asia has decreased by 110 million people since 1990, it is still practised by 41% of the region's population, representing 692 million people. Open defecation is highest in rural areas of Southern Asia, where it is practised by 55% of the population.

DRINKING WATER – ISSUES IN INDIA

The per capita water availability in India has declined from 1986 cubic meters (cu m) in 1998 to 1731 cu m in 2005, bringing the country close to being declared a water scarcity region. The situation is likely to worsen in the next few decades with the population of India set to reach 1.6 billion (2050). The water required to sustain such a huge population far exceeds the available water supplies. In 2006, for instance, about 829 billion cubic metres of water was used by

India supports one-sixth of the world's population, one-twenty-fifth of the world's water resources, and one-fiftieth of the world's land. India also supports about 20% of the world's total livestock population, more than half of which are cattle. Agriculture is the major consumer (80%–85%) of available freshwater. Average per capita availability of water, estimated at 1,600 cubic meters per year, is expected to fall to around 1,000 cubic meters per year by 2050 based on current population projections. The effects of climate change on the availability of future water resources are uncertain, but it is expected that the frequency of extreme events (floods and droughts) will increase. Climatic variability has always been a source of water stress in India. Monsoon failures and floods have significant social impacts. Both food security (as a result of reduced grain production) and rural livelihoods are adversely affected. Thus, a former finance minister quipped that his budget was a gamble on the monsoon. Surface reservoirs are an infrastructural response to the mitigation of flood and drought impacts. However, per capita water storage (200 cubic meters) is the lowest in India relative to comparable countries (e.g., 1,960 cubic meters per capita for the United States, 1,100 cubic meters per capita for China, and a world average of 900 cubic meters per capita).

In the absence of significant public investment in surface water-based irrigation infrastructure over the last 30 to 40 years, the need for reliable water supplies has translated into extensive and essentially unregulated groundwater pumping across the country. This trend has been facilitated by free or highly subsidized electricity and other energy sources for agricultural pumping. Groundwater irrigation now contributes to 50% to 55% of total irrigation water use, and it is responsible for two-thirds of total agricultural production, or approximately 10% of total gross domestic product. It is also responsible for almost 30% of total electricity consumption. Both groundwater and electricity consumption are higher in agricultural states such as Andhra Pradesh, Gujarat, Karnataka, Uttar Pradesh, Punjab, and Haryana, where agricultural electricity use accounts for 35% to 45% of total generated electric use and groundwater use is 70% to more than 100% of the estimated annual recharge. In such places, aquifers are being depleted (mined) at a rate of 0.2 to 0.5 meters per year, with higher rates locally. Farm water use efficiencies are typically very low (5%–15%) given the free provision of energy and water (Narula and Lall, 2011).

Source: Kapil Narula and Upmanu Lall, Columbia University Earth Institute (2011).



domestic, industrial and agricultural sectors. In 2050, the demand is expected to reach 1.4 trillion cubic metres of water, pushing India deep into a water stress condition. It is estimated that by 2025, of the 4 billion people expected to live in water stress conditions, more than 30 % would be in India.

STRATEGIES AND RECOMMENDATIONS

Following ten-point agenda is suggested to avert a water crisis in South Asia:

- ❑ Raise the profile of water security on the political and developmental agendas of national governments in Asia.
- ❑ Generate better policies through dialogue at every level, involving policy makers, non-governmental organizations, civil society groups, private enterprises, and other stakeholders in the “responsible management of water resources”,
- ❑ Governments to include water in security policy planning to ensure that water management organizations have direct communication with defense agencies and develop integrated water management and conflict prevention capacities where needed,
- ❑ Encourage investment in and increased collaboration on water management technologies with greater investment in the infrastructure and knowledge systems needed to manage complex water systems,
- ❑ Address the emerging water crisis through a post-2012 climate agreement with measurable and verifiable targets to reduce greenhouse gas emissions adopted by all countries, including agenda on adaptation as necessary to lessen the impacts on water resources resulting from climate change,
- ❑ Utilize the scientific data and environmental statistics, including IPCC reports, on water and climate change to develop early-warning systems, on a regional level to consider the impacts of desertification, sea-level rise, and other consequences like extreme weather events and water scenarios,
- ❑ Developing and promoting water financial partnerships, and financial means for promoting climate resilient and disaster safe water infrastructure for

Environmental Factors Governing Safe Drinking Water

Going by popular perception, water, which is sweet and free from odour, colour and organic and inorganic contamination, is considered as safe drinking water. Drinking water quality has been determined by the presence of certain organic and inorganic substances in excess of tolerance limits shown in Table 6. Unsafe and poor quality water adversely affects health status of people. For instance, the presence of chemicals like fluoride in excess quantity (more than 1.5 ppm) causes dental and bone hazards, while skin rashes result by consuming water with excess brackishness. Similarly, biological or organic contamination of water gives rise to water-borne diseases.

