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“Blame it on the community, immunize the state and the international agencies”

An assessment of water supply and sanitation programs in India

V.S.Saravanan

Abstract

National and international agencies focus on 'on-site' water supply and sanitation interventions targeting households to share costs, and showcase their commitment to the MDGs. This paper reveals that 'on-site' interventions in India have exposed millions to mass poisoning and drowned the country in sewage waters. While 'on-site' interventions are favoured, they fail to consider the integrated nature of the water supply, sanitation and sewerage systems; and burden households with additional social and economic costs. Failures in the programs are often blamed on the communities, while immunising the approach of the development agencies that fail to consider the integrated water infrastructure.

Keywords: MDGs, water infrastructure, governance, public health, South Asia

Introduction: The water supply and sanitation ‚ladder'

"*Women demand mobile phones, (but) they are not demanding toilets,*" claimed India's Minister for Drinking Water and Sanitation Jairam Ramesh (NDTV, 2012a). He went on to say that even the toilets that are built have been turned into storage godowns (warehouses) (Economic Times, 2012). Therefore, he initiated *Nirmal Bharat Yatra* launched a program to "increase awareness about cleanliness among *people*" (emphasis added) (The Hindu, 2012a). Presumably, the development agencies are well aware of the reasons behind poor sanitation in the country. Just having ‚on-site' toilets is not an answer for villagers in the Indian Himalayan state of Himachal Pradesh, who responded with frustration: "*We have toilets (and households can build one), but who will dispose of the waste*". Without adequate infrastructure to dispose of human waste, there is no incentive for households to construct and use the toilets. The situation in drinking water is not different. Though about 85% of Asia meets the 'improved' drinking water target of the Millennium Development Goals (MDGs), it is not clear how many of them are contaminated with human faecal organisms, polluted through geogenic chemicals, or polluted through industrial or domestic waste. High cases of diarrhoea, cholera, malaria and dengue in many of these countries indicate use of unprotected and/or unhygienic drinking water sources. Without adequate provision of safe water and infrastructure to dispose of the excreta, meeting the drinking water and sanitation coverage will be difficult.

The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation Report (known as JMP) claims the Millennium Development Goals for the drinking water target have been achieved five years ahead of 2015, and are on track to meet the next MDGs target – the sanitation goal (WHO/UNICEF, 2013). The MDGs' goals and targets are a 'bench-mark', and the 'ladder' is the 'approach' to achieve and assess the drinking water and sanitation coverage for many national and international agencies. The working group set up for the formulation of the Water, Sanitation and Hygiene (WASH) goals, targets and indicators post-2015 renamed the term 'improved' to 'basic' water services, and extended the service from home to intermediate scale (that considers health and non-health benefits). For sanitation, it extended the 'basic' provisioning of sanitation to non-household entities (hospitals, schools, public places, and so on). However, despite areas of incompatibility with the integrated approach, the 'ladder' approach remains crucial and unchanged for achieving the drinking water and sanitation targets post-2015.

This paper assesses the relevance of the 'ladder' approach for drinking water and sanitation coverage in India. First, examining the Household Census and Amenities Census 2011 (GoI, 2012), one of the largest surveys on drinking water and sanitation coverage in India, it reveals that though the MDGs are important bench-marks, the 'ladder' approach is expensive for people. Questioning the disconnected approach to water supply and sanitation programs, section two calls for connecting water supply, sanitation and sewerage as an integral system. Section three questions the governance mechanism of the contemporary supply- versus demand-driven approaches to expand water and sanitation coverage. The final section argues that it is not about supply versus demand, rather it is about the government supplying the growing demand for water from users and creating demand for effective treatment and disposal of wastewater from users that is crucial for improved public health and environmental sustainability.

Looking down the 'ladder'

The 'ladder' offers a phased approach for development agencies to meet the MDGs' target on drinking water and sanitation starting with 'on-site' facilities and then moving gradually toward collective infrastructure components, such as feeder sewerage at the community or neighbourhood levels, and eventually to trunk sewers and treatment plants (UN Millennium Project, 2005:89). The

interventions for drinking water facilities include both 'on-site' facilities (i.e., piped public tap/standpipe, tube-well or borehole, protected dug well, protected spring and rainwater collection) and collective infrastructure that includes piped water into the dwelling. The former is called 'other improved' and the latter is considered as 'improved' under the ladder approach. The 'improved' sanitation includes both 'on-site' facilities (toilet with septic tank, pit latrine, ventilated improved pit latrine, pit latrine with slab and composting toilet) and collective infrastructure (flush toilet with piped sewer system) (WHO/UNICEF, 2010). Globally, the coverage of the 'improved' water supply (with collective infrastructure) was only 16, 24, 25 and 30 percent in Sub-Saharan Africa, Oceania, Southern Asia and South-Eastern Asia, respectively (WHO/UNICEF, 2013:8). Much of the attention from national and international agencies has been on the 'on-site' 'other improved' category with coverage reported at 45, 30, 55, and 68 percent, respectively, in the above regions. Coverage of sanitation in the same regions remains even higher at 30, 36, 41 and 71, respectively (WHO/UNICEF, 2013:4). The 'on-site' water supply and sanitation facilities are favourable candidates for development agencies to achieve their international commitments to the MDGs, even though it is difficult to decipher what kinds of interventions were carried out under 'improved' sanitation.

