Thematic Discussion Synthesis

Setting Standards and Financing Waste Water Management in India

Contents

Introduction

Managing waste water is one of the key activities listed by the Ministries of Drinking Water and Sanitation (MDWS) and Housing and Urban Affairs (MoHUA) once an administrative unit becomes free from open defecation (ODF). While the MDWS' guidelines enjoin states to "initiate solid and liquid waste management (SLWM) programmes in ODF villages", the MoHUA's guidelines deals with managing faecal matter. They mandate the regular emptying, treatment and/or safe disposal of septage from toilets.

Waste water management includes the safe collection, transport, treatment and recycling/reuse/disposal of grey and black water. Water is taken from underground aquifers and surface sources such as rivers and ponds. Waste water is returned to mostly surface sources and some re-enters aquifers. In today's reality waste water is in India either completely untreated when it is discharged, or just partly treated. Additionally, there are challenges around setting standards that are achievable, and measuring the quality of effluents. The Central Pollution Control Board (CPCB) has estimated that 80% of India's rivers are polluted by sewage and other waste water from rural and urban areas.

Government of India statistics indicate rural India generates nearly 40,000 million litres per day (MLD) of waste water. Large panchayats, with a population of over 5,000, generate half of this. Cities generate an additional estimated 50,000 MLD of waste water. There is practically no treatment of waste water in rural India; only about a third of waste water from cities is treated.

This indicates a severe problem where untreated waste water is discharged back into rivers or allowed to flow into open spaces and improperly-made soak pits. In all discharge cases, it affects human and environmental health and undermines the purpose of safe water supply and sanitation.

Waste water, therefore, is a boon and a bane. The boon is in the nutrients domestic sewage carries. If health concerns are addressed through proper handling and use – e.g. by following the WHO (2006) Guidelines for the safe use of wastewater, excreta and greywater – this is an assured source of nutrients and water for farmers.

Across India, industry has been lifting and treating raw sewage for its use. However, in an 'Insights Discussion' on Experience sharing on wastewater challenges and solutions, organized by SuSanA, IRC and the India Sanitation Coalition in Mumbai, it emerged only a few state governments are systematically promoting the reuse of sewage under public-private partnerships. In Gujarat, several municipal corporations have signed memoranda of understanding with farmers' organizations to sell sewage.

Your sub-topic leads were:

Alka Palrecha who founded People in Centre, in Ahmadabad, a consulting service organization engaged in developmental works. She works with urban and rural communities for community-based management of water resources.

Sharada Prasad who is an assistant professor at the Azim Premji University, Bangalore, India. He has researched sanitation access and work in low- and middle-income countries.

This discussion will examine a few aspects of the waste water economy. In November 2018, the SuSanA India Chapter, IRC and TARU organised a face-to-face 'Insights Discussion' on sharing experiences on waste water challenges and solutions, facilitated by the Ecosan Services Foundation, in Mumbai. The link to the Insights Discussion document is available here. That discussion brought out five issues – setting standards for using waste water and sewage, faecal sludge treatment is not cheaper than sewage treatment, it has been a challenge getting

companies involved in waste water treatment, ownership of waste water and alternative financing mechanisms.

This thematic discussion took a deeper looker at setting standards and alternative financing mechanisms. Alka Palrecha from the NGO People In Centre steered the first sub-topic while Sharada Prasad from the Azim Premji University in Bengaluru steered the second.

Discussion Summary

The first part of the discussion, led by Alka Palrecha, was about setting standards to institutionalise the use of waste water in agriculture. In her opening comments, Alka said conflicts over water were on the rise owing to rising demand and supply constraints.

Cities generated waste water that was a resource for downstream farmers as it was rich in phosphorous and 60 other nutrients. The total sewage generated could irrigate an estimated 1.5 million hectares of land annually, reduce the consumption of chemical fertilisers and possibly, pollution of surface water. It could also generate 130 million person-days of employment.

Standards for waste water for use in agriculture should be developed in consultation with end-users, i.e., farmers. This has not been the practice till now by the World Health Organization (WHO) or the Central Pollution Control Board (CPCB). A consultative approach will help factor in their needs and concerns into the standards for using waste water and sewage in agriculture. These standards also need to balance the costs of treatment with the most appropriate standards.