Environmental problems in drinking water supply are caused by both supply and demand side factors. Two major supply factors are depletion and deterioration in water quantity and quality, which are aggravated by demand factors like over extraction and pollution as they are interdependent. Increasing demand and over exploitation are the other demand based causal factors leading to inadequate drinking water availability. Deterioration in drinking water quality either at source or in the distribution system has been caused by factors such as natural, human made (or demand driven) and institutional (like lack of monitoring system). Natural factors such as geological and geographical characteristics lead to inorganic contamination with excess fluoride, iron, nitrate, etc., while human made factors like over extraction of groundwater, discharging pollutants to surface and ground water bodies, inadequate and improperly designed drainage and sewerage systems too add their share of pollution.

loss prevention consideration
risk sensitive landscape and
land-use, environmental
safeguards and protection
from consequences of extreme
weather events,

- Utilizing global, regional and national platforms and dialogue forums on themes related to environment, land, disaster risk reduction and inclusive growth for mainstreaming 'water' and especially 'drinking water' issues with adequate focus on water system development, sustainability and stretching out the efficiency to meet the growing demand.

SCALING SOUTH ASIA'S CONCERN TO SWACHCH BHARAT (CLEAN INDIA)

Although gains in the use of piped water on premises have been made in these regions, progress is mostly in the 'other improved' category of water sources. Of note is the fact that 65% of the populations in Southern Asia are using other improved sources rather than piped water on premises. Many countries are off track in meeting the MDG sanitation target, including several of the most populous countries in Asia. Progress in China and India is highlighted, since these two countries represent

such a large proportion of their regional populations. While China has contributed to more than 95% of the progress in Eastern Asia, the same is not true for India in Southern Asia. Together, China and India contributed just under half of the global progress towards the MDG target in sanitation.

As a part of Swachh Bharat Mission, to achieve a clean India by 2019, it is proposed to provide Individual House Hold Latrines (IHHLs) to about 6 Crore rural households in the next 5 years. The MGNREGS will be aligned with this initiative, by undertaking construction of nearly 2

Seven challenges identified in the Ministerial Declaration

1. Access to safe and sufficient water and sanitation are basic human needs to be ensured.
2. Ensure food security through efficient and equitable mobilization, use and allocation of water.
3. Protect ecosystems through sustainable water-resources management.
4. Promote cooperation and synergy between different water users at all levels and across all boundaries.
5. Minimize risks from floods, droughts, pollution and other water-related hazards.
6. Valuation and pricing of water that reflect value of all uses and costs of service provision, while protecting the basic needs of the poor.
7. Good governance of water resources through more accountable public agencies, community empowerment and participation of all stakeholders.

(Ministerial Declaration, 2nd World Water Forum, WWF - March 2000)

Crore IHHLs, providing IHHL facility for every household in the selected Gram Panchayats, over a period of 5 years. It will be accompanied by behavioral change that builds sanitation into the daily lives of the people to achieve Open Defecation Free (ODF) status. (19th January, 2015 Ministry of Rural Development, Govt. of India notification). Under this initiative, Gram Panchayats which are ordinarily taking up labour intensive works and are in a position to take up works with higher material component will be identified for taking up IHHLs on a saturation mode so that the GP as a whole will achieve ODF status.

Pollution of Asia's water supplies from inadequate wastewater management is already a significant problem. The problem is particularly acute in Asia's urban slums, which have grown as a result of rapid urbanization. Many countries have not been able to meet the growing demand for sanitation services. Surface water is not the only water source that is being threatened by pollution. An estimated 32% of Asia's population gets its supply of drinking water from ground water. Even where surface water is abundant, communities prefer groundwater sources because they are considered safer. In actuality, however, groundwater pollution is often difficult to identify and treat. Despite such pollution concerns, overdraft from aquifers in India and Pakistan is estimated to be between 120 million and 160 million acre-feet per year (Mitchell, 2007).

Drinking water and sanitation are recognised as state subjects under the Constitution of India, Union Government programmes on sanitation have played significant role in increasing the coverage of

household toilets in rural areas from 9 % in 1991 to 22 % in 2001 and 32.7 % in 2011 (Kaul, 2015). The launch of Swachh Bharat Abhiyan (SBA) on 2nd October, 2014 marks the beginning of the largest programme on sanitation by the government in the country till date. The introduction of SBA provides an opportunity to address concerns in rural drinking water and sanitation services from the perspective of social inclusion and equity. Though the detailed guidelines of the programme are yet to be issued, a draft Action Plan for the programme has been put forth by the Ministry of Drinking Water and Sanitation.