The 'on-site' interventions are also favoured because of cost factors. The World Panel on Financing Water Infrastructure estimated in 2003 that USD 72 billion was needed annually to achieve the target on sanitation, including household sanitation, hygiene and wastewater treatment; the latter alone equals about USD 56 billion (van de Guchte & Vanderweerd, 2004). One of the leading funding agencies involved in promoting water supply and sanitation claims "*on-site sanitation are less costly and individual households can potentially contribute a greater share of investment……. Urban sewerage systems require high levels of capital expenditure for infrastructure*" (D*f*ID, 2012:2). It further states that its portfolio targets on those types of interventions are most likely to achieve the MDGs (D*f*ID, 2012:5-6), rather than sustainability of the interventions. Given the high cost of collective infrastructure, like pipelines and wastewater treatment, it is very logical for national and international agencies to go for a phased approach starting with 'on-site' options.

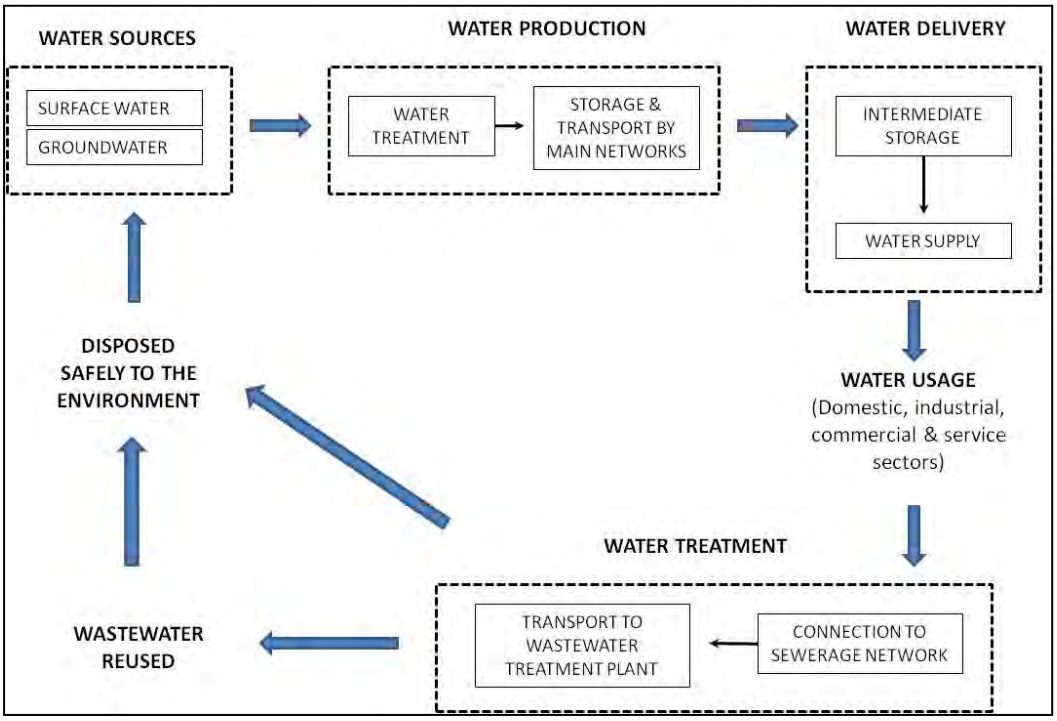
'On-site' facilities are easier to implement, compared to providing piped drinking water and sewerage connected sanitation. This is also justified due to the failure of the state to deliver public goods, a lack of knowledge of users' preferences, fiscal failures, and corruption by civil servants (Isham & Kähkönen, 2001; Briscoe & Garn, 1995). In response to these failures, staff and clients of international development agencies now advocate a decentralized 'on-site' (bottom-up) approach that relies on 'coproduction' by community members and civil servants (Briscoe & Garn, 1995). However, such an approach sacrifices the sustainability of the interventions (Table 1). Many of the 'on-site' drinking water facilities are untreated requiring households incur the costs of travelling to collect water, treating the water, storing it in a hygienic manner and meeting the health costs**.** These 'on-site' interventions remain a burden on communities and households, and create health insecurity for the households. 'On-site' sanitation facilities are not better; most of the toilets remain abandoned, or households dispose the waste in septic tanks, and discharge them on rivers/streams or let them out in the open, creating environmental and public health hazards.