India has developed standards for the disposal of waste water by various users but none for its reuse. For example, STPs can discharge treated sewage that complies with CPCB standards into surface water. A few states, however, have issued policies for reusing waste water or sewage by industry and agriculture.

The importance of waste water or sewage in agriculture is apparent from the fact that farmers have built infrastructure with their own money for this purpose in Karnataka and Gujarat. They have developed crops and methods. The benefits, Alka said, is the assured availability of water and nutrients, and lower fertiliser costs. Farmers thus provide ecological services.

This leads to the question of ownership of the waste water. Cities are keen to treat and reuse water. Industries also eye the same resource. If raw water is sourced from rural areas, , in her opinion rural areas should have the right to wastewater generated. It also helps close the nutrient loop essential for rapidly depleting minerals like phosphorus .

The most appropriate uses of waste water were in agriculture and industry, said Nitya. If it had only domestic sewage it could be used by farmers without worrying about toxicity from industrial effluents. However, sewage mixed with industrial effluents could be treated and used by industries, reducing the demand for fresh water, and pollution. Ajit Seshadri said waste water could be treated in STPs or naturally and used in agriculture, or by urban local bodies (ULBs) to water green spaces. However, Sampath Kumar Thothathri differed, saying the lack of oxygen in sewage would be detrimental to plant growth. This could be solved by partial treatment. Himanshu Thakkar said an urban water policy would help place reuse within a larger, planned context.

Regarding the ownership of waste water – whether it is owned by the city, industries or farmers – there were no clear answers. Respondents acknowledged raw water is often sourced from rural areas. While cities did now own the water, there were no institutions in rural areas to pay for the water. Ajit said if water was drawn from large farm holdings, those farmers could be paid directly. Nitya said cities

should treat and transport water at their own cost to farmers. As most farmers who used waste water lived close to cities, this was practical and could make economic sense. For treatment, while STPs are the method of choice, they do not work satisfactorily in most cases.

Waste water is being used in Delhi, said Ajit, by the South Delhi Municipal Corporation to irrigate parks in Vasant Vihar, a colony. Farmers in Kuthpura village in Agra are using water treated through a decentralised treatment system for farming. Himanshu said decentralised systems should be promoted instead of STPs.

Standards have been set by CPCB for discharging treated water into rivers and lakes, sewers and land for irrigation. These cover 35 parameters including colour, suspended solids, biochemical oxygen demand, arsenic and nickel. Saloni Shah shared standards for STPs, waste water discharge and the recommended microbiological guidelines for treated waste water use in agriculture of WHO. These specify the standards for intestinal nematode eggs (less than 0.1 per litre for crops to be eaten raw) and faecal coliforms (less than 1,000 per 100 ml). They also recommend the kind of treatment that would achieve this for raw sewage. These are well-designed waste stabilisation ponds and treatment reservoirs.

In the second part of the discussion, on alternative financing mechanisms for waste water, Sharada Prasad said infrastructure costs comprise capital and running costs. Even as efforts are being made to popularise decentralised treatment systems (DEWATS systems), development banks have been investing 20 times more in conventional infrastructure than in DEWATS systems. As a result, faecal sludge management that addressed the needs of poor parts of cities, did not get adequate attention. People connected to sewers paid only a fraction of the capital and running costs but those dependent on on-site systems paid much more.

Arkaja Singh from the Centre for Policy Research said faecal sludge management (FSM) sought to address this gap through a sustainable 'non-network' solutions. The national policy for faecal sludge and septage management and state policies were steps in that direction. However, several legal issues remained unresolved. These concerned the powers and responsibilities of local authorities, standards for hygiene and safety in managing sanitation, the law prohibiting manual scavenging and a policy framework to facilitate private operators. She asked how the ‘polluter pays’ principle could be applied to sewage or faecal sludge treatment.

Pointing out the cost differences between sewered and on-site sanitation systems, Gunilla Oberg asked the community if there was a large difference in expenditure on both systems. Sharada pointed out a study which indicated that in the poorest quintile, households’ sanitation facilities were almost 170 times more likely to require FSM (vs sewerage) than in the richest quintile. Nitya said urban infrastructure programmes in India had set aside large budgets for waste water, notably sewage, treatment. These were much higher than the investments in faecal sludge treatment plants (FSTPs). In the last few years several cities and towns had started making FSTPs that did not conform to any known design norms just to get certified by the Central Government, and claim pecuniary benefits.

