SWACHHATA HI SEVA 2024
17th September - 2nd October 2024
Swabhav Swachhata - Sanskaar Swachhata

सत्यमेव जयते
Ministry of Housing and Urban Affairs
Government of India

स्वच्छ भारत
एक कदम स्वच्छता की ओर

OUR COLLECTIVE CONTRIBUTION TOWARDS SWACHHATA

A Repository of Publications

Part A : Articles

TITLE
OUR COLLECTIVE CONTRIBUTION TOWARDS SWACHHATA: A REPOSITORY OF PUBLICATIONS

PUBLISHER
NATIONAL INSTITUTE OF URBAN AFFAIRS, DELHI

YEAR OF PUBLISHING
2024

CREDITS
Sanitation Capacity Building Platform (SCBP), NIUA
Regional Centre for Urban and Environmental Studies (RCUES), Lucknow

EDITING AND COMPILING
Dr. Mahreen Matto, Team Lead, SCBP
Mr. Shantanu Kumar Padhi, Senior Programme Manager, SCBP
Ms.Tanya Ahmed, Programme Officer, SCBP
Mr. Anant Mitra, Programme Officer, SCBP
Mr. Sachin Sahani, Technical Programme Officer, SCBP
Ms. Vanshika Bajaj, Intern, SCBP
Ms. Shatabdi Sinha, Intern, SCBP
Ms. Pragati Singhal, Intern, SCBP

GRAPHIC DESIGN
Design Team, NIUA

Contributing Organisations

- BBC Media Action (India)
- Centre for Science and Environment (CSE), New Delhi
- Center for Water and Sanitation (CWAS), CRDF-CEPT University, Ahmedabad
- Dasra, Mumbai
- Global Interfaith Wash Alliance (GIWA), Rishikesh, Uttarakhand
- Goa Waste Management Corporation
- National Faecal Sludge and Septage Management (NFSSM) Alliance
- National Institute of Urban Affairs (NIUA), New Delhi
- Tamil Nadu Institute of Urban Studies (TNIUS), Coimbatore

Message

As we proudly celebrate the 10th anniversary of the Swachh Bharat Mission (SBM), it is with great honour that I introduce this knowledge repository—a comprehensive compilation of published journal papers and articles focused on sanitation and waste management.

This repository comprises a range of reports, anecdotal experiences, and field-based learning that shall aid in developing a deep understanding of the impacts of the SBM at the ground level. By encapsulating a decade of SBM's progress, it showcases a wealth of topics, including sustainable sanitation strategies, community engagement, and the essential role of women in sanitation efforts.

This repository documents the Mission's impact across India, highlighting the efforts made towards building a Swachh nation. By leveraging the insights collated in this document, we aim to inspire cities to adopt sustainable sanitation practices.

Together, let us continue our commitment to building a Swachh Bharat, striving for a clean and sustainable future for all.

Dr. Debolina Kundu
Director
National Institute of Urban Affairs

Contents

Part A: Articles

Sanitation

Solid Waste Management

Inferences

The Swachh Bharat Mission (SBM), launched in 2014, is a transformative initiative aimed at eliminating open defecation and enhancing sanitation across India's urban and rural landscapes. This comprehensive collection of articles documents SBM's journey, outlining its progress, challenges, and best practices, while highlighting the diverse participation of government, local communities, and private sector partners in promoting a cleaner, healthier India.

A significant focus of the initiative is its impact on public health. SBM has raised awareness about the negative effects of poor sanitation, leading to greater community acceptance of sanitation improvements. By showcasing success stories targeting marginalized populations, the document emphasizes the value of inclusive urban sanitation strategies. Multi-stakeholder collaborations involving urban local bodies, state governments, citizens, and private entities are highlighted as crucial for effective service delivery.

Financial commitments to SBM are substantial, with the 2021 union budget allocating Rs 1.41 lakh crore for SBM 2.0 and Rs 2.87 lakh crore for the Jal Jeevan Mission (JJM). These funds facilitate the construction of individual household toilets (IHHL), community toilets, and faecal sludge treatment plants (FSTPs). Remarkable achievements include the construction of over 109 million toilets and the declaration of more than 600,000 villages as Open Defecation Free (ODF), which correlates with notable decreases in infant and child mortality rates.

The initiative has supported 100 million rural households and 500 million residents in accessing toilets across 630,000 villages. Households in ODF villages save up to INR 50,000 annually, with total benefits exceeding costs by 4.7 times (UNICEF, 2018). In ODF villages, soil and groundwater sources are less contaminated than in areas without complete toilet coverage (UNICEF, 2019). SBM has also created approximately 7.5 million full-time jobs, contributing to economic and environmental benefits while aligning with other Sustainable Development Goals (SDGs).

The document addresses gender equity in sanitation, emphasizing women's participation and leadership in decision-making processes. Articles showcase interventions designed to empower women as sanitation entrepreneurs and service providers, reflecting the necessity of understanding gender-specific needs.

Case studies from states like Uttarakhand demonstrate substantial progress in wastewater management through community engagement and public-private partnerships (PPPs), highlighting innovative approaches to water reuse and waste management. These examples provide scalable models for other regions. Community management committees (CMCs) and self-help groups (SHGs) empower women and marginalized groups to take ownership of sanitation services, fostering a sense of community responsibility.

Overall, the document serves as a testament to India's commitment to creating a cleaner and more equitable society through SBM. By focusing on inclusive practices and multi-stakeholder collaboration, the document aims to inspire continued efforts toward sustainable sanitation solutions, reinforcing the notion that access to clean and safe sanitation is a fundamental human right essential for public health and environmental sustainability.

Part A

ARTICLES

Sanitation

- 3 Containment
- 3 Emptying and Conveyance
- 5 Treatment and Operations
- 6 Safe Disposal
- 2 Reuse and Recycle
- 16 Integrated approaches (Inclusion, equity, safety)
- 15 Enabling environment: Planning, scaling, and sustainability

Solid Waste Management

- 1 Processing
- 2 Safe Disposal
- 1 Reuse and Recycle
- 1 Integrated approaches (Inclusion, equity, safety)
- 1 Enabling environment: Planning, scaling, and sustainability

TOTAL ARTICLES: 56

ORGANIZATION TYPE

- 1 Government
- 3 NGO, CSO, Development partners
- 1 Faith Organisation
- 3 Institutions

BW Healthcare WORLD.com

NFSSM Alliance With Ministry Of Housing And Urban Affairs Bring SBCC Primer As Tool For Sanitation

BW Online Bureau | May 11, 2022

The NFSSM Alliance has developed the Social and Behaviour Change (SBCC) Primer which was released in collaboration with the Ministry of Housing and Urban Affairs at the launch of the National Behaviour Change Communication Framework for Garbage Free Cities. Aligning with the government's vision of shifting from IEC (information, education and communication) tools to SBCC (social and behaviour change communication), the SBCC Primer aids the on-ground implementation of behaviour change to achieve inclusive sanitation outcomes.

Targeted toward sector practitioners and government implementers, the Primer lays down a blueprint to approach SBCC using a scientific methodology leveraging case studies to guide and build the capacity of target stakeholders in urban sanitation. The primer also includes insights from BBC Media Action's on-ground experience in impacting communities using communication strategies.

A few key points from the primer include: Tools, techniques and strategies that can be used to develop, implement and evaluate SBCC programs. These are illustrated using case studies based on implementation to guide and aid replication by practitioners. Guiding practitioners and implementers from rollout to evaluation of SBCC, the document will be a valuable learning tool to aid community-centric systemic changeto enable inclusive sanitation outcomes for all communities.

The event was organised at Nirman Bhavan, Ministry of Housing and Urban Affairs (MoHUA), New Delhi in the presence of key dignitaries including Roopa Mishra, Joint Secretary, Ministry of Housing and Urban Affairs. Other speakers and eminences at the event included Dr Anubhuti Yadav, Professor, Indian Institute of Mass Communication; Radharani Mitra, Executive Producer BBC Media Action (India); Saumil Ranjan Chaubey, Mission Director, SBM-U, Chhattisgarh; Sangramjit Nayak, Misison Director, Odisha; Swapnil Dinkar Pundkar, IAS, Commissioner, Vijayawada Municipal Corporation; Pandit Patil, Lonavala, CO; and Dr Barsha Poricha, Head-Techincal Cell, CURE.The event was followed by a multi-stakeholder discussion titled, 'Swachh Talks Webinar Series - Swachhata Ki Jyot' focussed on the need for social and behaviour change communication in the urban sanitation space.

This primer is an essential document which incorporates field-based learnings and evidence towards enabling behaviour change in the sector to move towards safe and inclusive sanitation outcomes. The insights and learnings from the primer can be valuable to any sector that wishes to incorporate SBCC within its programmatic priorities. However, the launch of the Primer is only the first step which has to be followed by building the capacity of relevant stakeholders to successfully integrate SBCC within the sector. The SBCC primer is hence a key implementation tool to ensure social and behavioural change within communities to ensure sustained inclusive sanitation outcomes for all.

DownToEarth

Rural Water and Sanitation

Swachh Bharat Mission: The last push

Over 100 million toilets in five years took a lot of effort; the change is showing now

DTE Staff

Published on: 27 Sep 2019, 10:02 am

Call it the result of a strong political will or a multipronged assault on a nagging problem, what India is witnessing now is no less than a civilisational leap forward. Till five years ago, open defecation was a way of life for most in the country. The government was over and again pulled up at international platforms for hosting 60 per cent of the global population that defecates in the open. But at the last count on September 23, villages and cities in all the 37 states and union territories had declared themselves ODF. With verification pending for just 22 per cent of the districts, the country was on track to attain ODF on October 2.