Tab 1: Water supply and sanitation ladder

	Sanitation Ladder		Drinking Water Ladder	Cost of Implementation	Level Stakeholders Involvement	Improved Public Health	Sustainability
Improved	Flush toilet connected to sewer system	Improved	Piped water on premises (inside the user's dwelling, plot or yard)	High	Government	High	High
	Pour flush toilet with septic tanks		Public taps/stand pipes				
	Ventilated improved pit		Tube wells or bore wells		Communities		
	Pit latrine with slab		Protected dug wells				
	Composting toilet		Protected springs				
	Shared Toilets		Rainwater collection				
Unimproved	Pit latrines without slabs	Unimproved	Unprotected dug wells		Households		
	Hanging or bucket latrines		Unprotected spring/surface water				
OD	Open defecation		Tanker/bottled water	Low	Individuals	Low	Low

The ladder approach though is not binding, its discourses, goals and targets are tied with national and international funding commitments for developing countries and it fails to consider the integrated nature of water supply, sanitation and sewerage systems. The physical process of water supply and sanitation (WSS) involves capturing surface and ground water, transporting it to the area of consumption, treating it in to raise quality, transporting the water to the final user through a pipe system, collecting wastewater through a sewer system, and treating the wastewater before discharging it to the environment (Krause, 2009:8) (Fig.1). The linkages between these stages remain crucial to improve public health security and ensure environmental sustainability. It is a known fact that water supplied to households has to be a potable quality (if not there are additional treatment costs). Once water is supplied to a household, about 80% of it goes as waste, and they require infrastructure to safely dispose of the waste. The technical approach of the ladder fails to understand the basic science of water supply and management, disconnects the water supply and sanitation, and altogether neglects the sewerage systems creating insecurity about public health and the environment. The state should have a larger role in this integrated water infrastructure in sourcing, transporting and treating drinking water, and collecting and treating the wastewater, with communities and individuals playing a supportive role. It does not necessarily mean providing piped water and sewerage networks (wherever it is possible should be on top priority). In places (like slums and lower-middle settlements), where piped drinking water and sanitation is not possible, innovative ways to supply safe drinking water through automated water vending machines, low-cost bottled water, regular disposal of sewerage waters and other means could be employed for people to get access to safe drinking water and basic sanitation facilities.

Figure 1: Water Supply, Sanitation and Sewerage Production Cycle



Source: Modified from Krause, 2009:8

Water supply and sanitation in India: An assessment

The poor management of water supply, sanitation and sewerage system has exposed millions to mass poisoning, and made the country drown in its own excreta, creating water and health insecurity among its people (CSE, 2012). Since Independence, the national and state governments of India have invested about 135 billion Indian rupees on rural drinking water (GoI, 2011). Under the current eleventh Five Year Plan (2007-2012), the total expenditure is likely to exceed 90 billion INR. Though external assistance for water supply and sanitation is minimal (reported to be less than 10% between 1993-94 to 2004-05, World Bank, 2008), international discourses (New Delhi Declaration, Dublin Principle, Earth Summit-1992/2002, and International Decade for Action – 'Water for Life' 2005-2015) have played a prominent role in setting the agenda for national interventions. Despite these investments, the goal of providing drinking water and achieving total sanitation has remained unmet and conditions have worsened, namely in urban regions.

The Houselisting and Housing Census 2011 (GoI, 2012) (hereafter Census-2011) reveals that 87% of households have access to various water sources; therefore, the MDGs on drinking water seem to have been achieved. Of these, only one-third (32%) has access to treated piped drinking water sources, and the rest (two-thirds) have developed their own methods to treat or consume water without treatment. In terms of sanitation, only about 12% of households have their toilets connected to sewer systems while about 24% have toilets connected to septic tanks or other systems. About 10% have pit latrines with unsafe disposal mechanisms or other latrine types let out in an open drain, or are serviced by humans or animals. About 3% use public latrines, and the rest (50%) defecate in the open. The access to safe drinking water and basic sanitation in urban and rural settings indicates stark differences. A large percentage (44%) of rural households source their drinking water from hand pumps, with just about 18% receiving piped drinking water. On the sanitation front, only about 2% of rural residents have piped sewer systems. A high percentage (67%)

of rural residents defecates in the open. About 62 % of urban residents have access to treated piped water while only 33% of the urban residents have access to a piped sewer system. About half of urban residents dispose of toilet waste through septic tanks that should be emptied regularly, but unfortunately many of them overflow and pollute the soil and groundwater.