Under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), according to a link shared by Paresh Chhajed, cities have to survey and prepare annual action plans. Data is collected on the numbers of households connected to onsite and sewered networks but the planning and budgeting for both is combined. Disaggregated data on FSTPs and sewer networks and STPs is not available.

Another report, Excreta Matters, provides some indicative costs of sewage treatment plants but not of sewage networks. This is more evident from a report, Estimating the investment requirements for

urban infrastructure services – Report of the High Powered Expert Committee (HPEC) of the Ministry of Urban Development (as the Ministry of Housing and Urban Affairs was called earlier).

In addition to finances, it was important to understand effluent standards from DEWATS plants and FSTPs, said, G Kondala Rao. Neha Modi brought up the issue of handling the faecal waste from migrant colonies; it not connected to any network or FSM system, these were a major source of 'deferred open defecation'. The problem here was the cost of connections or handling, that was too high for migrant labourers to afford, and even building owners were reluctant to pay. Ajit said connection or collection charges were a deterrent. The performance of ULBs was not monitored.

Topic 1: Standards for Institutionalizing use of Wastewater in Irrigation

In her opening comments, Alka Palrecha said water had become the subject of conflict with its rising demand and scarce supply. Cities were major waste generator, with domestic waste being disposed in semi- or untreated form in water bodies. The same water was used by the farmers downstream for irrigation. common and seem most appropriate as it requires minimal treatment if the waste is domestic.

Wastewater helped in recycling phosphorus and 60 other nutrients back into the soil. It completed the loop as the aquifers were recharged and the same water could be used for portable purposes thereafter. India's sewage waters could annually irrigate about 1.5 million hectares (Mha) of land area and had the potential to contribute over one million tonnes of nutrients and 130 million man-days of employment, she stated.

In this situation and given that sewage treatment plants (STPs) do not work optimally, it had been suggested standards for waste water use in agriculture be developed in consultation with the users of waste water or sewage. WHO or CPCB had not followed such as consultative process to develop standards for using waste water in agriculture. In the case of use by agriculture, it was suggested that farmers should be part of the process to understand and incorporate their concerns about using waste water or sewage. The standards and process needed to balance these concerns with costs of treatment to provide the most appropriate combination.

Determination of global standards for treatment should be reconsidered depending on its reuse post the treatment to appropriately deal with health and environmental issues. The legal framework in India had disposal standards of wastewater but no standards for reuse. For instance, there were standards available for STPs to release wastewater into water bodies or land after treatment but if a farmer lifted and applied it for irrigation, there were no standards. The disposal standards did not include industrial pollutants and needed to be revised considering there was industrial pollutant load mixed with domestic pollutants almost from every city that was sewered. Currently, some states had policies of wastewater reuse but not standards.

Alka said farmers understood the importance of using the wastewater and had invested millions of their own money to construct the infrastructure. Investments could be documented in the states of Karnataka and Gujarat. They had prepared lists of crops which worked best with wastewater without any help of experts like agriculturists.

The benefits of using waste water included year-round availability, improved productivity, higher nutrient value, and lastly reduced fertilizer cost, said Alka. Since the performance of STPs was found to be sub-standard in most developing countries, farmers' fields could become the treatment farms if planned in a safe and appropriate manner.

About the ownership of waste water, she said were rural-urban conflicts. While farmers had been using wastewater for a long time, completing the loop and providing ecological services, industries had entered the scene relatively recently. Cities also planned to reuse treated waste water for non-potable purposes. She posed the following questions -

1. What is the most appropriate use of wastewater?
2. Who owns the wastewater – industries, cities or farmers? Therefore, should farmers buy water from cities, or should cities pay them to take and use waste water?
3. What standards already exist in India and abroad (such as those developed by WHO, USEPA or CPCB) for reuse of treated sewage for agriculture?
4. Examples of reuse of treated sewage for agriculture in India and their compliance to standards (monitoring and enforcement)

Reinforcing Alka's statement that water had become a matter of contention between rural and urban areas, Nitya Jacob said was also an opportunity for building bridges but water needed to be treated before it could be safely reused. Depending on its quality, waste water could be used in farming or by industry and for power generation. The biggest advantage in the first use case was the assured availability of water and nutrients. Waste water from villages that was relatively free from chemicals was better suited for this than waste water from cities.

