Sceptical about septage

Management of septic tank sludge in cities should be priority if India is to achieve Millennium Development Goal for sanitation

UDAY BHONDE AND SURESH ROHILLA

A glance at India's 2011 census shows that almost a third of the country's population (377.2 million) resides in its cities. Water and sanitation are the two most important services that people require and to this end the seventh goal of the Millennium Development Goals (MDGs) assures improved sanitation to at least half of the urban population by 2015 and to 100 per cent by 2025. In keeping with the MDG the government of India has rolled out various plans and programmes to improve sanitation, but most of the efforts are directed towards providing sewerage network and centralised sewage treatment. Not sufficient attention has been paid to the fact that a large part of the population still depends on onsite sanitation systems such as septic tanks, cesspools and soak pit latrines. This makes septage (sludge in septic tanks) management crucial if India is to achieve its sanitation goal. In this context it is important to examine India's sanitation policies and initiatives.

Following the announcement of MDGs in 2000, there have been significant developments in India for improving the living condition of its people. To achieve the sanitation targets set under MDG the centre prepared the National Urban Sanitation Policy (NUSP) in August 2008. It aimed to "transform urban India into community-driven, totally sanitised, healthy and liveable cities and towns".

NUSP provides a clear road map for developing state- and city-level sanitation plans. Simultaneously, the service level benchmarking (SLB) programme was also launched in 2008. Following NUSP, the momentum to achieve sanitation goal increased with immediate formulation of action plans under state sanitation strategies (SSS) and city sanitation plans (CSP) in 2009. NUSP indicated that considering the local parameters, SSS would be the responsibility of states and implementation would require strong support from city institutions and stakeholders. Therefore, SSS must clearly define roles and responsibilities of urban local bodies (ULBs) and other parastatal agencies as mentioned in the 74th Constitutional amendment.

Six years have passed since the launch of NUSP, but only 13 states have initiated work on SSS and CSPs. Only six states—Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Bihar, Tripura and Odisha—have actually prepared SSS. Goal setting, stakeholder involvement, fund arrangements and timelines are discussed in these sss. Compared to other regions in India, more states from the south have followed NUSP. As a follow up of SSS, about 200 cities across India have prepared CSPs. Of these, complete CSPs (as per the framework mentioned in NUSP) have been finalised for only for five cities—Raipur, Nashik, Shimla, Kochi and Tirupati.

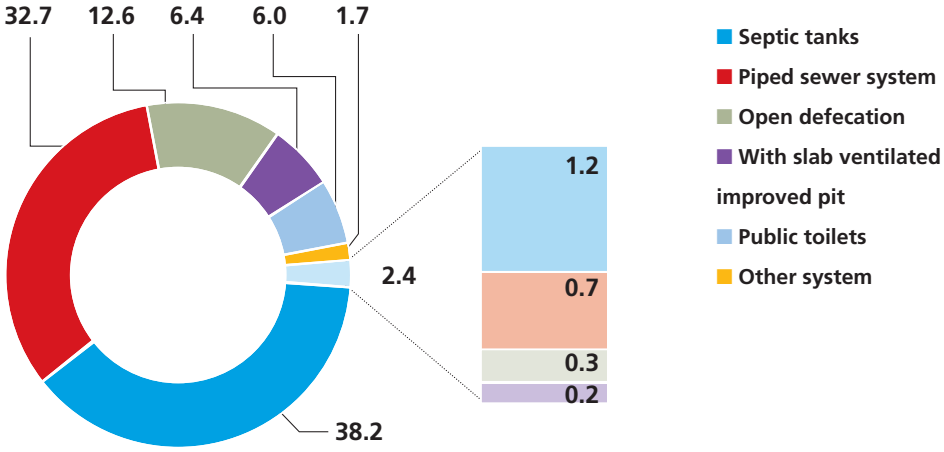
Implementing NUSP immediately is crucial because only a fraction of sewage is getting treated. Sewage generated from class-I and class-II cities in the country, as per a Central Pollution Control Board (CPCB) report in 2009, was 38,254 million litres a day (MLD). Of this, only about 11,787 MLD (about 31 per cent) could be treated with the facilities existing then. CPCB's more recent report of 2013 indicates that sewage treatment capacity in 35 metropolitan cities (having a population of more than one million) in India is 51 per cent, for class-I cities (including metropolitan cities) it is 32 per cent, and for class-II towns it is 8 per cent. Nearly 33 per cent of India's population resides in urban areas where half of the sewage is left untreated and released in the open. Further, the performance evaluation report indicates that the actual treatment capacity utilisation is only 66 per cent.