However, this coverage in urban areas does not reflect the quality of service provided. Poor infrastructure is an obstacle (NIUA, 2005) — unaccounted for water, poor metering, poor cost recovery, poor drainage and aging infrastructure. Poor disposal and treatment of wastewater remains a problem (Refer to CSE, 2012 for extensive survey in urban regions in India). The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched in 2005 has not shown any significant promises either. The Parliament Panel in its report expressed 'distress' over an overwhelming number of sanitation and drainage projects (Sood, 2012). It reports almost 50% of households in cities do not have sewerage connections, and that 4,861 of the 5,161 cities in the country do not even have a partial sewerage network. Even those receiving treated water are at the mercy of the erratic power supply and uncertain availability of water. While the metropolitan cities treat about two-fifths of the water, the smaller sized urban centres treat less than one-fourth of the wastewater. With a rapidly growing urban population, these smaller-sized urban centres are likely to emerge as urbanising sewerage wetlands.

The distribution of treated water supply across the states in India reveals only one state (Himachal Pradesh) reporting more than 75% of the population having access to drinking water. Three states and the National Capital Territory (New Delhi) report coverage between 50% and 75% (Figure 2). The central and central eastern states of India and union territories report less than 25% coverage of treated drinking water supply, revealing their dependence on untreated water sources, namely from groundwater sources (Figure 3). What is even worse is the coverage of toilets with piped sewer systems, with just two states reporting 25% to 50% coverage of toilets with a piped sewer system among its population (Figure 4). The rest of the states and union territories report less than 25% of the population covered with toilets with a piped sewer system. In essence, almost the whole country disposes their waste in open and untreated methods (Garduno et al., 2011:10).