Ajit Seshadri said in urban areas, waste water could be used to irrigate green areas. If the hydraulic retention time in wetlands was a week or more, considerable remediation occurred naturally, and the water was fit to be reused safely for irrigation. The wetlands could be used for remediation of waste water. Waste water from cities were an assured water supply all year round for farmers. An urban water policy could be framed to provide an effective environment for these issues, said Himanshu. The key area to be tackled was governance.

With some treatment, urban waste water can also serve the same purpose. If industry were to use urban waste water (as estimated by Alka in her comments), it would reduce the demand for fresh water by that amount and thereby, the stress on water resources. It would also reduce the pollution caused by the release of untreated waste water that impacts people living downstream, said Nitya.

He quoted the example of people in villages around Baghpat in Uttar Pradesh who had reported high rates of cancer as sugar mills and other industries running illegally had polluted the river water by dumping hazardous material in several cities. Himanshu suggested bio-remediation as the preferred treatment method.

The ownership issue was unclear. Even though source was predominantly rural, and some cities paid irrigation departments for water with return clauses, the issue was who would the city pay to use water and return it, after treatment. It they were to pay farmers from whose lands the water has come, there were no institutions that a city corporation could pay other than the state irrigation department. However, if a municipal corporation wanted to return the water for irrigation, it should provide the infrastructure - treatment and distribution - to the command area rather than putting the onus for collection and transport on users. A study by the International Water Management Institute showed most farmers using waste water lived in or around a city, said Nitya.

The issue of ownership, Ajit said, had to be assessed with prudence. It would be seen that if water was sourced from large fields, then actual costs could be worked out. But if the water came from small holdings the costs could be waived. On the other hand, if recycled water is put to use in construction activities then it could be charged for.

Wastewater could be used to irrigate non-food crops, those that are not consumed directly or raw. In several countries and parts of India, this was an established practice but acceptability of such food crops may be low. WHO has reported a study in which infections of ascaris and hookworms were twice as high among farm workers on fields irrigated by waste water compared to those using fresh water.

Additionally, in Delhi, about 60,000 litres of waste water was being used to irrigate about 10 acres of parks in Vasant Vihar, a colony in Delhi. Ajit said water from a drain flowing from 2 villages outside Agra was being treated through DEWATS and used for growing vegetables and seasonal crops over 6 acres in Kutchpura village.

Farmers were not in a position to pay for treated sewage, Himanshu said. If farmers were already using surface water for irrigation and were offered treated sewage instead, it was necessary to ensure that the water thus saved was used for domestic or ecological purposes. Rather, farmers were providing ecosystem services by treating the wastewater and putting it back in the system by way of irrigation. They should be paid for the services rendered by them.

Sampath Kumar said if untreated/partially treated water was used for the plants would suffer since they needed oxygen through the roots. The common methods of treatment through effluent treatment plans and STPs was expensive and cumbersome. Very often these plants did not work and the untreated water was let into water bodies. A product called Nualgi Lakes could be added to polluted water bodies to promote the growth of diatom algae to photosynthesise and produce oxygen. The company had a contract from the National Mission for Clean Ganga (NMCG) where it had treated a 37 km long drain near Haridwar using this technology.

Topic 2: Financing Capital and Running Costs

In his opening comments, Sharada Prasad, an assistant professor with the school of development at the Azim Premji University in Bengaluru, any treatment infrastructure, be it sewage or faecal sludge, involves two major components – cost of Construction and costs related to operation and maintenance (O&M). However, the problem with treatment infrastructure financing in India can be broadly classified into three categories:

1. Raising the necessary capital for building the infrastructure
2. Generating revenue for O&M of the infrastructure
3. Building adequate capacity for proper O&M of the infrastructure

Though there has been considerable effort to popularize decentralized treatment systems and FSM, a recent study by Cranfield University has found out that development banks have been investing 20 times more money in sewerage infrastructure compared to FSM. While this might change in the coming years, it is doubtful that FSM will become as popular as sewer infrastructure. Nonetheless, treatment facilities for faecal sludge also needs to be financed. Research has also shown that poorest section of the society needs FSM more than the rest (the richer neighborhoods in the city usually get sewer infrastructure first).