In 2010, the Union Ministry of Urban Development (MOUD) carried out an exercise for national rating of class-I cities (423 cities) because 72 per cent urban population resided in them. The study

Not much work has been done in India on scientific disposal of septage

KUNDAN PANDEY / CSE

HOUSEHOLD-WISE LATRINE FACILITY (IN %)



Source: Census 2011

found that 65 per cent cities (274) were showing unsatisfactory performance. CPCB reports (2009, 2013) and national rating of cities by MoUD in 2010 indicate that sewage disposal is not satisfactory in urban India where financial, infrastructure and institutional resources are available.

As per Census 2011, there are nearly 8,000 cities and towns in India. The urbanisation process in the country is rapid and heavy migration occurs in big towns and cities. With the growth of population, the load of sewage disposal will also substantially increase. But setting up infrastructure demands time and resources. The mismatch in population growth rate and infrastructure development will further damage the environment and pose risk to public health.

Census 2011 indicates that the piped sewer system that transfers waste from households to treatment facilities is available to only 32.7 per cent urban households in India. This comprises only 26 million of the 79 million households in urban areas. The remaining households rely on onsite sanitation systems (OSS) like septic tanks or use public toilets or defecate in the open (see 'Household wise latrine facility'). The most common OSS in India, as per Census 2011, is septic tank (38 per cent). Waste from septic tanks, or septage, is not disposed of in a scientific manner in the country. It is discharged untreated in rivers, lakes, ponds or in manholes of sewerage chambers, which ultimately affects working of sewage treatment plants (STPs), designed for treating a fixed sewage load.

Not much work has been done on scientific disposal of septage. Preliminary data on the physical and chemical characteristic of septage indicates that substantial research is needed in India. Based on inputs from international experiences and compilation of information from India, MoUD published an advisory note on septage management in urban India in 2013. It discusses existing septage handling practices and provides guidance on requirements to handle septage in terms of possible treatment technologies, role of urban local bodies in handling it, financial aspects, O&M requirements and reuse options. The advisory has been issued to all the states. But only 11 states have prepared plans for septage management—Karnataka, Tamil Nadu, Kerala, Andhra Pradesh, Mizoram, Tripura, Assam, Chhattisgarh, Uttar Pradesh, Uttarakhand and Maharashtra. Even in these states, the initiatives taken for septage management are mainly on a pilot project basis and supported by international agencies such as the Asian Development Bank, German government's development agency, GIZ, and Bengaluru-

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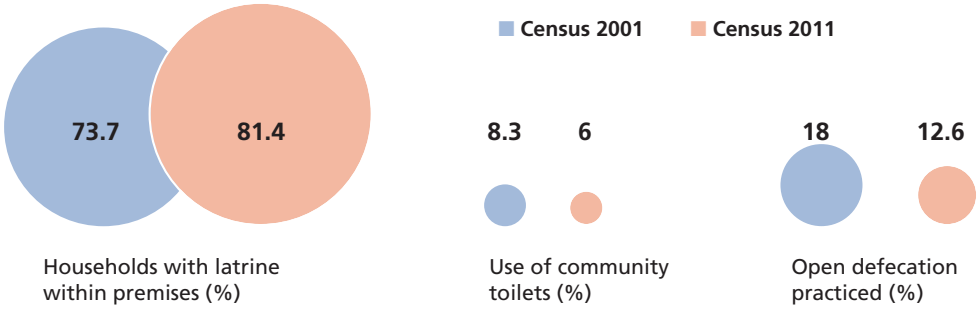
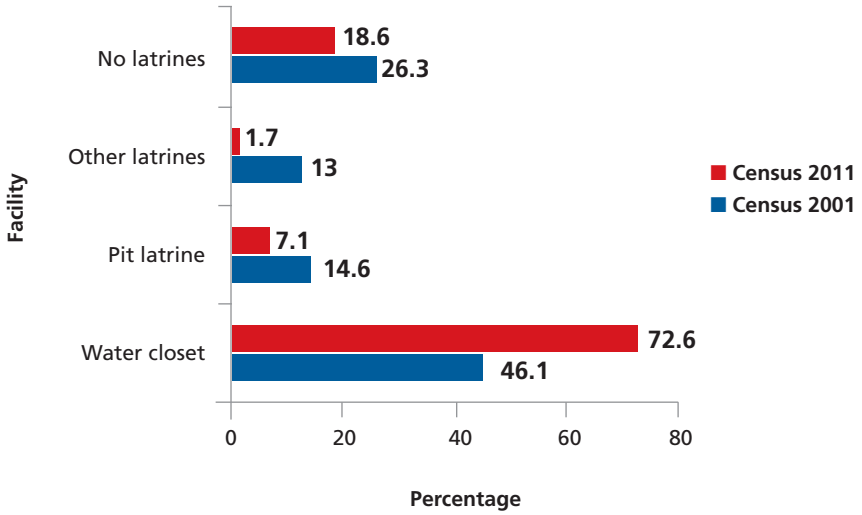
COMPARISON OF CENSUS DATA