Figure 2: Coverage of Treated Drinking Water in India – 2011

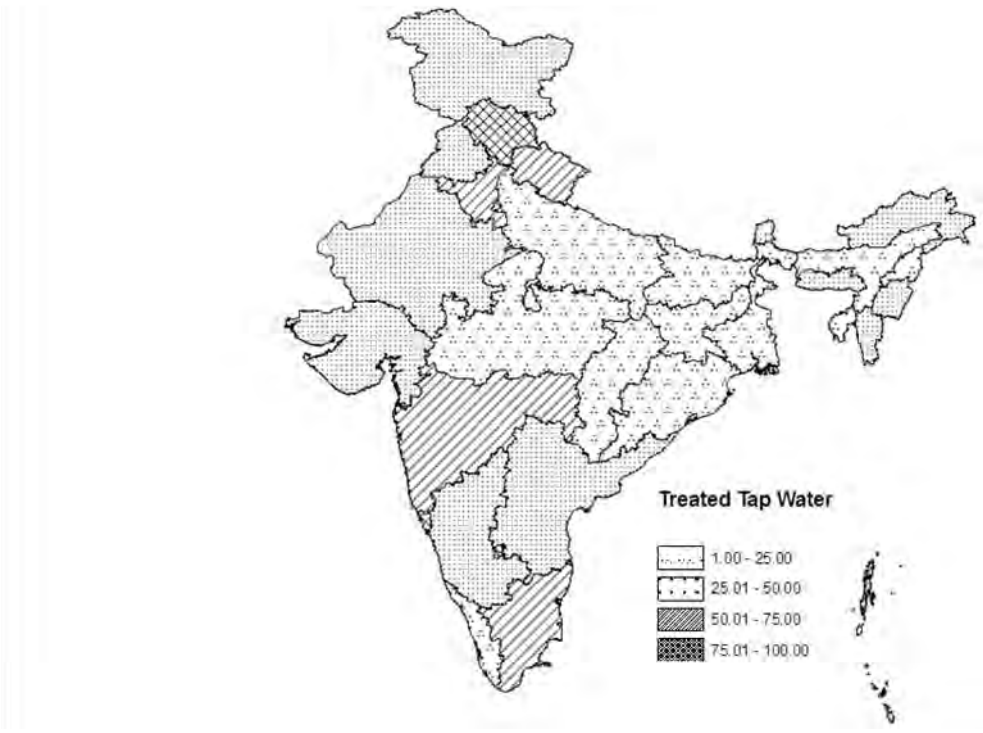


Figure 3: Groundwater as a Source of Drinking Water in India – 2011

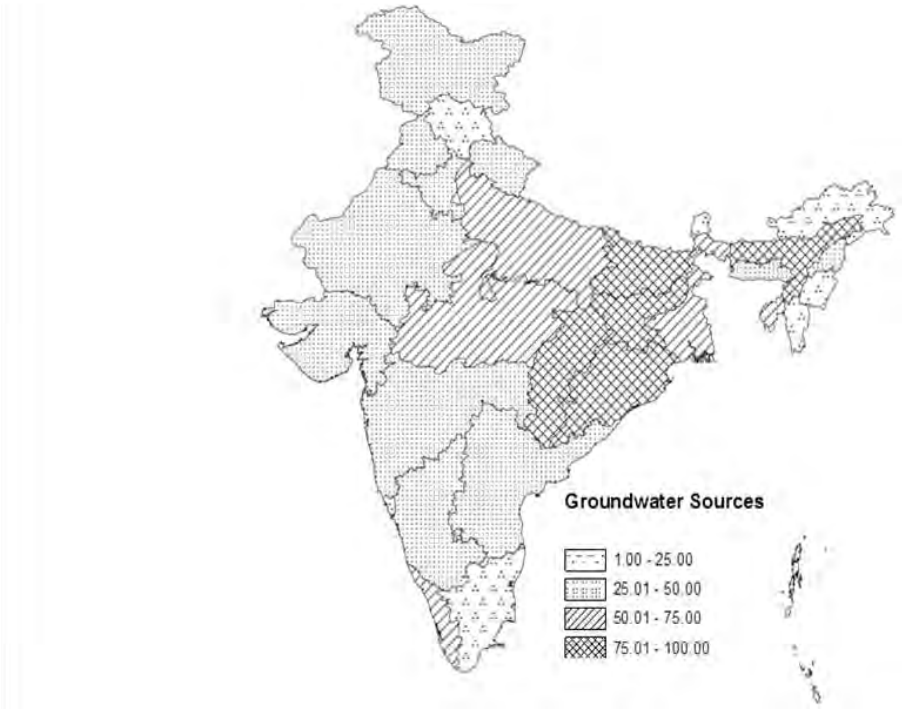
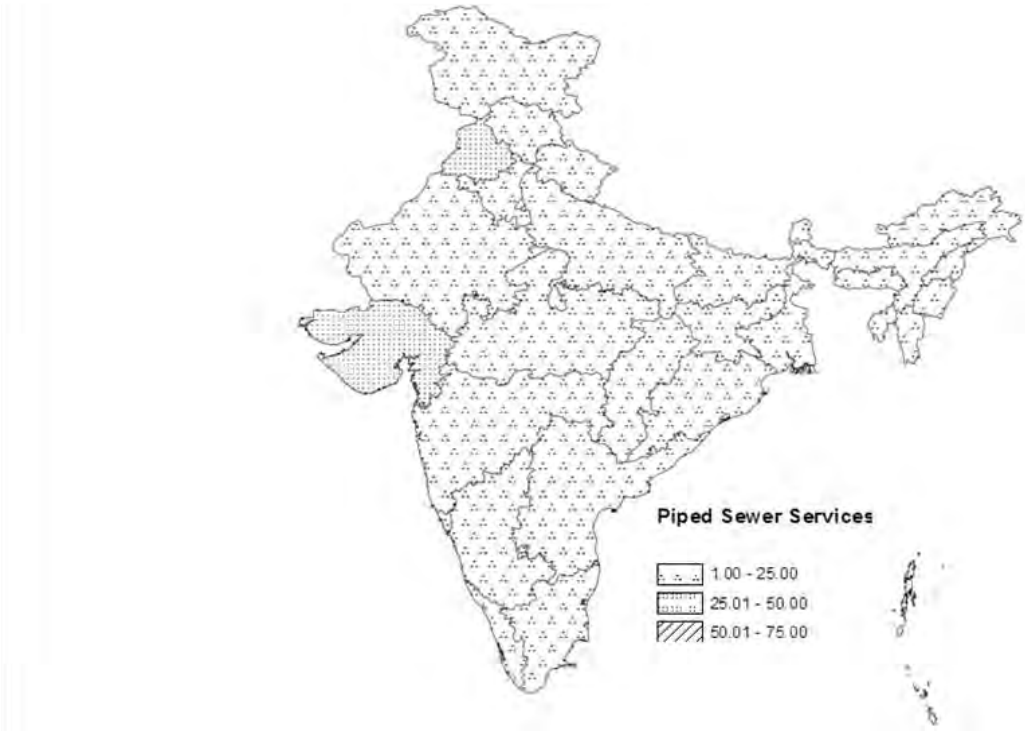


Figure 4: Coverage of Piped Sewerage Services in India– 2011



Disconcertingly, India has a deplorable history of 'promising water' (Agarwal, 1999) or 'slipping targets' due to depleting sources, contamination of sources, poor maintenance and lack of adequate involvement from the users. NC Saxena (1998), former secretary of the Planning Commission, revealed the increasing gap between coverage reported and thereafter villages reporting problems in 1974, 1980, 1985 and 1994. Evaluating the water supply in rural areas, the

World Bank study (2008) reveals serious inadequacies in the programs. The quantity of water supply and hours of supply commonly fall short due to design inadequacies, frequent breakdowns, non-availability of daily supply, and insufficient water supply compared to the requirements. The insecurity created by these false promises and inadequate functioning of water systems has had a huge impact on the coping costs of households accessing water. An average coping cost per household is estimated to be around Rs. 81 per month (US$1.8) (World Bank, 2008). Given the failures to integrate water infrastructure, the reported coverage of drinking water and sanitation in the Census-2011 could 'slip-back' in the near future.