Sewer infrastructure, to a large extent, is not funded by directly by the people who get connected to it. The politics surrounding the tariff has been such that the users connected to sewers are not even paying fully for the operation and maintenance. FSM on the other end is a different story. Homeowner pays for the pit as well as the emptying of the pit. Government is not sharing the burden. It has not even providing the necessary infrastructure to treat the sludge. As a result, the current cost of emptying does not involve any treatment expenses. How do we change this? What type of financing

structures do we need to treat both sewage and sludge without burdening poorer section of the society?

India is not focusing the treatment of waste as much as it is focusing on solving the access problem by building more toilets. India is not managing its waste, it is only moving it. Eventually, India has to face the problem of adequate treatment. That means it needs to think about how to build and manage treatment infrastructure. He posed the following questions:

1. What are the existing and new financing mechanisms and sources of finance?
2. Which financial institutions lend to the sector, to which sort of entity (private, government or non-profit), and for what (capital or running costs)?
3. What are principles (such as 'The polluter pays') that can be applied?
4. How to ensure that the investment in treatment infrastructure is pro-poor and equitable in nature?
5. What kind of legislation and enforcement is required?
6. How do we ensure that faecal sludge treatment gets the necessary financing?

Responding, Arkaja Singh from the Centre for Policy Research referred to a Dialogue around some of the legal and institutional issues relating to FSM, including the role of environment laws, health and safety, and the issue of manual scavenging, as well as options for financing FSM infra and services. She asked Sharada what he meant by 'polluter pays' in this context? The National Green Tribunal of India uses this term in context of domestic wastewater and faecal sludge, but those are really gross misapplications of the principle.

Sharada said the 'Polluter Pays principle' in case of sewage treatment could be that the house / apartment complex / commercial building bore the entire cost of collection, transport, and treatment. In that case, there would not be any kind of subsidy / support from the city's side (which is currently what is happening).

However, currently, at least in Bangalore and Hubli - Dharwad, the money charged by the truck operator is mostly to move the waste from the household to a dumping ground, which could at times include farm lands. Households are not bearing the cost of the treatment. Current emptying / collection costs do not account for several externalities. If sanitation workers needed to be trained and paid proper wages, provided with necessary safety gear, and the waste needed to be treated adequately, the cost of faecal sludge emptying might be really high. The 'Polluter Pays Principle' might make it very expensive for poorer segment of the society. In a paper by Berendes et al, it is said "FSM needs scaled inversely with wealth: in the poorest quintile, households' sanitation facilities were almost 170 times more likely to require FSM (vs sewerage) than in the richest quintile".

Neha Modi from the Urban Management Centre, said it was incorrect to assume cities were not paying for the entire cost of the system. Users paid ₹ 1,000 – 2,000 per sewage connection, which was nominal. The rest was paid as, 'VERA bill, in Gujarat. She said the major issue and the challenge in the cities was the floating population. The areas where they stay are not connected to sewage networks and many defecate in the open.

Sharada said while cities were not providing any support for FSM, many were building FSTPs. Regarding the floating population, the problem was how cities did not provide them basic sanitation infrastructure. In Bangalore, migrants who lived on construction sites lacked access to toilets. He gave the example of the Indian Institute of Technology, Delhi, where the swimming pool was being renovated some years ago. There was a labour camp right next to the swimming complex whose

workers had to defecate in open, inside campus, even though there are toilets in every building. The security guards did not allow these workers (some of them were women) to use the toilets.

Asking respondents for hard data that demonstrated the most common approach is still centralized sewer systems, Gunilla Oberg said considerably more funding seemed to be directed towards conventional sewer systems. The Cranfield study showed 20 times more was invested in conventional sewer systems. Additionally, the build-out rates for conventional sewer systems were too slow to be feasible for rapidly growing urban areas and that such an approach therefore would be a lost catch-up game from the start.