Source: Census of India

URBAN SANITATION PROFILE OF INDIA



Source: Census reports, 2001 and 2011

based non-profit Consortium of Dewats Dissemination (CDD). Of these agencies, GIZ has supported the most number of cities in preparing integrated septage management plan under CSPS.

Overall, the initiatives taken for septage management are far from encouraging. Many states are yet to prepare plans. Operative guidelines that conform to the advisory issued by MOUD have so far been issued by only one state—Tamil Nadu, in September, 2014.

Status of urban sanitation

Analysis of data from censuses (2001 and 2011) and National Sample Survey Office (NSSO) indicates that sanitation facilities are improving across India (see 'Comparison of Census data'). But concerns over public health and contamination of surface and ground water due to poor sanitation still remain. The quality of water in rivers, lakes, ponds and wetlands is going down. One of the main reasons for the decline in water quality is contamination caused by the discharge of domestic waste (sewage) into the water bodies without proper treatment.

Census 2001 and 2011 also show that the availability of water closet (toilets with flush facility) is increasing in urban areas and unhygienic practices are on the decline (see 'Urban sanitation profile of India'). In Census 2011, a further bifurcation of the survey on water closet was carried out. This information was not collected in the previous censuses. The move might have been prompted by sanitation goals set by MDGs. Census 2011 also highlighted that the availability of latrine facilities has improved over the years in urban areas.

Comprehensive surveys were also carried out by NSSO in 1973-74 (28th round), 1988-89 (44th round), 1993 (49th round), 2002 (58th round), which provide information on housing and amenities. The most recent surveys were in 2008-09 (65th round) and in 2013 (69th round). The results indicate

« Rewind 2014

Data released by Delhi non-profit Centre for Science and Environment shows that people in Delhi are exposed to shocking amounts of air toxins. The data was gathered following a unique initiative to assess how much pollutants people breathe in on a daily basis in Delhi when overall winter pollution stays high and elevated. The study found that daily personal exposure to toxic air is significantly higher than the background ambient air pollution that is monitored by the Delhi Pollution Control Committee (DPCC) in Delhi. This can be a serious risk to public health

CHINKY SHUKLA / CSE

The cost to economy on account of inadequate sanitation was pegged at ₹2.4 trillion in 2006

that only 12 per cent households in urban India did not have latrine facility in 2009 compared to 33 per cent in 1993.

The NSSO survey (69th round) found that 89.6 per cent households in urban areas have access to improved latrine facilities (see 'What improved latrine facilities mean' *p*79). However, only 82.5 per cent households were found to have improved drainage facilities. The improved drainage facility included underground drainage system and *pucca* drainage (open and covered). The survey also gathered information on additional issues, such as the age groups and gender of people using toilets, the reasons why people were not using toilets despite having one, the problems of flies and mosquitoes in households, and illnesses reported in households within 30 days of investigation.