There is a sense of triumph among officials and community leaders who have been part of this sanitation programme, dubbed the largest in the world. Data with the Department of Drinking Water and Sanitation shows in October 2014, when the mission was launched, sanitation coverage in rural areas was just 38.7 per cent. Some 550 million people, or almost half of the country's population, were defecating in the open.

Since then, a massive 100 million household toilets have been built across 600,000 villages; another 5.8 million household toilets and about 500,000 community and public toilets constructed across 4,303 cities. By the government's own admission, "SBM has changed the behaviour of hundreds of millions of people with respect to toilet access and usage." By March this year, notes its press release, 500 million people in rural parts of the country had stopped defecating in the open.

The National Annual Rural Sanitation Survey (NARSS) 2018-19 by the Independent Verification Agency under the World Bank, which has offered financial assistance for SBM-Gramin, reconfirms the claims. The agency, during its survey between November 2018 and February 2019, found that 93.1 per cent of the households had toilets; 96.5 per cent of them were using the toilets.

Such massive toilet coverage has helped the government achieve another milestone much ahead of the target. In 2015, when the United Nations prepared the list of 17 sustainable development goals (SDGs) to be achieved by 2030, one of its foremost agendas required countries to "achieve access to adequate and equitable sanitation

Such massive toilet coverage has helped the government achieve another milestone much ahead of the target. In 2015, when the United Nations prepared the list of 17 sustainable development goals (SDGs) to be achieved by 2030, one of its foremost agendas required countries to "achieve access to adequate and equitable sanitation and hygiene for all and end open defecation". Meeting SDG 6.2 then seemed a humongous task for India that topped the list of laggard countries and is often described as an Asian enigma by researchers.

India has a much larger prevalence of open defecation than in other countries with similar economic status, wrote Dean Spears, founding executive director, the Research Institute for Compassionate Economics (r.i.c.e.), in the August 2018 issue of the *Journal of Development Economics*. Spears says open defecation in such a densely populated country could be the reason many health outcomes are much worse than what would otherwise be predicted based on its GDP per capita.

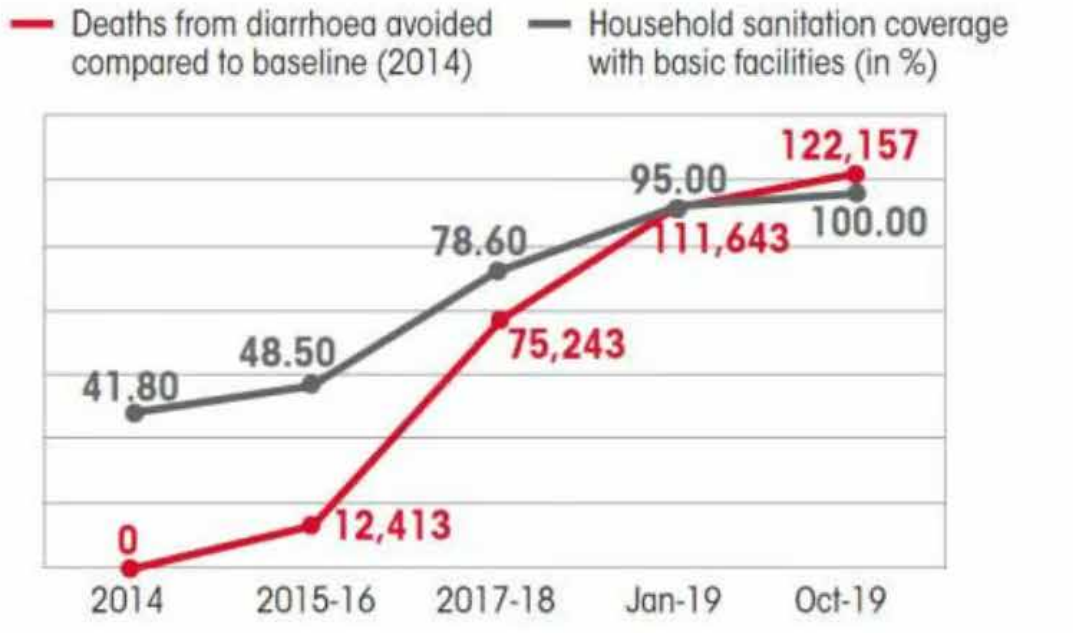
For instance, India's infant mortality rate is about one-third higher than those of poorerBang ladesh and Nepal. Anaemia, too, is poorly explained by income and is common in India despite it lacking a high malaria burden similar to sub-Saharan Africa.

Officials say health indicators are fast improving since SBM. "Diarrhoea, a leading cause of death among under-five children in India, accounted for 11 per cent of deaths in 2013," notes the Economic Survey 2018-19. Its sample analysis shows diarrhoea cases reduced significantly — by 18.4 per cent — in areas where more toilets were installed.

Improvements are evident in malaria, still births and low-birth weight cases, notes the report, which reviews developments in the Indian economy over the past financial year. Citing a World Health Organization report, it says deaths due to unsafe sanitation have also significantly reduced.

Advantage sanitation

Since SBM, deaths due to unsafe sanitation are declining



Source: Swachh Bharat Mission—Preliminary estimations of potential health impacts from increased sanitation coverage by the World Health Organization, as cited in Economic Survey 2018 -19 based on data available till June 2018

These are no mean feats for a country that has been trying to provide safe sanit ation to all its citizens for over three decades now. However, there was no dramatic shift in the access rates for toilets until SBM was launched, says Economic Survey, adding, "SBM is the first one to emphasise behaviour change as much as, if not more than, const ruction of toilets."

The December 2015 report of the Comptroller and Auditor General of India shows during the sanitation programmes implemented between 2009-10 and 2011-12, money for information, education and communication (IEC) was spent on unrelated activities like booking meeting halls. By comparison, shows the June 2019 assessment by international policy advisory firm Dalberg, Rs 3,500 crore to Rs 4,000 crore was spent on IEC under SBM-Gramin. This mobilised an equivalent investment worth Rs 22,000 crore to Rs 26,000 crore — almost half of the budget allocated under SBM.

On an average, a person in rural India was exposed to between 2,500 and 3,300 SBM-related messages over the last five years. To initiate behavioural change, 650,000 swachhagrahis were recruited. When new toilets are built and used, says the report, they serve as nudges for people to adopt safe sanitation behaviour.

This is part of Down To Earth's print edition dated 1-15 October, 2019

DownToEarth

Water

Swachh Bharat Mission: 'Inducing behavioural change was a task'

Parameswaran Iyer, secretary, Department of Drinking water and Sanitation, spoke to Down To Earth on how intensive information-education-communication efforts by the Centre and states made India ODF

Sushmita Sengupta

Published on: 30 Sep 2019, 11:15 am

Parameswaran Iyer, secretary, Department of Drinking water and Sanitation, spoke to *Down To Earth* on sustaining India's open defecation-free status. Excerpts:

India is now open-defecation free (ODF). What are the challenges you faced in achieving this status?

Bringing about behavioural change at such massive scale and in such short time was the biggest challenge, especially with the stigma associated with toilets.

This was achieved due to the demand-centric approach of the Swachh Bharat Mission (SBM). Supply followed demand.

There were intensive information-education-communication (IEC) efforts by the Centre and states. The biggest communicator was the prime minister, whose leadership was the game changer.

The recent National Annual Rural Sanitation Survey (NARSS) showed that toilet usage was over 95 per cent. This is a testament to the behavioural change.

How do you plan to sustain this status?

IEC for regular toilet usage have been underway at the grassroots level through our 0.6 million *swachhagrahi*s , or foot soldier of the mission, who are being reoriented towards ODF sustainability. They will continue to motivate people to use toilets regularly.

Additionally, district administrations are setting up ODF sustainability cells. Local monitoring efforts like *nigrani samiti*s are ensuring that the behaviour change of toilet usage is sustained and becomes the new norm.

At the mass media level, campaigns like *Darwaza Band*-Part 2 are being run.

Not all toilets set up under SBM have adequate supply to water. How do you plan to make ODF sustainable without this?

While running water in a toilet is desirable, it is not a necessary condition for sustaining toilet usage. Most toilets in rural India have the steep slope pan which requires just about 1.5 litres of water to flush, and hence linking toilets to running water supply is not necessary.

However, as the prime minister announced during his Independence Day address, the Jal Jeevan Mission will aim to provide piped water supply to all households by 2024, and this will further strengthen ODF sustainability.

How do you plan to manage the black and grey water from all these toilets installed under SBM?

A majority of toilets in rural India are twin-pit leech pit type, which is like a self-contained treatment plant and does not require any additional blackwater or faecal sludge management.

There are two honeycombed pits dug into the ground and at any point of time the faecal material empties into one pit while the other remains shut. The liquid leeches out of the pit and the pathogens die within a few feet of the pit, while the solid material remains in the pit.

Once the first pit fills up in about five to six years of continuous usage by a family, the faecal material is diverted to the second pit and the first pit is shut. In about six months, the material in the first pit converts into pathogen free organic manure which is safe to handle by hand and use for agriculture.