To accelerate the progress of sanitation in rural areas, Government of India is implementing from April 2012, the 'Nirmal Bharat Abhiyan (NBA)', a Centrally Sponsored Scheme [earlier Total Sanitation Campaign (TSC)]. Similarly, to provide drinking water to rural population in adequate quantity, the Govt. of India is implementing a centrally sponsored Scheme called the National Rural Drinking Water Programme (NRDWP). Under Swachh Bharat Abhiyan (SBA), the Goal is now pre-poned to make India Open Defecation Free (ODF) India by 2019 by construction of individual, cluster & community toilets; and villages will be kept clean, including through solid and liquid waste management through Gram Panchayats. Water pipelines have to be laid to all villages enabling tap connection into households on demand by 2019. In this matter, co-operation and convergence of all Ministries, Central & State schemes, CSR & bilateral/multilateral assistance may become necessary as well as new & innovative ways of funding such interventions. In a federal set-up

like ours, where sanitation and water are state subjects, it is all the more important that states take the initiative to complete all activities to achieve Swachh Bharat by 2019 by dove-tailing all schemes - Central or State.

URBAN CONCERNS

Large numbers of households in cities around the developing world do not have access to one of the most basic of human needs – a safe and reliable supply of drinking water. Rural areas contain the largest number of people without access to safe water but, in common with many developing countries, the fastest growing unserved populations live in urban and peri-urban areas. The water supply in most Indian cities is only available for a few hours per day, pressure is irregular, and the water is of questionable quality. Intermittent water supply, insufficient pressure and unpredictable service impose both financial and health costs on Indian households. Monitoring of water quality in Indian cities is haphazard. While municipal boards claim to conduct regular tests of water supply, the results of these tests are generally not disseminated publicly.

Contemporary India faces a pressing developmental challenge, namely providing safe, affordable and efficient drinking water and sanitation services to a burgeoning urban population, the size of which is largely underestimated even by the official records of the census of India. Inadequate water supply and sanitation services impose a disproportionate financial and public health burden on the poor. It also results in unregulated and unsustainable groundwater pumping. Poor quality infrastructure,

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India's Strategic Plan for Drinking Water in Rural Areas

- By 2017, Ensure that at least 55% of rural households are provided with piped water supply; at least 35% of rural households have piped water supply with a household connection; less than 20% use public taps and less than 45% use hand-pumps or other safe and adequate private water sources. All services meet set standards in terms of quality and number of hours of supply every day. Ensure that all households, schools and anganwadis in rural India have access to and use adequate quantity of safe drinking water. Provide enabling support and environment for Panchayat Raj Institutions and local communities to manage at least 60% of rural drinking water sources and systems.
- By 2022, Ensure that at least 90% of rural households are provided with piped water supply; at least 80% of rural households have piped water supply with a household connection; less than 10% use public taps and less than 10% use hand-pumps or other safe and adequate private water sources. Provide enabling support and environment for all Panchayat Raj Institutions and local communities to manage 100% of rural drinking water sources and systems.
- As per the provisions of the National Water Policy, drinking water has the first priority in allocation, of all available water. The Strategic Objectives can be achieved through an appropriate mix of implementation initiatives. Most of these are set out in the National Rural Drinking Water Programme guidelines (2010). The focus of this strategy is to ensure that the water supplied to rural citizens meets the national water quality standards.
- Adaptation measures and opportunities for rural water supplies (as suggested by Water and Sanitation Program – South Asia, Climate Risk Screening):
 - ❖ Redesigning the engineering codes for pipelines, water treatment, water supply systems, local dams, and irrigations systems.
 - ❖ Increasing use of rain fed systems to enhance the sustainability of local water supplies.
 - ❖ Introducing measures to enhance groundwater recharge following all rainfall events.
 - ❖ Addressing waste water treatment and recycling waste water.
 - ❖ Providing improved flood forecasting measures based on measure precipitation gauges or weather radar systems, linked to catchment models.
 - ❖ Helping refine policy at national, state, and local levels to incorporate the above four tasks.
 - ❖ Supporting educational systems to inform local people and also encourage research to support the above five tasks as well as development of a regional climate model which can be linked to local water use patterns to better estimate impacts of climate change.

insufficient maintenance and non-standardised accounting practices undermine the effectiveness of water utilities and lead to unacceptably high levels of water loss. The urban water and sanitation services sector needs systemic responses to address these interconnected problems, which have huge ramifications for other development imperatives for India as well.