Efforts so far

Considering the importance of environmental health and economic aspects related to sanitation in India, the government of India has invited cooperation from many international and national organisations. Inputs from the research carried out by these institutions form the basis of the guidelines for various government agencies.

According to one such study by the Water and Sanitation Program (WSP), which is part of the World Bank Group's Water Global Practice, the cost of inadequate sanitation to Indian economy was about ₹2.4 trillion in 2006. Following the concrete steps taken by the Indian government in the form of NUSP, SSS and CSP, many international agencies like the Asian Development Bank (ADB), Bill and Melinda Gates Foundation, USAID, UNICEF and GIZ have partnered with the government to support and achieve goals set under NUSP.

In 2010, ADB drafted a programme for technical assistance in septage management for two Indian states—Mizoram and Himachal Pradesh. Support was provided to these states through consultants for the design of septic tanks or pits, their maintenance, the process of approval of building plans and retrofitting of existing installations to comply with rules. The consultancy also extended to de-sludging, transport and disposal of sludge and revenue sources for septage management, such as tariffs, cess, and taxes, and penalty clauses for untreated discharges. The programme was in association with Urban Development and Poverty Alleviation Department of the Mizoram government. The timelines mentioned on the project website indicate that the process of mainstreaming septage management in ULBs would take three years, which is a considerable timespan.

Households in the neighbouring state of Tripura are dependent on septic tanks. Nearly 78 per cent households have septic tanks and the remaining have dry latrines or unsanitary latrines. In the absence of any city-level septage management plan in Agartala, the water quality of the Haora river, which flows through the city, is poor. The city municipal body has decided to go for co-treatment of septage in the proposed STP of the city.

In addition to seeking international collaborations, MOUD has set up centres of excellence to provide capacity building support, which is mentioned in the road map of NUSP for improving sanitation in India. Centre for Science and Environment (CSE), a Delhi-based non-profit is working in the water and sanitation area, among other things. The institution has brought out seminal publications in the water sector in the past 30 years, compiling experiences from across India. CSE promotes decentralised water management by promoting rainwater harvesting and decentralised waste water treatment systems. While undertaking a research on decentralised waste water treatment systems, CSE came to the conclusion that septage management is a key component of sanitation. The organisation also published a policy paper, titled *Septage Management in India,* in 2011. It highlighted the important aspects and challenges in managing septage decanted from septic tanks (see 'Challenges associated with septage management' on *p*81). It said that the major problems facing septage management in the country included the emphasis of ULBs on centralised sanitation systems, limited financial and human resources, lack of coordination and absence of clearcut responsibilities among institutions, and weak enforcement of laws.

The 2012 septage management advisory report of WSP states that despite a large section of population using onsite sanitation systems, septage management has not been given due attention in India. The findings in the report indicate the following as issues of septage management in India:

a) insufficient knowledge/capacity/awareness and public involvement;
b) inappropriate system design and selection process;
c) poor O&M issues;
d) poor inspection, monitoring, programme evaluation, and regulatory components.

The CSE policy paper and WSP report played a crucial role in the formulation of advisory on septage management in urban India by MOUD in 2013.

But even after a year, no state except Tamil Nadu has evolved a clear strategy or plan of action to deal with septage. Census 2011 says 48.5 per cent of Tamil Nadu's population lives in urban areas. But only 35 per cent of the population is covered by underground sewerage system. A large section uses septic tanks and the septage is discharged into fresh water bodies or storm water drains. On September 1, 2014, the state's Municipal Administration and Water Supply Department issued the "Operative Guidelines for Septage Management for Urban and Rural Local bodies in Tamil Nadu".

WHAT IMPROVED LATRINE FACILITIES MEAN

The state of sanitation facilities available to the households which had access to latrine is reflected in NSSO surveys. In the survey, "improved" latrine facilities include set ups which have "flush/pour-flush to piped sewer system/septic tank/pit latrine, ventilated, improved pit latrine and pit latrine with slab and composting toilet".

In the World Health Organization and United Nations Children's Fund's Global Water Supply and Sanitation Assessment 2000 report, sanitation was defined to include connection to a sewer or septic tank system, pour-flush latrine, simple pit or ventilated improved pit latrine, with allowance for acceptable local technologies.