Quoting his findings from Bangalore and Hubli-Dharwad, Sharada said sewer networks in those cities were not expanding at the same pace as the rate at which those cities are growing. However, Bangalore was expanding its sewer network in the periphery. If the city's population grew without much increase in geographic area, the sewer network might not be too far behind. However, getting connected to the sewer did not always mean that the sewage was getting treated.

Septic tanks were here to stay and the requirement to treat faecal sludge would remain but the Bangalore Water Supply and Sewerage Board (BWSSB) said FSM not their remit. Instead, they were confident, said Sharada, that sewer networks would eventually cover all of Bangalore.

Regarding FSM costing and capacity, he said it had been hard to find data on how much the Bill and Melinda Gates Foundation (BMGF) has spent on each of its treatment plants. The Foundation has funded several 'pilot' plants.

Nitya responded to the question of costs of sewered vs. septic tank systems. From the urban infrastructure development programmes of the Government of India, that started with the Jawaharlal Nehru National Urban Renewal Mission in 2005 and went onto the Atal Mission for Urban Transformation (AMRUT), it appears the single largest expenditure was on water infrastructure, including sewers. This included water supply, sewage systems and drainage. While India's urban sanitation policy, of Swachh Bharat Mission Urban had a 5-year budget of Rs 63000 crore (Rs 6300 billion, roughly $1 billion), this was much less than the amount budgeted for infrastructure.

He said while the 2011 Census showed about a third of urban toilets were connected to septic tanks and the same number to sewage systems, this was not reflected in expenditure. This bore out Sharada's contention that it was mostly the poor parts of large and medium cities that were unsewered and therefore, dependent on septic tanks. Also, most of India's 4000 small towns are unsewered and depend on septic tanks. These were not made up of all poor people, but the ULBs were not well-off and cannot afford sewage systems.

Cost of sewage project in one part of Guwahati	
Location of the Project	Guwahati Kamrup Metropolitan District
Target Population	2020: 1.01 million 2035: 1.4 million 2050: 2.3 million
Project Implementation Period	7 years
Construction of Capacity Treatment Plant	STP (ASP technology) 187 MLD
Trunk Sewers	201 km
Lateral Sewers	501 km
Laying of Pumping Main Station	16.9 km
Gravity Main	184 km
Number of Pumping Stations	5
Number of Lifting Stations	18

Number of House Connections	101058
Trenchless Pipe Laying	880
Total Project Cost	₹ 118 billion

He felt governments should provide the capital outlay to develop proper FSM since the public would not be able or willing to finance this. However, users (or polluters) need to pay for operations and long-term capital maintenance of the facilities through property taxes, collection charges, etc. In slums of small and medium towns where people earn little, a cross-subsidy could be worked out where those in richer colonies pay more (through higher property taxes). User fees from public/community toilets can also offset some of these costs.

The blind rush across the country Nitya said, to make faecal sludge treatment plants was worrying. Many did not conform to any standards but were being put up so cities could claim to be ODF++ under Government regulations and glean additional funds from the state or central governments. This was reminiscent of the toilet building rush that SBM unleashed on India. It also underlines the fact we are not concerned about treating sewage but merely shifting the problem elsewhere.

Regarding legislation, building bye-laws were needed to reflect the need to manage pollution from septage and sewage. Septic tanks had to be made properly, not just single pit holding units. Their outlets, connected to open drains, had to be disconnected and directed to soaking areas. Pit toilets had to be built in keeping with user needs, not national norms, i.e., the number of users in a house. Solid waste that chokes these had to be collected and handled properly. The use of treated water and sludge from STPs/FSTPs should also be part of the bye-laws. Model laws could be drafted and modified as individual ULB needs in addition to policies on faecal sludge management.

Responding to Gunilla Oberg, Nitya Jacob said centralised sewage systems were not the only solution. But choices need to be tempered with caution. Decentralised systems may be cheaper to make and eco-friendlier than STPs, but their operators were usually small-time contractors. These people cut corners on maintenance and employed human beings to clean septic tanks and sewers and suffocated to death.

To understand how effectively FSTPs and DEWATS plants were, G K Rao said it was essential to measure the actual effluent discharge parameters. Although discharging septic tank effluent to storm water drains was not a satisfactory or permanent solution, leading it to soak pit as per standards meant they needed regular emptying. The addition of a simplified sewerage system or small bore sewerage system would help to make them environment safe.