There are a few septic tanks in rural areas as well, and most of these have soak pits which manage the blackwater safely. Going forward, SBM-Gramin will also focus on setting up faecal sludge management plants across the country to manage the faecal sludge from these sceptic tanks.

Any plans of collaborating with the Ministry of Agriculture and Farmers Welfare so that the digested feacal sludge is used as fertiliser?

As mentioned earlier, twin-pit toilets, which are the predominant type in rural India, convert the faecal material into high quality organic manure. The Department of Drinking Water and Sanitation has been making people in rural India aware of this and many farmers are already using this manure in their fields.

Civil Society

Dalits continue to be sent into manholes

Sewer deaths: why machines are not replacing people

IF a sewer line gets clogged in Japan, Sweden or France, and you really do need to send a man inside to unclog it, a sewer diver is called to do the job. The sewer diver has the status of being a highly skilled and trained professional. He dives in, clad in protective personal equipment with emergency measures on stand-by, and clears the blocked sewer.

But in India it is Dalits, the poorest and most marginalized community, who are sent into manholes with no protective equipment, to unclog filthy, stinky sewers or clean up septic tanks. Invariably, they die after breathing in noxious fumes. Newspapers report such deaths with frightening regularity. In almost every Indian city or town, the sewerage network is a deathtrap.

Such manual scavenging work was banned in 2013. Sanitation workers were supposed to be rehabilitated. Everyone is aware of the practice. Activists have protested. Award-winning films, like Chaitanya Tamhane's *Court*, refer to the stark reality of the sanitation worker's plight. Machines have been invented to do this nasty job. And yet manual scavenging continues.

It's not as if no efforts have been made. Odisha, for instance, has emerged as the frontrunner in curbing manual scavenging. In September 2020, the state government launched GARIMA, a scheme for core sanitation workers and their families with all 114 Urban Local Bodies (ULBs). It also set up a State Commission for Core Sanitation Workers.

Aspects of GARIMA have been included by the Centre in its own NAMASTE scheme for sanitation workers. It offers loans and skilling opportunities and encourages cities to 'convert manholes into machine holes'. Yet city governments continue to send sanitation workers down hazardous sewer lines to their death.

Manvita Baradi

"The system of city governance is complex and convoluted at all levels. There has been some progress, but the pace of change is slow," says Manvita Baradi, director of the Urban Management Centre (UMC) based in Ahmedabad, with some exasperation. "Unless we strengthen our municipalities, our city governance systems, we won't make any progress."

The UMC is a Section 8 company which works with ULBs to provide solutions to urban management. Its mandate is to simplify processes so that citizens get better services. Since 2017, UMC has been working with the Ministry of Housing and Urban Affairs (MoHUA) and the Ministry of Social Justice and Empowerment to converge livelihoods with the Swachh Bharat Mission.

"There has been much emphasis on sanitation improvement but not on worker safety and the occupational hazards they face," says Meghna Malhotra, deputy director of UMC. "We focus on sanitation workers' safety and how SHGs can be engaged across the sanitation value chain in cities across India."

Meghna Malhotra

The UMC is also a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a group of 30 organizations supported by the Gates Foundation. The NFSSM recommends policy and action on handling human waste safely and sustainably. Its agenda is four-fold: inclusion, technology, strengthening ULBs and communication, says Rishma Shah of the alliance.

THE DRAIN BANE

Machines are available so how come they aren't deployed to clean sewer pipelines? The problem is that Indian cities and towns expand in a chaotic manner. Such growth does not conform to master plans often set in stone. Residential and commercial buildings, built by private developers, arise faster than roads, drains and sewer lines that are built by slow-moving government agencies.

As a result, the gradient on the ground is not even and sewage lines can't be laid in a uniform manner. "It's a planning failure," says Baradi. "If you know how many people will occupy those offices and homes before such development happens, you can plan your sewerage system accordingly. But first the buildings come up and then you lay the sewage lines. Since the gradient is not even you will need much more water to flush sewage through those pipelines." And every Indian city suffers from water shortage.

Then there are peri-urban areas or small towns where the sewerage system is absent and people opt for septic tanks. The problem, explains Baradi, is that the septic tanks are badly designed and built. Since people don't want to clean out the tank every two years they dig, basically, a very deep hole. Over a period of time the sewage hardens in this hole and becomes rock-like. The depth of the tank and the hard sewage make it impossible for any machine to clean it up. You have to send a man down.

Also, who is in charge of sewer lines? In every city the agency responsible differs. It could be the Jal Board in one city, the municipality in the next. "There is no preventative maintenance. Indore is one exception. You should not let the sewer line clog in the first place. That requires a management system or an SOP. No city does any preventive maintenance apart from pre-monsoon cleaning," says Malhotra.

Contracts for maintenance of sewer lines, given out via tenders, merely state that the pipelines have to be cleaned. "These are not performance-linked contracts," says Malhotra. The contracts don't spell out exactly how sewers will be cleaned. Will it be done mechanically? Which machines will be used?

So UMC surveyed the market for such machines, drew up an inventory and printed a catalogue which they distributed to various municipalities. Here, too, they hit a wall because the procurement process is convoluted and opaque.

"When cities buy one or two machines, it is mostly a photo-op. No study has been done to see how many and where they will be used," says Malhotra.

The role of technology is also limited because of the maze of twisted lanes and bylanes in Indian cities. "Jetting machines and suction machines can navigate wide roads but not narrow ones. For that municipalities will have to work with the private sector to customize machines that suit the needs of their sewerage systems. Ahmedabad, for instance, has innovated such machines, trying them out before placing an order. But such things are not happening on scale," says Baradi.

Some lanes are too narrow for machines

On November 19, 2021, World Toilet Day, MoHUA launched a Safai Mitra Suraksha Challenge for a week to encourage cities to mechanize cleaning of sewers and septic tanks. Around 246 cities took part. Baradi again underlines that it is all happening slowly. Cities like Chandigarh, Indore, Puri, Kanpur have taken up mechanization seriously.

"You know, there is also the mindset. Sanitation workers are Dalits. They don't matter. This is so ingrained into the psyche of officials, to remove it is very difficult,"she says.

GARIMA SCHEME

Odisha remains the only state to seriously try and improve the lives of sanitation workers and their families. UMC has been working with the state to implement its GARIMA scheme. It has managed to place sanitation workers in the highly skilled category and raise the minimum wage paid to them from ¯258 to ¯420 per day. An additional 15 percent risk allowance is paid by the housing department. Their work hours have been reduced to six hours per day. UMC also took up the task of training sanitation workers, evaluating them and giving them a certificate. It was tough because most of them are not literate.

"Sanitation workers in most states are not recognized. Even the terminology they use is scavenger. In Odisha we have been able to grade them as sanitation workers," says Baradi.

Under GARIMA, sanitation workers are categorized into five job roles: sewer line cleaning, de-sludging, drain cleaning, community toilets and those who work at STPs and faecal sludge treatment plants. "If you are a sewer line worker or a de-sludger you are recognized as a highly skilled person," says Baradi.

Protective equipment is provided according to each category. Clothing is also changed, as and when required. Gloves, for instance, may need to be changed every two months but perhaps not the helmet.

Before recommending such equipment, UMC did a survey. They talked to sanitation workers who told them that they did not wear protective clothing because of the heat or because the clothing was much too large for their small frames. The UMC assessed their problems, and gave them various gloves, aprons and wader suits to try out.

"It turned out to be a huge exercise spanning some six months. We ordered appropriate sizes, testing the equipment in summer and winter. We created a catalogue and got cities to procure some of this equipment," says Baradi. Workers also had to be taught how to wear such clothing and how to remove it, wash it, hang it. Films and videos were made to propagate the use and care of such equipment.

The Odisha government also financed Garima Grihas, places where workers can change, bathe, eat and then go home. Earlier, they would go straight home with the dirt still on them and the risk of infecting their children was high.

MoHUA has issued an advisory recommending that every city set up a sanitation response unit attached to a senior officer like the commissioner to assess whether a worker is really needed to go into the sewer or septic tank and to ensure workers are sent in with protective equipment, oxygen, and an ambulance is on stand-by. But, says Malhotra, this is not being implemented in cities.

NAMASTE AND JOBS

Aspects of the GARIMA scheme have been included by the Centre in its NAMASTE scheme for sanitation workers. Two new elements have been added — loans for sanitation workers and skilling opportunities. The National Safai Karamchari Development Finance Corporation (NSKDFC) offers loans and skilling to SHGs or groups of sanitation workers who want to buy machines and provide sanitation services. City governments will be encouraged to hire them.

Secondly, sanitation workers are offered alternative livelihoods. Malhotra says their interaction with workers in Odisha revealed that nearly 50 percent of them joined such work because they belonged to a sanitation worker family or had married into one, despite some of them being educated. "We have to break this inter-generation cycle," says Malhotra.

"We are trying to capture their aspirations and link them to skilling programs and enterprise development programs. Once a worker starts an enterprise there is no help to run a business. So we are linking them to the National Urban Livelihoods Mission (NULM). Typically, ministries work in silos. This time all three, MoHUA, the Ministry of Social Justice and Empowerment and NULM, are coming together," says Malhotra.

The NAMASTE scheme is applicable to 500 Amrut cities, typically large cities where a lot of work on laying sewer lines is happening.