Rewind 2014

The first global standard to measure greenhouse gas emissions (GHG) from cities has been launched. Called Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), the standard will help cities voluntarily report their emissions, compare it with the emissions from other cities, help them create targeted action plans to reduce the emissions level and consistently track performance

CHINKY SHUKLA / CSE

Twelve per cent urban households in India do not have latrine facility

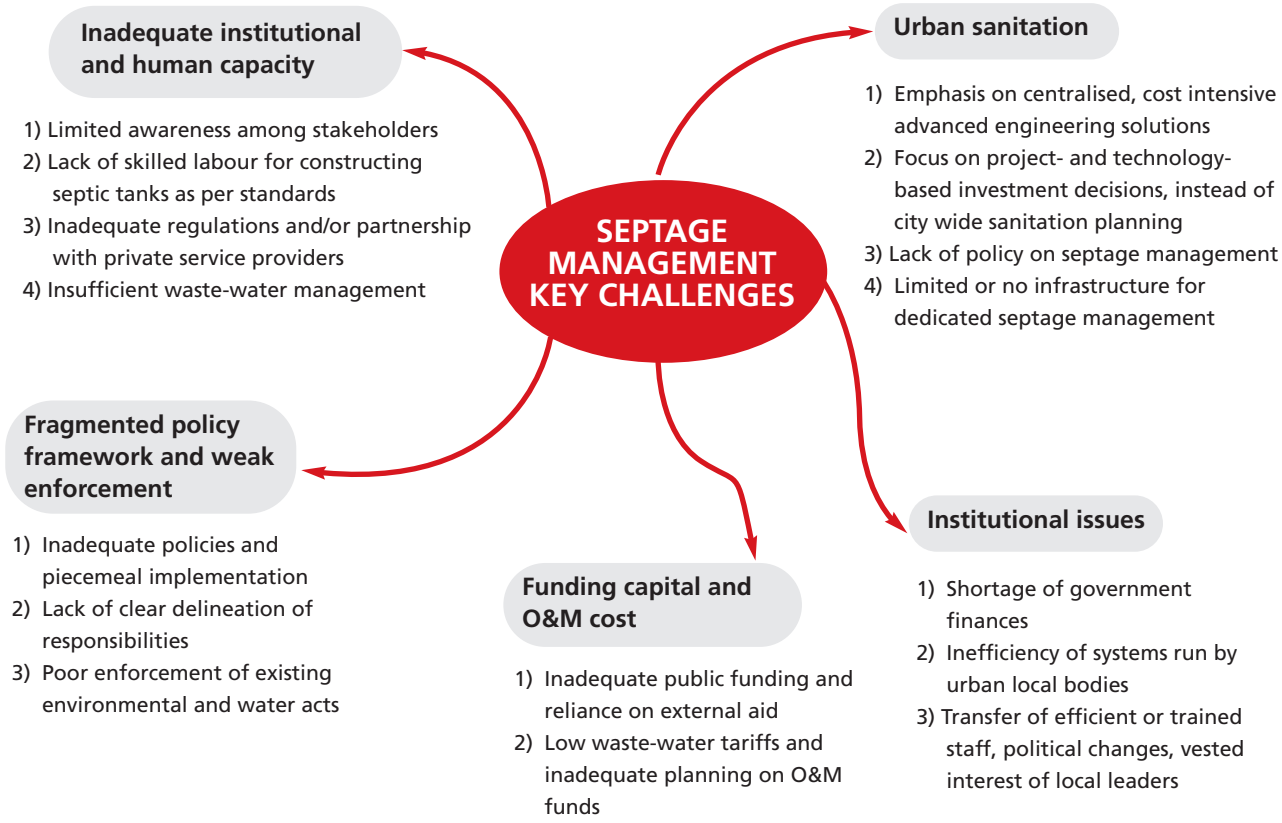
The guidelines have been issued to regulate periodic cleaning of tanks, transport, treatment of sludge and its scientific disposal. The guidelines give emphasis on the design of septic tanks. Provisions to issue notices to owners of septic tanks that do not meet standards have been made under Tamil Nadu Public Health Act. Information, education and communication (IEC) material for municipal staff, residents and septage transporter/operators has been given due importance in the guidelines. It has also fixed charges for de-sludging, transportation and treatment. Rates for treatment have been fixed at ₹150-₹200 per 9,000 litres of septage. There is a provision for periodic revision. Use of management information system (for administrative details) and geographic information system (GIS) will be used to plan the route of septage vehicles. Helpline for residents and pubic grievance redressal are also planned under the guidelines.