The World Health Organization (WHO, 2012:3) estimates global economic losses associated with inadequate water supply and sanitation to be around US$ 260 billion annually. Therefore for universal coverage of safe water supply and basic sanitation for India, it estimates a cost of about US$ 42.75 million and targeting the MDGs alone will cost about US$ 24.71 million. Safe water supply in rural areas involves a borehole with a life span of 30 years, while in urban areas it is a piped household connection from a water treatment plant with a life span of 20 years. For sanitation, in rural areas it presumes an improved wet latrine with a lifespan of eight years, and in urban areas involves a mixture of a septic tank as well as sewerage with wastewater treatment.

A growing body of literature identifies the effectiveness of piped drinking water in meeting public health and basic needs. Jalan and Ravallion (2003) found that piped water supplies reduced childhood diarrhoea in high-income households. Bennett (2012) suggests that substitution between piped water and sanitation offsets the health gains from the expanded piped water. Similarly, Jessoe (2013) reveals how the supply of good quality water (or source protected water) reduces the cost of in-house water treatment, offsets 4% of the water quality gains and helps save about one percent of household monthly expenditure. Piped water supply will have significant gains in arsenic polluted regions (Roy, 2008). This does not mean the existing piped drinking water systems are safe; many of the systems that exist are deteriorating and affecting public health, requiring immediate rehabilitation attention. In terms of sanitation, examining cases in Chittagong, Dhaka, Nairobi and Hyderabad, Joshi and others (2011) reveal a growing mismatch between agendas (on-site sanitation) set by the national and international agencies and the diverse needs of the common people.

Realising the potential of piped water supply and sewerage connected toilets, the working group on drinking water and sanitation in rural (GoI, 2011a) and urban areas (GoI, 2011b) has offered insights for India's twelfth five year plan (2012-2017) and earmarked the funds. The report of the working group on rural drinking water and sanitation (GoI, 2011a) estimates a total allocation between US$ 49 billion (2723.77 billion INR) to US$ 55 billion (3031.65 billion INR) to provide piped drinking water to rural areas under two scenarios. In the first scenario it plans to increase the 40 litres per capita per day (lpcd) to 55 lpcd in the states that already have more than 55% piped water coverage, and in the second scenario offer piped water supply in the states where the coverage is less than 55%, respectively. For sanitation in rural areas, it demands allocation of US$ 80 billion[1] (4411 billion INR). For urban areas, it calls for an investment of about US$ 286.54 billion (15722.98 billion INR with 7546.27 billion INR for capital and Rs 8176.71 billion INR for O&M) for a 20-year period (2012-2031) (GoI, 2011b). On average, this will require allocation of US$ 71.64 billion during the period 2012-2017. In total, to cover the cost for piped water supply and sewerage connected toilets in rural and urban areas the country needs about US$ 206.64 billion for five years (between 2012-2017), with an annual average of US$ 41.32 billion.

Piped drinking water and sanitation with sewerage connections will offer significant benefits, namely in reducing the treatment costs of various health complications from the supply of poor quality water and open drainage. A Brainstorming Session at the WHO New Delhi office in November

[1] The exchange rate for USD to INR is about 55.14 INR as on 10 May 2013 for USDs in the text.

2006 (WHO, 2006) reveals dengue spreading rapidly to newer areas, with outbreaks occurring more frequently and explosively; Chikungunya re-emerging in India after a gap of more than three decades; and Japanese Encephalitis endemic in 135 districts in 15 states and Union Territories of India. Further there is an increase in vector- and water-borne diseases. High dependence on untreated groundwater as a source for drinking water and pollution combined with poor water supply and sanitation has exposed the country to hot spots of groundwater pollution (Romani, 2006, cited in Garduno et al, 2011:9). The mapping of hot-spot states from groundwater pollution in India reveals the whole country suffering from various salinity, geogenic and anthropogenic pollution, not to mention poor drinking water and sanitation management (Garduno et al., 2011). An integrated water infrastructure could avert about US$ 2 billion[2] spent annually on treating diarrhoea and malaria. An effective integrated water infrastructure will reduce the unaccounted treatment cost for about 5 million people who are at risk from arsenic contamination (Ahmed et al., 2006), about 66 million at risk from fluoride (World Bank, 2008) and about 20,000 at risk from nitrate contamination (Mukherjee, 2012: 260). Not to mention the reduction in the cost of treating dengue, chikungunya, kala-azar and other illnesses; person-days lost as a result of illness; and reduction in the burden among households.

Supply vs demand-driven approach: Will shifting approaches work?