Only 68 percent of India is sewered and most sewer lines disgorge into ponds, lakes and rivers. Both Baradi and Malhotra point out that long sewer lines linked to STPs are not sustainable. Smaller STPs at colony or housing level would be better suited to cities. Even better are Frequent Sludge Treatment Plants (FSTPs) which towns and cities in Odisha are opting for. Some of these systems are being managed by SHGs and groups of transgenders in the state.

"The problem is not in technicalities. We have great designers, architects, engineers and planners. But we have terrible managers. We don't manage our cities well. It's not going to happen with a few IAS officers or state-level officials who get frequently transferred," says Baradi.

APN NEWS

Government Of Telangana Announces Scheduled Desludging In Urban Local Bodies Across The State

by Admin — March 11, 2022 in General 0

Administrative Staff College of India collaborates with the State Government to support implementation of scheduled desludging in 142 Urban Local Bodies

Hyderabad : Highlighting their commitment towards safeguarding environmental quality, public health, compliance with Swachh Survekshan protocols and achieving Parisubramina Pattanalu of 'Pattana Pragathi Programme,' the Government of Telangana announced scheduled desludging across 142 Urban Local Bodies (ULBs) covering the state. One of the first states in India to implement Faecal Sludge and Septage Management (FSSM) policy, Telangana government has committed their support in establishing Faecal Sludge Treatment Plants (FSTPs) in all ULBs and complement this with scheduled desludging once every 3 years – as recommended vide guidelines issued as a part of National Faecal Sludge and Septage Management (NFSSM) policy launched by the Ministry of Urban Development with support and inputs from NFSSM Alliance. Telangana is the first state in the Country to notify scheduled desludging of onsite toilets in all ULBs.

Administrative Staff College of India (ASCI) has joined hands with the Telangana Government as knowledge partner to provide support for training and handholding of ULBs to ensure proper planning, implementation, and monitoring of the scheduled desludging.

"In a scenario where the larger part of the country is dependent upon on-site sanitation systems, FSSM is essential to ensure city wide inclusive sanitation. The safe management and treatment of faecal sludge goes a long way in securing public health and environment. Proper and timely desludging, along with safe disposal and treatment are of prime importance. Timely desludging of septic tanks will improve its treatment efficiency. While FSTPs are necessary for ensuring the safe disposal and treatment of faecal sludge, the maximum utilization of their capabilities can only be actioned through regular desludging," said, Prof. V. Srinivas Chary, Director of the Centre for Urban Governance, Environment, Energy and Infrastructure Development at the Administrative Staff College of India (ASCI).

The scheduled desludging will include the geo-tagging of all the septic tanks of residential and institutional areas, public, and community toilets in cities. While ULBs are responsible for payments to private desludging operators, the cost of desludging will be borne by households, institutions, and commercial establishments. However, to reduce the financial stress on economically marginalized sections, differential pricing structure with pro-poor tariffs has been provided for.

Highlighting the inclusive aspects of FSSM, Dr Y Malini Reddy, Professor in Urban Governance Area, ASCI, and member, NFSSM Alliance said, "Given that septic tanks, pits and other on-site sanitation systems are not emptied regularly, scheduled desludging is an important step in ensuring the success of the FSSM model. Desludging services are a significant part of the sanitation value chain and hold many opportunities for inclusion of women and setting precedents for maximizing physical safety of sanitation workers who carry out this process. Assigning the responsibility of scheduled desludging to ULBs is also necessary to encourage sanitation for all by reducing the costs involved in desludging for the economically marginalized sections, thereby ensuring that they are not excluded from the ambit of safe sanitation."

the pioneer

Azadi ka Amrit Mahotsav with SafaiMitra Suraksha

Saturday, 20 August 2022 | PNS | Jamshedpur

National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative body that drives the discourse on Faecal Sludge and Septage Management (FSSM) forward in India, celebrated Azadi ka Amrit Mahotsav along with Ministry of Housing and Urban Affairs (MoHUA) and Ministry of Social Justice and Empowerment (MoSJE).

On the occasion, a virtual event was organised around the topic of 'SafaiMitra Suraksha: Manhole to Machine hole'. It was chaired by Manoj Joshi, secretary, Ministry of Housing and Urban Affairs (MoHUA) and R. Subrahmanyam, secretary, Ministry of Social Justice and Empowerment (MoSJE).

The discussions during the event spotlighted some of the key challenges for sanitation workforce like need for mechanized solutions and equipment to ensure their safety, provisions of social security and financial stability and overall support required to improve their working conditions. Acknowledging the gravity of the issue, the government laid emphasis on streamlining sanitation operations and formalizing the sector through welfare schemes, capacity building initiatives and spotlighting best practices.

As first of a kind joint convergence MoHUA and MoSJE launched NAMASTE Scheme (National Action for Mechanized Sanitation Ecosystem) – aimed to ensure safety and dignity of sanitation workers in urban India and providing sustainable livelihood and enhancing their occupational safety through capacity building and improved access to safety gear and machines. Scheduled to be implemented across 500 cities from 2022 to 2026, the scheme will also aim to enumerate workers engaged in sewer line and septic tank maintenance and cleaning and provide them insurance scheme benefits and livelihood assistance.

How this cluster approach enhances sanitation services in Tamil Nadu

Since 2018, Government of Tamil Nadu has been utilising the cluster approach to implement Faecal Sludge and Septage Management (NFSSM) as a key principle to scale treatment infrastructure across the State in a phased manner, and Tamil Nadu has been one of the first states in India to adopt this approach as well, points out Mahima Vijendra of Indian Institute for Human Settlements.

By Mahima Vijendra
March 14, 2024, 8:58:30 PM IST (Published)

6 Min Read

Since the launch of the National Faecal Sludge and Septage Management (NFSSM) Policy in 2017, India has progressed towards the effective implementation of this programme with 24 states adopting the policy and 12 states drafting state-specific FSSM policies. This momentum has led to increased mechanisation in the sector, dignified working conditions for sanitation workers and proper treatment and disposal of faecal sludge.

These initiatives have greatly improved sanitation outcomes and are ensuring that safe sanitation services reach the most marginalised communities. However, with the rising urban population in India, the amount of faecal sludge being generated in cities and towns daily is also increasing. With approximately 45% of urban toilets in India relying on decentralised on-site sanitation systems such as septic tanks and pits, and continued expansion of sanitation infrastructure to meet growing needs, it is critical to ensure untreated faecal sludge is not disposed in water bodies or open land.

The traditional approach of increasing sanitation infrastructure through the expansion of sewer networks is fraught with infrastructural and lengthy implementation challenges in many developing nations, including India. Complex geophysical conditions, such as the challenges of lack of urban space, especially within urban-poor communities, coupled with limited funding, make establishing sewered sanitation systems a massive challenge across the country. FSSM offers an excellent cost-effective solution to complement existing systems and allows for rapid implementation and scaling.

Tamil Nadu, which is inhabited by about 30 million people, is an example of a state which has recognised the need for robust treatment of faecal sludge, given around 70% of the state's urban population relies on onsite sanitation systems. In 2014, the Government of Tamil Nadu (GoTN) issued an order (GO) bringing FSSM to the fore.

While the Government Order (GO) in the state resulted in the construction and operationalisation of Faecal Sludge Treatment Plants (FSTPs) across the state, there was a shortage of treatment facilities to meet the requirements of safe treatment of faecal sludge. This played a role in faecal sludge being unsafely disposed which resulted in environmental pollution and contamination of water bodies, which severely affected the well-being of communities.

One method to address this is through the adoption of a Cluster Approach that enables the rapid scaling of treatment capacity across the state. In the Cluster Approach, larger Municipal Corporations or Municipalities or Urban Local Bodies (ULBs) around a treatment facility are clustered with smaller Town Panchayats. This enables smaller ULBs to take advantage of economies of scale and optimises investments by leveraging the resources, capacity, and skills of larger ULBs, particularly in terms of finance, land, and operation and maintenance of treatment facilities.

A unique and cost-effective approach, Clustering improves the utilisation of existing plants, increases the overall treatment capacity through new plants and enables access to treatment facilities in areas which previously had no access to treatment.

Recognising the urgent need to address the issue of inadequate access to treatment facilities, GoTN adopted a State Investment Plans (SIP) in 2018 to optimise the utilisation of existing and proposed treatment plants through the co-treatment of faecal sludge and sewage in Sewage Treatment Plants (STPs), and increase access to treatment plants through the now pioneering model of 'Cluster Approach'.

Since 2018, GoTN has been utilising the cluster approach as a key principle to scale treatment infrastructure across the State in a phased manner, and has been one of the first states in India to adopt this approach.

To operationalise the cluster approach in Tamil Nadu, the state Government, with support from the Tamil Nadu Urban Sanitation Support Programme (TNUSSP), took a step ahead to formalise it through a Memorandum of Understanding (MoU), a first-of-its-kind agreement for the sector. This was later adopted through a government order to establish working mechanisms between cluster ULBs to share the usage of the treatment facility.

The MoU defined the roles and responsibilities of the stakeholders involved in the operations and management (O&M), usage of Faecal Sludge Treatment Plants (FSTPs) and the duties of ULBs for the shared treatment facility. It enabled sharing of O&M costs between ULBs and secured the financial sustainability of treatment plants through strategies such as the creation of a separate bank account to ringfence the fees and the O&M payments received.