Existing septage handling practices

In earlier times septage was handled manually in India. But since the past few decades, septage removal is mainly carried out mechanically. Recently, along with the MOUD advisory on septage management, India also passed the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013. Though this Act is in force, many parts of urban India, including metropolitan cities, still practice manual removal of septage. One of the main reasons for this is that septic tanks in the narrow streets of highly dense settlements restrict the entry of tractors and trucks.

Mostly, the business of handling septage is done by contractors and it is an on-demand service provided to households. Trucks and tractors mounted with mechanical pumps are used to remove sludge.

CHALLENGES ASSOCIATED WITH SEPTAGE MANAGEMENT



In the absence of clear understanding and proper instructions and guidelines from ULBs, septage removed from households by private contractors is disposed of illegally in the open or in waterbodies. This practice prevails in most of India. Disposal of untreated septage in surface water bodies leads to eutrophication and groundwater pollution, too.

Alwar, a case in point

Alwar city in Rajasthan, situated 200 km from Delhi and having a population of about 400,000, exemplifies the problems of septage management in India. Sanitation arrangements are not up to the mark in the city and only 10 per cent of households are connected to the sewer network. The remaining 90 per cent households have septic tanks constructed within the premises, locally known as *kund* or *kunda*. CSE team's discussions with city officials and local people indicated there is no design standard followed in the construction of septic tanks in Alwar. These are mainly constructed by local contractors.

The septic tanks overflow into the drains where the sewage mixes with the water from the kitchens and bathrooms. The sludge is removed only once in 10-15 years when toilets get choked. Local trucks with vacuum containers—there are five of them in the city—remove septage on demand for a fee of ₹600 to ₹800 per trip. The collected septage is usually disposed of in private fields or open drains. At times, farmers use them as manure in fields.

In the absence of clear understanding and proper instructions from urban local bodies (ULBs), septage removed from households is disposed of by private contractors in open areas or in waterbodies and drains. This practice prevails in most of urban India. The government needs to push civic bodies to adopt safe septage handling practices

JITENDRA / CSE

No state with the exception of Tamil Nadu has evolved a strategy plan to deal with septage

Lessons from Musiri pilot project

A pilot septage management project in Musiri town in Tamil Nadu's Tiruchirapalli district is not too encouraging either. The town has a population of over 30,000 people. The project for treatment of sludge from 19 community toilets and about 1,500 septic tanks of the town was launched in 2010.

A sludge treatment plant was constructed with financial assistance from international organisation, WASTE, Netherlands, and District Rural Development Agency of Tiruchirapalli and technical support from non-profit SCOPE, Kochi, Kerala. Prior to the construction of the plant, the septage was being dumped in the Cauvery river or in open land.

The pilot-cum-demonstration unit comprises a vertical flow constructed wetland for treating septic sludge. The unit is essentially designed like a conventional sludge drying bed. In its policy paper published in 2011, CSE had cited this septage management as an example of good practice. CSE researchers revisited the site in August 2014 to find that the project has come to a halt because of the objections raised by local ward councillors, especially because the second phase of the proposed project was not taken up due to lack of funds.

The original proposal incorporated treatment of the septage disposed of by 1,240 trucks (of 1,500 litre capacity each). The facility of emptying the trucks (vehicles) carrying the septage was found to be poor. This was resulting in a spread of septage around the plant. This caused an unbearable stench in the area and led to protests. Moreover, adequate safety measures are not adopted by labourers working at the site.

Since septage management is given a top priority for promoting sustainable sanitation in the state, attempts are being made to revive the project and start the second phase of construction.

Given that the government has set for itself the goal of achieving total sanitation by 2019 under Swacch Bharat Mission, it cannot afford to lose any more time in galvanising civic bodies to adopt best practices for septage management. ■