The State Annual Action Plans (SAAP) prepared by state governments provided some information on the current flow of investments in India, said Paresh Chajjed. Also, a report of the high-powered expert committee (HPEC) of the Ministry of Urban Development (2008) to calculate investment needed for urban infrastructure made assumptions of per capita cost for sewerage based on city size for construction and O&M.

Ajit said the point regarding connection charges that you are making is probably related to sewer systems alone. There was no responsibility to ensure the safe disposal of sewage, waste waters and solid waste. There had to be norms for recovering and reusing sludge.

Respondents

The following SuSanA members contributed to the discussion

Name	Organization	Country
Alka Palrecha	People in Centre	India
Nitya Jacob	SuSanA India Chapter	India
Ajit Seshadri	Vels University	India
Saloni Shah	People in Centre	India
Gunilla Oberg	University of British Columbia	Canada
Neha Modi	Indian Institute of Technology – Gandhinagar	India
Paresh Chajjed	Indian Institute of Technology – Bombay	India
G K Rao	Freelancer	India
Sharada Prasad	Azim Premji University	India
Arkaja Singh	Centre for Policy Research	India
Sampath Thothathri	Nualgi	India

Compiled by Nitya Jacob (Coordinator SuSanA India Chapter) and reviewed by Alka Palrecha and Sharada Prasad. March 2019.

The Thematic Discussion Series Host

The thematic online discussion "*Setting standards and financing waste water management in India*?" hosted by the Sustainable Sanitation Alliance (SuSanA) on the SuSanA Discussion Forum. The discussion is part of a series of online discussion taking place under the umbrella of the SuSanA India Chapter.

To view the whole discussion, please go to the SuSanA Forum:

https://forum.susana.org/setting-standards-and-financing-waste-water-management-in-india-thematic-discussion-india-chapter-february-2019

Further Reading

1. Effluents discharge standards in India https://forum.susana.org/media/kunena/attachments/13606/StandardsTable1.pdf
2. Standards for STPs in India https://forum.susana.org/media/kunena/attachments/13606/StandardsTable2.pdf
3. Recommended revised microbiological guidelines for treated wastewater use in agriculture https://forum.susana.org/media/kunena/attachments/13606/StandardsTable4.pdf
4. Amerasinghe, P.; Bhardwaj, R.M.; Scott, C.; Jella, K.; Marshall, F. 2013. Urban wastewater and agricultural reuse challenges in India. Colombo, Sri Lanka: International Water Management Institute (IWMI). 36p. (IWMI Research Report 147). doi:10.5337/2013.200. Available at https://www.gwp.org/globalassets/global/toolbox/references/urban-wastewater-and-agricultural-reuse.-challenges-in-india-iwmi-2013.pdf
5. Dialogues on Sanitation: 'Legal Perspectives on Sanitation in Urban India' (invite only) on how cities across India need to come to terms with the challenge of establishing Faecal Sludge Management (FSM) systems, protocols and services to address their 'non-network' sanitation needs. You can view the video clips at http://www.cprindia.org/events/7313
6. P. Hutchings, M. Johns, D. Jornet, C. Scott and Z. Van den Bossche, 2018. A systematic assessment of the pro-poor reach of development bank investments in urban sanitation. Journal of Water Sanitation and Hygiene for Development, 08.3, 2018. https://forum.susana.org/media/kunena/attachments/2721/washdev0080402.pdf
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11. Sharada Prasad, 2018. Comparison of STP and sewers for 2 towns. https://forum.susana.org/media/kunena/attachments/2721/HDSTPandUGDDetails.pdf
12. Nitya Jacob, 2019. Costing of sewage treatment project in Guwahati, available at https://gmdwsb.assam.gov.in/portlets/jica-assisted-guwahati-sewerage-project
13. Shah, Tushaar; Verma, S.; Durga, N.; Rajan, A.; Goswami, A.; Palrecha, A. 2016. *Har Khet Ko Pani* (Water to Every Farm): rethinking Pradhan Mantri Krishi Sin chai Yojana (PMKSY) Gujarat, India: IWMI-TATA Water Policy Program. 23-25 pp.