Further, the opportunity emerged to create a Standard License Agreement (SLA) to regulate Desludging Operators (DSOs) and ensure that all faecal sludge collected is disposed only at designated disposal facilities. Since the Cluster Approach enables DSOs to access a wider market, DSOs are incentivised to adopt the SLA, which also ensures a nominal decantation and licensing fee, taking the financial burden on DSOs into consideration.

To improve the operationalization of the MoU and SLA implementation at the ULB level, the state government has taken various measures at different levels. The Government has conducted online orientation sessions for over 200 officers through digital blended learning modules and drafted bye-laws to provide legal backing.

The state has also shown continued persistence through state-level mandates, regional-level meetings, and efforts to institutionalise systems and knowledge. At the ULB level, support has been provided for implementation and monitoring, including capacity-building efforts. The State Investment Plan (SIP) based on the cluster approach has led to the operationalization of 32 FSTPs, with 51 more planned, and 50 STPs (sewage treatment plants) enabled for co-treatment in Tamil Nadu. These treatment facilities will eventually serve 192 ULBs.

The cluster approach has played a crucial role in scaling FSSM in Tamil Nadu. It has allowed the optimum utilisation of existing resources, positively impacted capital investments and provided treatment facility access to smaller ULBs through shared usage with better-equipped ULBs. Emerging as a best practice, the cluster approach has immense potential to be replicated across states.

For instance, Odisha has initiated efforts to implement a similar cluster approach in the state leading to better utilisation of existing infrastructure and better rural-urban convergence. Adopting flexible approaches whose implementation can be easily adapted to local contexts, and enabling collaborative action amongst stakeholders is crucial to achieving sustainable and safe sanitation for all.

These have been implemented with the vision to ensure dignified sanitation services reach all communities and secure their well-being by restricting unsafe disposal of faecal sludge. The cluster approach can be scaled up to ensure the safe treatment of faecal sludge across the country, magnify the impact of FSSM and ensure that safely managed sanitation is accessible to all.

—The author, Mahima Vijendra, is Specialist, Tamil Nadu Urban Sanitation Support Programme (TNUSSP), at Indian Institute for Human Settlements — a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance. The views expressed are personal.

Utilizing untapped potential of existing 1600+ Sewage Treatment Plants can help over 40 crore Indians : NFSSM Alliance

By: TheCSRUniverse Team | **Published:** 25-Aug-2023

New Delhi, August 24, 2023. Urban planning's pivotal role in creating resilient and sustainable cities, as outlined by the United Nations' Sustainable Development Goals (SDG 11), has garnered increasing attention. An inclusive approach encompassing the challenges of urbanization, population growth, and environmental decline is key.

Sanitation, waste-water management, and effective faecal sludge treatment emerge as vital components in safeguarding public health and the environment, contributing to overall community well-being and SDG 6 alignment. Presently, merely 40% of urban India is linked to sewer networks, while the majority (60%) relies on on-site sanitation systems such as septic tanks. With just over 1000 dedicated faecal sludge treatment plants nationwide, only 400 are operational. The untreated sludge, capable of environmental contamination and disease transmission, hampers sustainable urban evolution and development.Proposing a solution, co-treatment of faecal sludge and sewage within Sewage Treatment Plants (STPs) stands out. Utilization of only 75% STP capacity in India opens avenues for co-treatment. Unlocking potential within more than 1600 STPs enables the treatment of faecal sludge from a population of around 43.5 crores. Co-treatment emerges as the most efficient method for extending Faecal Sludge and Septage Management (FSSM) to partial sewerage coverage areas, facilitating 100% wastewater management. Integrating faecal sludge with sewage treatment optimizes STP efficiency and streamlines urban waste management. The Swachh Bharat Mission-Urban (SBM-U) 2.0 mandates co-treatment readiness for new STPs, furthering urban waste management efforts.

Co-treatment doesn't solely enhance wastewater treatment but ensures equitable access for urban communities, even in non-sewered areas. Implementation curbs the hazardous release of faecal sludge, contributing to cleaner water bodies and open spaces.Effective execution necessitates scientific planning to prevent operational issues. The National Faecal Sludge and Septage Management (NFSSM) Alliance's Co-treatment Manual, launched at the U20 Mayoral Summit, provides a systematic approach. The manual aids in feasibility assessment, planning, and operational aspects, serving administrators, technical personnel, consultants, and practitioners. The manual underscores the significance and benefits of co-treatment within STPs, bridging infrastructure gaps in urban faecal sludge treatment.

SasankaVelidandla, Director, WASH Institute, said, *"Co-treatment is the quickest and most inexpensive pathway to achieving 'Safely Managed Sanitation' as per SDG 6.2. Many existing STPs across India are co-treating faecal sludge with sewage already. Since sewerage networks lag STP deployment by a few years, the co-treatment ready new STPs in small towns are the need of the hour."*

Professor Srinivas Chary, Director, Administrative Staff College of India (ASCI), said, *"Co-treatment or combined septage or faecal sludge treatment at a functional Sewage Treatment Plant (STP) is scientifically and commercially appropriate. Most STPs in India and South Asia are designed for long horizons and often have excess capacity. Following scientific protocols, cities can leverage this extra capacity to achieve their safely managed sanitation goals."*

The Co-treatment Manual outlines a step-by-step process for data collection, capacity assessment, technology selection, infrastructure needs, commissioning, monitoring, and maintenance. It addresses co-treatment methods and operational challenges, supporting India's pursuit of sustainable urban growth.

Firstpost.

Home / Opinion / Sustainable sanitation: Co-treatment emerges as a key solution in Uttarakhand

Sustainable sanitation: Co-treatment emerges as a key solution in Uttarakhand

Doab Singh

November 10, 2022, 10:09:14 IST

Uttarakhand is one state that has shown immense progress in the implementation of co-treatment across existing and upcoming Septage Treatment Plants to mainstream safely managed sanitation

India in the past few years has adopted a holistic and multi-stakeholder approach to solve for its sanitation needs, despite the challenge of rising urbanization. The launch of the National Faecal Sludge and Septage Management Policy in 2017 was a milestone step that led the discourse beyond ensuring access to toilets, towards proper containment, disposal and treatment of faecal sludge. With a population of 1.5 billion, India generates almost 120,000 tonnes of faecal sludge.

Only 32.7% urban toilets in India are connected to piped sewer networks where faecal sludge flows through treatment plants, and 45% are connected to on-site containment systems (OSS). The remaining untreated faecal sludge when discharged in water bodies or open fields has severe consequences on the health of communities, causes environmental damage and disproportionately impacts the economic growth of the country.

India has 15,730 Sewage Treatment Plants (STPs) operating across cities for septage treatment. However, in case of underutilization of STPs or conditions that pose a challenge to establish sewered network, there is immense scope to implement co-treatment of septage and faecal sludge. Co-treatment has emerged as a cost-effective solution where Sewage Treatment Plants (STPs), beyond treating the domestic sewage transported through sewers, also treat Faecal Sludge and Septage (FSS) emptied from OSS.

This allows optimum utilization of existing site infrastructure and facilities of the STP and has the potential to eliminate the challenge of additional costs related to site infrastructure. Adopting this inclusive approach of utilizing the STPs for co-treatment also helps in achieving City-wide Inclusive Sanitation (CWIS), increases the scope of FSS treatment with current sewage treatment, benefits both stakeholders and communities, and ensures safe sanitation for all.

Uttarakhand's example

Uttarakhand is one state that has shown immense progress in the implementation of co-treatment across existing and upcoming Septage Treatment Plants (STPs) to mainstream safely managed sanitation. Uttarakhand is a hilly state with 103 Urban Local Bodies (ULBs) and approximately 80% is dependent on Onsite Sanitation (OSS) system The population dependent on OSS systems generates approximately 957 KLD of septage (based on per capita daily estimates) and only 30% is being safely managed by discharging it in the 66 operational STPs of the state. Over t past two years, Uttarakhand has shown significant progress towards managing safe disposal through diverse interventions such as capacity building of over 350 officials from more than 85 ULBs on wastewater and septage management, developing advisory documents and technical documents at the state level and providing hand-holding support to potential cities. These efforts have both ensured dignified sanitation services for communities, and streamlined the process of safe disposal and treatment.

Strengthening its commitment towards formulating, regularizing and streamlining septage management across the value chain, the state notified the "Protocol for Septage Management" in 2017. The protocol directs the formation of a Monitoring Committee, Septage Management Cell (SMC) and state-level Septage Management Cell for the effective planning, implementation and monitoring of Septage Management. It further focuses on identifying and registering septic tanks, ensuring timely emptying and treatment of septage, licensing private operators involved in desludging, procuring appropriate mechanized equipment for emptying of septic tanks and securing the health and well-being of sanitation workers involved in the process. The effective execution of these initiatives has led to increased accountability amongst stakeholders, empowered sanitation workers and upheld their right to decent work and provided communities with safer sanitation systems.

Collaborative efforts like these have encouraged local leaders, STP operators, engineers and sector practitioners to further implement the state's Advisory for Co-Treatment in accordance with the Protocol for Septage Management. The advisory has emerged as a benchmark step to further mainstream the co-treatment process and move rigorously towards sustainable sanitation. It highlights the need for planning and implementation of co-treatment without adversely impacting the treatment efficiency of the STPs, focuses on occupational safety of sanitation workers and elaborates on the roles and responsibilities of ULBs and state officials. It also focuses on understanding and upgrading STPs based on infrastructural requirements and monitoring the performance of the co-treatment process to ensure smoother service delivery. Co-treatment initiatives have ensured equitable access to improved sanitation services to low-income settlements, commercial establishments and areas where sewer connections are not feasible and has restricted the discharge of hazardous faecal sludge in water bodies and open fields.