> *"If you know how to row a boat, you can row any boat. If you don't know how to row a boat, changing the boat won't help*"
>
> (Ravishankar, 2002:22)

The national and international community continue to debate supply- and demand-driven approaches to govern the drinking water supply, sanitation and sewerage systems. Independent India adopted a supply-driven approach with five-year government plans for the implementation of the water supply and sanitation program. During the initial years, the program realised only limited achievements. Reasons identified include irregularity in electricity supply (GoI, 1996), lack of a qualified workforce to plan and execute projects, lack of community participation, and limited financial allocation (GoI, 1980; 2002:19; Mohan, 2003; World Bank, 2008:14). Supported by international consensus (The New Delhi Declaration 1990 and the Dublin Principle 1992), a fundamental shift favouring demand-driven approaches aimed to decentralise responsibilities to communities to encourage the use of local resources and ingenious modes of technology, share costs, and increase transparency and accountability within the program. This shift led to a Sector Reform Project (SRP) launched in 1999, which was later transformed into *Swajaldhara* in 2003. The Total Sanitation Campaign (TSC) was launched the same year. Narrowly focused on constructing toilets, its new vision document aims to prioritise the management of solid and liquid waste in the near future (GoI, 2011: 39). The JNNURM was launched in 2005 with an aim to address many of the infrastructure issues in urban regions with an expenditure of over 1 trillion Indian rupees, including water supply, sanitation and sewerage. In spite of this shift, the supply-driven program still dominates in both rural and urban areas with more than 80% of the funds being allocated in rural regions (World Bank, 2008).

On the surface, demand-driven approaches perform better than the supply-driven alternatives. However, neither of them takes an integrated perspective on water supply and sanitation nor is one superior to the other. A comparative study of supply- and demand-driven

[2] This estimate was arrived at based on estimates on diarrhoea (Mendelsohn et al., 2008) and for malaria (Kakaliaya, 2012).

approaches in rural water supply programs across India reveal the average capital cost of a piped water supply scheme is about US$ 136 (World Bank, 2008). The capital cost per household is relatively lower in schemes implemented by communities, as compared to those implemented by public utilities. Piped water supply schemes implemented by public utilities incur high institutional costs, partly due to the salary of government officials, but it is comparatively lower among the community implemented (piped water) schemes, because the communities take certain responsibilities and a comparatively lower salary for staff from the non-governmental organisations. While there is hardly any cost recovery from hand pumps (manual and deep bore-well), the recovery is higher in community-managed piped-water supply schemes than in government managed schemes. Operation and maintenance (O&M) costs among various schemes illustrate less allocation in this activity than the norm.

Three decades of experience in demand-driven approaches under various sectors has revealed a mixed response to improving the functioning of the water supply and sanitation programs compared to the traditional supply-driven mode[3]. The demand-driven approaches are plagued by limited participation, elite capture, and inadequate knowledge among communities forcing decision-makers to rethink their approach to water supply and sanitation. Participation is difficult to achieve fully, especially when communities are highly diverse. The demand-driven approaches place increasing pressure on communities to contribute more than their capability. No doubt involving communities and non-government organisations has developed innovative approaches (e.g., community-led total sanitation, Sulabh toilet, community-based water supply programs, rain-water harvesting, ECOSAN, water kiosk) to meet water supply and sanitation requirements. These have changed the conventional form of water supply and sanitation to a demand-driven form, which requires communities to sacrifice considerable time and resources to manage collective resources; added to this is a change in the technology, monitoring of water quality, water distribution and conflict resolution (Jha, 2010:19). An evaluation study of the Rajiv Gandhi Drinking Water Mission (GoI, 2010) reveals over half of the *Gram Panchayats* have expressed their inability to take responsibility for its operation and maintenance. Further, most of the village water and sanitation committees (VWSCs) are non-functional and there is little community involvement, with only one percent of households knowing the existence of the committee.

Many of these community-driven programs are marred by elite capture (Jha, 2010; Cullet, 2009). These elites play a 'cunning role' in exploiting the gaps in the policies, existing statutory legislation and socially embedded norms and values to facilitate their own objectives (Saravanan, 2008). Examining a *Swajaldhara* program in a district in Uttar Pradesh, Srivastava (2012) revealed that the role of local patronage ties was effectively used to mobilise the rural population and participation remained a mere fiction. Enforcing community participation often leads to reinforcing certain traditional (menial) tasks carried out by certain sections of society, often the scheduled caste and scheduled tribe. For instance, collecting water, cleaning drains, and disposing of garbage and human waste were often considered to be the tasks of particular castes. Re-invoking community practices sometimes leads to reinforcing these cultural practices, which the government and civil societies are struggling to eliminate. In the process, often families and children from lower castes are menially employed to dispose of the excreta (Stalin, 2007). The demand-driven approaches often are considered 'projects', which are discrete, stand alone, bounded by a timeframe to achieve targets and outcomes, and not appropriate to resolve complex problems (Allan, 2012), like water supply, sanitation provision and sewerage system.

[3] A similar finding is notable by Eguavoen and Youkhana (2008), who argue that none of the management options offers a solution to the prevalent water management problems in Ghana, but both carry the potential to do so.