Honouring the human right to water in India's cities is going to be a growing challenge thanks to rapid urbanisation as well as citizens' impatience with the quality of one of the most basic services. Only 43.5% of the households in India use tap

water as the major source of drinking water. Even among urban residents, the Ministry of Urban Development assesses that only 72% have water within their premises (CPHEEO, 2012). Moreover, the pressures of urbanisation continue to increase. Just as public ownership of water utilities has been plagued with inefficiency, lack of accountability and persisting inequities in access to water, awarding of contracts to private companies is not in itself a guarantee that the challenges of urban water and sanitation will be overcome. Given the status of water and sanitation infrastructure in the countries of the South Asia, large capital investments will be needed

either to repair or upgrade water systems or install new systems where none exist.

Table 1 shows the distribution of India's population with access to an improved drinking water source. By 2010, 92% of the population had access to an improved source of water, which brought down the proportion of the population without such an access from 31% in 1990 to 8% in 2010. If Target 7C of the MDG (improved water access) were to be applied on a country-level basis, India is well on its way to surpass the target by 2015. It is a somewhat different story on the sanitation front.

Table 1: Population (in percent) of India with access to improved sources of water

Year	Improved			No Sanitation		
	Urban	Rural	Total	Urban	Rural	Total
1990	51	7	18	28	91	75
1995	53	10	21	25	86	70
2000	55	14	25	22	79	63
2005	56	19	30	18	73	57
2010	58	23	34	14	67	51

Source: WHO/UNICEF (2012)

Contrarily, table 2 shows the proportion of the population with access to an improved source of sanitation, and those that lack any source of sanitation and have to use open defecation. Though the proportion of the population with access to improved sanitation nearly doubled in the last 20 years, a majority of the population still does not have access to any sanitation and has to resort to open defecation. The five states of Chhattisgarh, Madhya Pradesh, Bihar, Jharkhand and Orissa – largely rural and located in the central and eastern parts of the

country – have less than 30% access to any sanitation source. It appears that India is likely to miss the Target 7C of the MDG (improved sanitation access), and any hope of achieving the target by 2015 rests on the progress made in these five large states.

The proportions of the population with access to improved sources and no sanitation do not add up to 100 percent. The remaining population has access to unimproved sources.

Although urban areas of the country fare better than their rural

counterparts on water and sanitation access, a larger and denser population, coupled with dwindling natural sources of freshwater pose unique challenges to large cities such as Bangalore, Mumbai and New Delhi. Table 3 shows the status of water and wastewater infrastructure in the six largest cities in India. Though the major cities reported an increase in the service coverage between 1991 and 1997, the availability of water supply ranges from 4 hours or less per day in Delhi, Bangalore and Hyderabad to 9 hours in Kolkata; and 18% (Mumbai) to 50% (Kolkata) of the

Table 2: Population (in percent) of India with access to improved sources of sanitation, and no sanitation

Year	Urban	Rural	Total
1990	88	63	69
1995	90	70	75
2000	93	77	81
2005	95	83	86
2010	97	90	92

Source: WHO/UNICEF (2012b)

Table 3: Status of water supply and wastewater treatment in the 6 largest cities of India. Water and wastewater treatment capacities expressed in million liters per day (MLD)

City	Capacity (MLD) ¹⁴	Water Supply Hours Per Day	Consumption (%) ¹²	Waste Water Unaccounted (%) ¹²	Waste Water Generated (MLD)	Waste Water Treatment Capacity
Bangalore	965	4		34-44	772	
Chennai	198	4		20	158	264
Delhi	4346	4	78	26	3800	2330
Hyderabad	578	0.5-4	96	33	462	593
Kolkata	1625	9	116	30-40	706	172
Mumbai	3000	5	90	18	2400	2130

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water is unaccounted for (McKenzie and Ray, 2009).

Challenges with quality of data and Capacity building

For enabling prudent planning, implementation and monitoring of drinking water development and promotion programmes and especially when linking it with schemes like Swachha Bharat Abhiyan, data on different aspect in appropriate format and intervals is required. However, there are certain challenges identified:

- ❑ Lack of institutionalised reporting
- ❑ Limited information on the mix of consumers

- ❑ Lack of data on water consumption
- ❑ Poor data on groundwater
- ❑ Poor data on distributed water supply

It has been underscored that consumers should not be treated as passive recipients of (poorly managed) water services. Instead, they could participate as suppliers, resource managers and data providers to government agencies responsible for supplying water. Consumers' feedback on the quality of services is the ultimate water audit possible. Therefore, it is important to develop a good network with the consumers to understand the type of services they

are getting and the areas needing improvement. For instance, there is a dearth of information about water use and conservation practices in slum areas. It is important to know how slum dwellers are managing their limited resources, the health impacts due to their water use practices, and the best water management practices that could be adopted in other areas.

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Author has referred a number of information sources and literature ranging from published and unpublished documents, communications, and reports and has interpreted for driving at useful conclusions. Their original sources are acknowledged with thanks.

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