Moving forward, the state aims to further scale up co-treatment across ULBs and achieve CWIS through its multi-dimensional approach. Its implementation has shown great results for both communities and sanitation workers, and has emerged as a cost-effective solution that can be replicated in other cities. With India's rapid urbanization and its diverse topographies, it is crucial to adopt these solutions and action upon it collaboratively to achieve sustainable and safe sanitation.

The author is the Program Officer, National Institute of Urban Affairs and Shantanu Kumar Padhi, Senior program officer, National Institute of Urban Affairs

THE TIMES OF INDIA

INDIA

Integrated urban water management

May 13, 2022, 10:38 AM IST / Krishna Rao in Voices, India, TOI

35% of India's population inhabited urban areas in 2020 and this number is projected to double by 2050. A major cause for this urbanization is not only the socio-economic opportunities that cities provide but also the dreams and aspirations that they cater to. However, cities have not been prepared for this influx and their infrastructure and resources are often stretched – the consequences of which are mostly borne by people from low-income groups. One of the most stretched resources in cities continues to be water. The constant expansion of urban boundaries renders the surface water sources inadequate for the growing population and this leads to an increased dependence on groundwater resources. At present groundwater resources serve about 45% of water supply in urban areas. Central Ground Water Board data (from 2017) finds that as many as 256 of 700 districts in India have reported 'critical' or 'over-exploited' groundwater levels. Additionally, water also continues to be burdened with contamination, pollution and climate change which makes it necessary for us to focus on managing water and its quality in our cities. With the increasing urban population, the demand for water and food in cities continues to increase and is expected to be much higher than its supply. Cities are importing water and food that they need to sustain themselves and this is distorting the nutrient cycle which is then impacting our soil.

Currently in India, different departments are set up to manage different types of water based on its various utilities urban water, sanitation, storm water, wastewater etc. These departments are expected to work on their water system and address concerns related to it. This results in siloed planning and implementation which does more harm than good. For example, issues like wastewater management, water quality, consumption, flood control are closely interconnected but are not addressed together. There is a need to shift from this '**siloed**' approach where Water Management is seen as a linear, divisive process to the '**systems**' approach where the entire urban water cycle is understood and integrated solutions are prioritized.

This systems approach is referred to as **Integrated Urban Water Management (IUWM)** where all components of the urban water cycle (water supply, sanitation, storm water) are managed in a holistic and

sustainable manner. IUWM encourages coordinated and flexible planning at a local level among water-using sectors so that water demand/supply can be managed effectively and to ensure that cities are adapting to climate change.

- **Understanding Interdependence of Water and other Urban Sectors**

The primary advantage with a new-age philosophy like IUWM is that it considers the intersection of the water sector with other aspects of urban planning such as city infrastructure, economic development, and land use. Building an overarching view of the water situation in a town or a city will also encourage urban local bodies to link water management with city development plans.

- **Water – A Resource, Not an End-Product**

Secondly, IUWM also ensures that water is viewed as a resource rather than an end product. This approach directs us to the fact that different kinds of water can be used for different purposes: freshwater sources (surface water, groundwater, rainwater) may supply domestic use, for example, and wastewater (black, brown, yellow, and grey water) can be treated appropriately to satisfy the demands of agriculture, industry and the environment. Since all sources and all uses of water are taken into consideration along with the city's existing infrastructure and land use patterns, the system infrastructure can be customized as per end-user categories. A residential area, for instance, will have vastly different water needs from an industrial area. With IUWM, water management can be made on the basis of quality and quantity of water which meets the specific requirements of various categories of end-users.

- **Customized Solutions for Every City**

Lastly, IUWM also gives adequate importance to the local context and requirements. By its very definition, it doesn't allow for a *'one size fits all'* solution and prioritizes a rights-based approach towards water, which makes stakeholder participation a major factor for success. In the conventional approaches to water management, stakeholder engagement is rarely factored in. By diminishing boundaries between various governance structures for water, IUWM expands the scope for involvement of multi stakeholder participation in decisions related with water while simultaneously building the capacity of communities to better adapt to climate change in the longer run.

IUWM has the potential to not only ensure efficient management of water resources, but also to prioritize the most vulnerable in cities. To ***ensure water for all*** is a matter which is much larger than intermittent, isolated reforms in the delivery system. A paradigm shift is required on how water management is carried out in the nation. Government of India (GoI) has taken necessary action by implementing the Swachh Bharat Mission (SBM) to further inclusive sanitation outcomes and the Jal Jeevan Mission (JJM) for adequate provision of piped water supply. Additionally, GoI has also mandated reuse of water keeping principles of circular economy in mind. There is potential for all these initiatives to come together and converge in Indian cities in a systematic manner through IUWM. In the past, IUWM has been established as a key solution in the last decade itself but has only been implemented in an ad hoc manner and has not enjoyed a systematic rate of nationwide implementation that was expected. This could be due to budgetary constraints, lack of awareness about the approach (especially in smaller urban cities) and inadequate national direction to translate this knowledge into on-ground practices. Recent national policy initiatives implemented by GoI along with amendments in the Municipal Act can prove to be the catalytic solution that leads to planned adoption of IUWM by various states.

IUWM is the one-stop solution to tackle water scarcity, mitigate risks to the environment, combat public health risks arising out of water pollution, and make the foundations strong for climate resilience of cities. Water runs across all SDGs and ensuring our water is managed well will determine our success in achieving our SDGs in Health, Sanitation, Education and Livelihood. It is the need of the hour and several global cities such as Singapore, Amsterdam, Melbourne, Los Angeles have recognised this and adopted the IUWM philosophy to manage the urban water sector. In India, IUWM could be the answer to ensuring the successful implementation of national level policy initiatives and providing clean water and sanitation for everyone.

DownToEarth

Photographs: Vikas Choudhary

Urban shit: where does it all go?

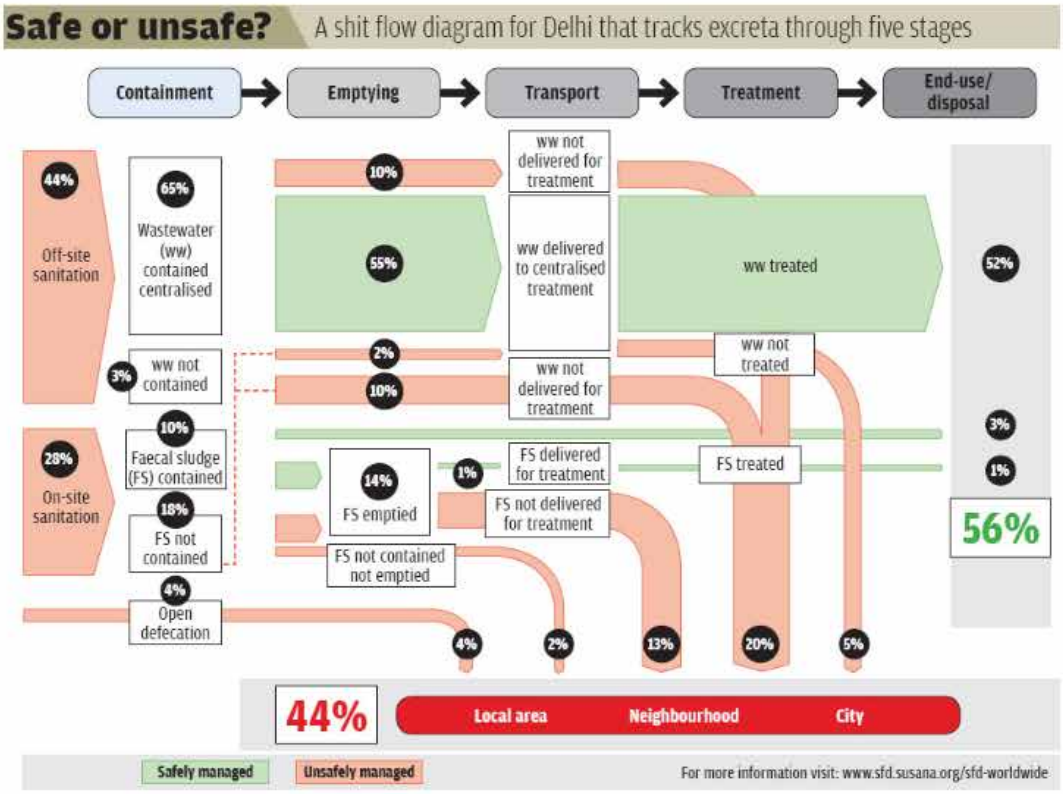
India is staring at a big sanitation crisis and needs to reinvent its excreta disposal mechanism

1.

Manoj Kumar should know the national capital's dirty little secret: where does the excreta of its residents not connected to the sewer system go? He has been working as a septic tank cleaner for 20 years. By now he owns three vacuum tankers that suck faecal sludge from septic tanks. Accompanied by his helper Rajbir Pal, he arrives at a house in Sangam Vihar locality in south Delhi. Rajbir Pal hops off the tanker and lays out a pipe to the septic tank in the house. He uses bare hands and laughs sarcastically at the idea of using a gas mask. "We have heard of instances where workers die when they have to go deep into the tank where toxic gases are emitted. We should at least be provided gloves," he says.