After almost three decades of experience with demand-driven approaches, and over half a century of experience with supply-driven approaches (Table 2), we can conclude that both these approaches lead to increasing water scarce habitation, water quality problems and services not reaching the poor. What is important is not supply versus demand, rather it is government supplying the demand for water, and government creating demand for communities to supply (dispose) their sanitation waste. While government recognises the importance of community participation in several of their policy documents, rarely are these supported (or existing legislation modified) with legislation to monitor and regulate the water use, promote participation, promote equity and place conflict resolution mechanisms to ensure smooth functioning of the community institutions. There is a democratic deficit in water law-making (Cullet, 2012). The government has to tailor its regulation as per the existence of social capital (Isham & Kähkönen, 2002). Facilitating such reforms requires the government to formulate rules to sustain these efforts, and reconcile the top-down and bottom-up approach.

Tab 2: Lesson from supply- and demand-driven approaches to water supply and sanitation in India

Supply-driven Approach	Demand-Driven Approach
Increasing water scarce habitations	Increasing water scarce habitations
Growing water quality problems	Growing water quality problems
Inadequate participation from communities	Inadequate support from government agencies
Inadequate planning and management of the technical system	Inadequate knowledge among communities to plan and manage the technical system
Programs benefiting the elites (or non-poor)	Projects benefiting the elites (or non-poor)

Governing integrated water infrastructure: supplying the demand, demanding the supply

An integrated water infrastructure requires development agencies, namely the government, to identify socially and environmentally safe water sources, treat and transport this water, store it in a hygienic environment to ensure adequate supply to meet diverse water demand through pricing and regulation. The users (domestic, industries and commercial establishments), on the other hand, should efficiently use, pay the price and maintain hygiene standards. A cross-country analysis (Krause, 2009) of about 69 developing countries reveals the significance of 'governance'[4] mechanism to address water and sanitation. Though the analyses are suggestive, it offers helpful insights on the role of governance on water and sanitation services in the developing world. The Krause (2009) cross-country analysis reveals the importance of a broader institutional and political environment, and sector-specific institutions and policies play a crucial role in expanding safe water and basic sanitation in the developing world.

An integrated water infrastructure should ensure safety, sufficiency (minimum amount required per person per day), equity, regularity (availability of water close to 24x7), accessibility and affordability for various users for improved public health and environmental sustainability (Krause, 2009: 12). 'Safety' meaning providing potable water and sanitation services that minimise health

[4] It is defined as political governance of a country or sub-national political environment as well as sector-specific institutions and regulations involved in water and sanitation.

risks. This requires development agencies to diagnose the contextual (geological, climate and social) characteristics for the sourcing of water that is environmentally and socially safe, efficiently transporting and treating the same for effective distribution to the users. Ensuring a sufficient amount to these users who are diverse requires regulation for proportionate sharing. Adequate policies, regulation and delivery of services enable the government to regulate the distribution of water equitably across users, gender, race and social settings. It is about distributing quality water, not a quantitative of water regularly[5]. Moreover given people are willing to pay for a quality service, which is visible for many illegal drinking water and sanitation connections in cities, but equally requires government to effectively deliver the services. Such an integrated water infrastructure cannot be primarily the sole responsibility of the state nor of the community, though the former holds a greater responsibility in placing policies, legislations and administrative structure in place to supply quality drinking water to users, and to place infrastructure (technical, institutional and social) to create demand for users to effectively dispose of the wastewater. This could be complemented with an anti-filth campaign.

Inadequate water infrastructure to supply treated water and the disposal of sewerage waters has only placed immense burden on the people to treat water and to dispose of wastewater that is hygienic and environmentally safe. Many international agencies have considered the WSS targets, without meaningful local adaptation (Fukuda-Parr, 2008). It is important that national and international agencies realise the cause [of poor water quality?], than simply pursuing the MDGs' target,

As the monsoon arrives, frequent media reports highlight the rise in water- and vector-borne diseases in a number of cities (refer to media reports Anparthi, 2012, Masand, 2012, The Hindu, 2012) mainly due to mixing of sewerage with drinking water in many localities. Europe came out of filth in the late 19th century through a sanitary revolution, which was identified as one of the most important medical milestones in the past 150 years by the British Medical Journal (2007). The integrated approach of sewerage disposal and piped (treated) water into homes played a major role in reducing diseases in Europe, more so than even medical intervention or the 'ladder approach' adopted by the JMP. Although the cost of the infrastructure has been high, these countries understood the integrated nature of water infrastructure, were able to mobilise funding, and coupled with an anti-filth campaign, the state played a substantial role in effectively delivering the management of infrastructure (Shah, 1997:25). Seldom do national and international development agencies recognise (or conveniently ignore) these important milestones in the developing world context.

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[5] In India it is hard to find a city or village where there is 24x7 supply of drinking water.

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