It is a two-storey building that houses seven families. Its septic tank should ideally have two chambers, with an outlet connected to a soak pit or some other treatment system for safe dispersal of effluent after the faecal sludge has settled at the bottom. Instead it is a single-chambered tank without any outlet, so its entire content has to be emptied. Small wonder the owner, Birender Singh, complains, "We have to empty it every month."

Amid the roar of the vacuum pump slurping the sludge from the tank, Singh seems contented, having managed to get rid of the excreta generated in his house. But does he know where the tanker is headed? "We don't know, madam. And frankly, we don't care," he says. In seven minutes the tank is emptied. He pays Rajbir Pal Rs 1,000 and that for him is the end of his problem.



Back on the vacuum tanker, Kumar and Rajbir Pal head straight towards Batra Hospital, Tughlakabad. They empty the sludge into the drain outside the hospital which ends up in a bigger drain that opens into the Yamuna. When asked why they do not go to one of the 36 sewage treatment plants (STPs) spread across 21 locations in the city, Rajbir Pal minces no words. "If we go to a treatment plant, it will eat away into our earning time. We can cover three-four houses in that time." But what if they are caught? "We pay Rs 100-200 and get away."

Kumar is part of an informal union of cleaners operating from outside Batra Hospital. He makes 10-15 trips in a day; in monsoons the number of trips shoots up. His tanker is just one of the 350 to 400 vacuum tankers run by individuals or unions in the National Capital Territory. So one can imagine the enormous amount of faecal sludge generated in the region—and India.

Only a third of urban houses in India are connected to the sewer system. The majority of the houses—38.2 per cent, as per Census 2011—use toilets connected to septic tanks. The problem is that the construction quality of the tanks, buried underground in populated areas, is often poor. As a result, the treatment of sewage is partial. Then there is no system for the disposal of the faecal sludge, which is in most cases emptied out surreptitiously into water bodies and municipal sewers.

It is not even practical to connect every house to the sewer system. In India, over 1.2 billion people generate nearly 1.75 million tonnes of excreta daily. A large proportion of these then proceed to release the lever on the flush attached to the toilet. Ironically, this only aggravates the problem. Now the volume of sewage has expanded several times and the municipalities will have to separate the excreta from water at a huge cost.

If the house is connected to sewerage this sewage will travel from the building's internal wastewater collection system to the municipal sewer system. Propelled by pumping stations, the wastewater will finally reach an STP, if there is one. Creating this infrastructure for all will be prohibitively costly. Nor is it suitable to all terrains. Management of excreta on the site by using septic tanks and pit latrines is, therefore, a necessity.

Census figures show that nearly 45.3 per cent of urban houses depend on on-site systems. A large part of the wastewater from these systems seeps into the soil. This may penetrate deep enough to pollute groundwater. Emptied faecal sludge should ideally be sent to a treatment facility, where it should be treated to meet the standards set by the Central Pollution Control Board (CPCB). This, however, does not happen in most cases. Census data shows 65 per cent of the cities in the country do not have a proper arrangement for safe collection of human excreta, forget about disposal.

India does not even have specific legal provisions related to the management of faecal sludge, also called septage in municipal parlance, although a number of laws cover sanitation services and environmental regulations. It was only in 2013 that the Ministry of Urban Development issued an advisory note on septage management in urban India. As per this note, city sanitation plans, recommended by the National Urban Sanitation Policy, should be supplemented with a septage management sub-plan.

Mismanagement at every stage

Alarmed by these findings, Delhi non-profit Centre for Science and Environment (CSE) set out to follow the trail of human excreta in 11 cities across India (see 'Shit scan',). It selected the cities to cover different agro-climatic zones. This is important because the soil strata and the kind of aquifers in a region as well as the extent of urbanisation determine the waste containment and management system best suited to it, says Bhitush Luthra, one of the CSE researchers involved in the exercise.

CSE then prepared a shit flow diagram(SFD), which is a visual tool to understand how excreta is contained, emptied, transported, treated and disposed of or reused, for each of these 11 cities (see 'Safe or unsafe?'). These form part of a 50-city report prepared under SFD Promotion Initiative. Here are some observations related to different stages of faecal sludge management in India.

Containment : Bureau of Indian Standards (BIS) specifies the guidelines for construction of septic tanks in houses. The minimum liquid-holding capacity of a tank should be 1,000 litres. When the capacity of a septic tank is more than 2,000 litres, it must consist of two chambers separated by a partition. The first chamber should be twice the size of the second. BIS also mandates that the floor of the tank should be watertight. All in all, an ideal septic tank is a two-chambered lined containment either connected to a soak pit to drain out the effluent after primary treatment or connected to some other secondary treatment system.

But these guidelines are only suggestive, not binding. As a result, most septic tanks do not conform to the recommended design. A lot also depends on the skills and experience of the mason building a septic tank and the area available to him. Consider the septic tank at the Sangam Vihar house in Delhi. Given its volume of 6,000 litres, it should have two chambers. But space constraint in Singh's house meant a two-chambered septic tank was out of the question. Sangam Vihar is a clustered colony where the surface area of a house is no more than 21 square metres.

In Delhi, the capacity of septic tanks varies from 3,000 litres to 8,000 litres in individual houses. "But most septic tanks in Delhi are single-chambered," says P K Jha, chairperson of the Delhi-based NGO, Foundation for Environment and Sanitation.

In areas like Meethapur and Pratap Vihar in Delhi, the effluent from septic tanks is discharged directly to an open ground. CSE also found that some tanks were designed with an outlet to an open drain, such as in Harsh Vihar. This is when the National Building Code, 2005, specifies that "under no circumstances shall effluent from a septic tank be allowed into an open channel drain or body of water without adequate treatment". In parts of Maidangarhi and Meethapur, CSE found cesspools, which are lined tanks with no outflow. "Poor houses have a storage tank in the name of a septic tank," Jha says.

Some may think that a law to ensure compliance with BIS standards will serve the purpose. But the field study in Agra showed this is not necessarily the case. According to the Uttar Pradesh Water Supply and Sewerage Act of 1975, the Agra Nagar Nigam (municipal body) has the power to fine the owner of an improper septic tank. Despite this, septic tanks in Agra generally do not conform to the design specified by BIS and the effluent is allowed to flow into open drains. Unlined pit latrines are also a prominent feature in the city.

It is the same case in Tiruchirappalli. Tamil Nadu's septage notification of 2014 states that the owners of septic tanks that do not meet the standards will be issued notices as per the Tamil Nadu Public Health Act, 1939. Yet septic tanks in Tiruchirappalli were not found to adhere to the standards.

Then there are cases where a mason's knowledge of local conditions beats BIS' scientific standards, such as in Bikaner. In this city of Rajasthan, septic tanks are mostly in the form of kuiis, lined pits with semi-permeable walls and an open bottom with no outlet or overflow. A slab is used to cover a kuii, which gets filled in 20-30 years. It is a common feature in peri-urban areas in Bikaner. Although kuiis are not a scientifically viable solution because they have an open bottom and may pollute groundwater, CSE believes that in an area like Bikaner, where the groundwater level is astonishingly low, leachate from a kuii cannot percolate to groundwater. It is better to have the faecal sludge contained in the soil where, microorganisms can digest it, instead of having a conventional septic tank and risking discharge of effluent into open drains or fields.

In coastal cities Cuttack and Srikakulam pits outnumber septic tanks. This is because in these cities pits are designed in the form of concrete rings placed one over another which makes them inexpensive and easy to close and replace.

Emptying: One stark fact illuminates how neglected septage management is in the country: most septic tanks are emptied manually in Indian cities. CSE observed manual emptying in Agra, Cuttack and Aizawl. This, despite the fact that India has enacted the Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993, which aims to eradicate manual scavenging.

So one can imagine how many people follow directions on safety precautions and regular emptying. As per BIS standards, half-yearly or yearly emptying of septic tanks is desirable. A small amount of sludge should be left in the tank to ensure the presence of microorganisms for anaerobic digestion of sludge. As regards the safety precautions a cleaner must follow, the Union urban development ministry's manual on sewage and sewerage states that workers must be provided adequate safety gear: gloves, masks, safety belts and jackets.

How do the 11 cities fare in terms of these guidelines? In Delhi, sludge is removed from the tanks only when they are choked or overloaded. In Aizawl, the emptying frequency is three years but there were instances where tanks were not emptied for 10 years. In Gwalior also the emptying frequency was once in three years.

According to the CSE surveys, no safety precautions were undertaken by cleaners in Delhi, Agra, Dewas, Solapur, Cuttack, Srikakulam, Bikaner and Aizawl. Workers in Aizawl, however, said they had not had health problems due to lack of protective gear.

The country also needs standards/guidelines on the equipment used to empty septic tanks. The most satisfactory method is by vacuum tankers mounted on trucks or tractors. A new technology is in the offing which treats sludge in the vacuum tanker itself, says Amiya Kumar Sahu, founder of the National Solid Waste Association of India, a non-profit. "It will be the next big thing in the emptying business," he adds. However, the cost could be a limiting factor in adopting this technique.

Only three of the studied cities have taken steps to regulate operators involved in emptying. In the rest of the cities anyone can empty septic tanks and charge any fee. A comparison of sludge management in different cities shows that government's involvement can bring improvements. Take the case of Dewas in Madhya Pradesh. Emptying in this city is managed and regulated by the Dewas Municipal Corporation. House owners have to submit an application to the corporation for emptying their septic tanks. The cleaners charge only Rs 500 per trip, though they have to make more than one trip because the septic tanks in Dewas are oversized.

Contrast this with Srikakulam, where the private sector is responsible for emptying septic tanks. Operators there follow no safety precautions and charge between Rs 1,500 and Rs 2,500. In Delhi they charge between Rs 500 and Rs 3,000.

The solution, it seems, is a public-private partnership. Collaboration would work best because it would destroy the mafia of private cleaners, making them accountable. Private cleaners, in turn, would bring an experienced workforce.

In Delhi, where private operators dump faecal sludge at their will and charge whatever they like, the Delhi Jal Board recently got into action to regularise the business. In August 2015, the water body enacted the Delhi Water Board Septic Tank Waste Management Regulations under the Delhi Water Board Act of 1958. According to these regulations, faecal sludge can be collected and transported by only those private cleaners who have a licence. If they fail to obtain a licence and still operate, they will have to pay a fine. But the regulation fails to specify the amount of fine.

It also lists the conditions for obtaining a licence: only individuals and agencies with leak-, odour- and spill-proof vehicle and proper vacuum and discharging equipment will be given a licence. They must also have gas detectors, gas masks, protective gear, a first-aid box and an oxygen mask and cylinder. Licensed cleaners can dispose of sludge only at locations specified by the Board, which will also prescribe the emptying fee. "It is a difficult procedure. It has been four months since we applied for a licence. Only now has the process started," says Yasin, owner of a union of cleaners operating in and around the Loni border.

Tiruchirappalli also has operative guidelines for septage management but monitoring is weak.

Krishna Chaitanya Rao, a researcher at the International Water Management Institute, suggests that cities' municipalities should enforce scheduled cleaning of septic tanks, contract emptying activities to private cleaners through bids and adopt a call centre-based model to streamline the process. "This is of advantage to the household, as it receives improved and lowest cost service; to the municipality as it can better regulate tariffs and septage disposal; and to private cleaners as they can now have clear access to markets and be a part of the formal sector," Rao says.

Transportation, treatment and disposal: Ideally, the sludge collected should first be treated and then either disposed of according to the standards prescribed under the Environment (Protection) Act of 1986 or reused as fuel, soil conditioner or filling material, depending on the treatment method.

In reality, most of the faecal sludge collected from septic tanks is dumped into rivers, drains and sewers or emptied untreated into agricultural fields and low-lying areas. A tiny portion of it reaches STPs, though ideally it should not. Septage is high in total solids, suspended solids, biological oxygen demand (BOD), chemical oxygen demand (COD), nitrogen and potassium. STPs are not designed for this. "Treatment of septage at STPs can only be an interim solution," says Luthra of CSE, adding that "treatment can be as simple as drying the feacal sludge for reuse in agriculture."

For using treated faecal sludge in agricultural fields, WHO suggests a faecal coliform density of less than 1,000 most probable number (MPN) per gram of total dry solids, a salmonella density of less than 3 MPN per 4 g and an E coli density of 1,000 MPN/g. "The minimum one can do is let the sludge out in the sun to dry. Using raw sludge as manure is never recommended," says Sahu of the National Solid Waste Association of India.

But use of raw sludge in fields is common as seen on Ali Sher's farm. It is 5 km from the site where tankers from Loni in the National Capital Region congregate. As a tanker releases faecal sludge on his farm, Sher tells Down To Earth how he has been fertilising his crops using raw sludge for years. He grows wheat, sorghum and vegetables such as potato, cauliflower and turnip. "I still have to add some urea because the sludge is not enough. But I get the sludge for free. Sometimes I pay for it," he says.

No city has a treatment plant designed specifically for septage. Dewas, Srikakulam and Solapur do not even have a functional STP. In Srikakulam, private cleaners dispose of faecal sludge outside the town, where farmers use the dried sludge as compost. The Solapur Municipal Corporation dumps the faecal sludge it collects into a dump yard 10-15 km from the town, while private cleaners dump it into open drains. In Dewas, the wastewater from sewer lines ends up in the Kshipra and Kali Sindh rivers, while tankers generally discharge sludge into surface drains, nallahs, low-lying areas or agricultural fields.

In cities that have an STP not all sewage/septage reaches the plant, partly because of losses in transportation, but mostly because cleaners refuse to go to an STP.

In Aizawl cleaners transport sludge to private land in Tuirial, Bethany and Mualpui localities by paying Rs 100 per trip. While Tuirial has an oxidation pond to partially treat the faecal sludge, the sludge emptied in Bethany is sometimes used for agriculture.

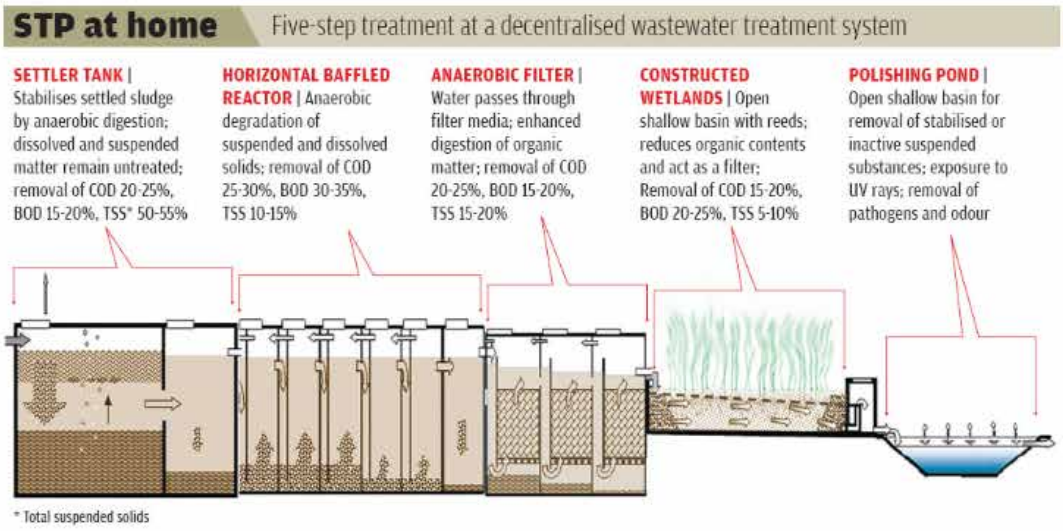
In fact, most STPs in the country remain under-utilised. Only 66 per cent—3,126 million litres per day (MLD)—of the actual treatment capacity of the 152 STPs spread across 15 states in the country is utilised, shows a 2015 report of CPCB. In Tiruchirappalli, the 58 MLD STP is underutilised, so it treats sewage as well as septage. In Agra, the nine STPs have a capacity of 221.25 MLD, while the sewage delivered to them is only 175.75 MLD. Agra, too, can go the Tiruchirappalli way.In Delhi as well, STPs are under-utilised. Yet, the Yamuna has become the major receptacle of treated, partially treated and untreated sewage, while septage is disposed of in low-lying areas, vacant plots, water bodies and agricultural fields. A private guard in Okhla, who does not wish to be named, says he often sees tankers empty sludge on the banks of the Yamuna.

Then there are STPs that treat sewage but the quality of treatment is not according to the prescribed norms. As per CPCB, 49 of the 152 STPs in the country exceed the BOD standard, while seven STPs violate COD standards. That's how Tumkur's treated sewage discharged into Bommasandra lake ends up choking it.

And what about effluent? CSE observed soakaways connected to individual septic tanks only in Aizawl. The saving grace in many cities is that their groundwater level is low, so leachate from pit latrines and soak pits poses no threat there.

Simple steps to sanitation

India cannot do away with septic tanks. The best it can do is to fix the gaps in handling excreta. One step the authorities can take is to train masons in the design and construction of a tank. Then, the regulation of private cleaners is equally important. It can be done through a public-private partnership. Such a partnership would give houses access to improved service, the municipality can better monitor and regulate emptying activities and private cleaners get access to markets and formal employment, wherein they are also made aware of safe sites for disposal of faecal sludge.



As for safe disposal, Suresh Kumar Rohilla, programme director, urban water management, CSE, suggests decentralised wastewater treatment system, which basically brings an STP home (see diagram above). Such systems can be used at different scales; in houses, schools and colonies.

Rohilla gives the example of Aravind Eye Care Hospital at Abhishekapakkam in Puducherry that adopted a decentralised system in 2003. It did so because its water demand for horticulture was very high. Primary treatment at the hospital is similar to an improved septic tank, called anaerobic baffled reactor with filter. It is basically a series of chambers where filter material is installed in the last few chambers. The organic matter is degraded by microorganisms attached to the filter media. This decreases BOD by about 90 per cent.

Secondary treatment is achieved through a planted gravel filter bed. It consists of a gravel bed over which reeds are grown. The roots absorb nitrates and phosphates and inject oxygen in the wastewater. This results in more than 50 per cent reduction in BOD, nitrates and phosphates. Finally, tertiary treatment is achieved in a polishing pond. It is basically a shallow pond in which ultraviolet light can penetrate deep enough to kill pathogens.

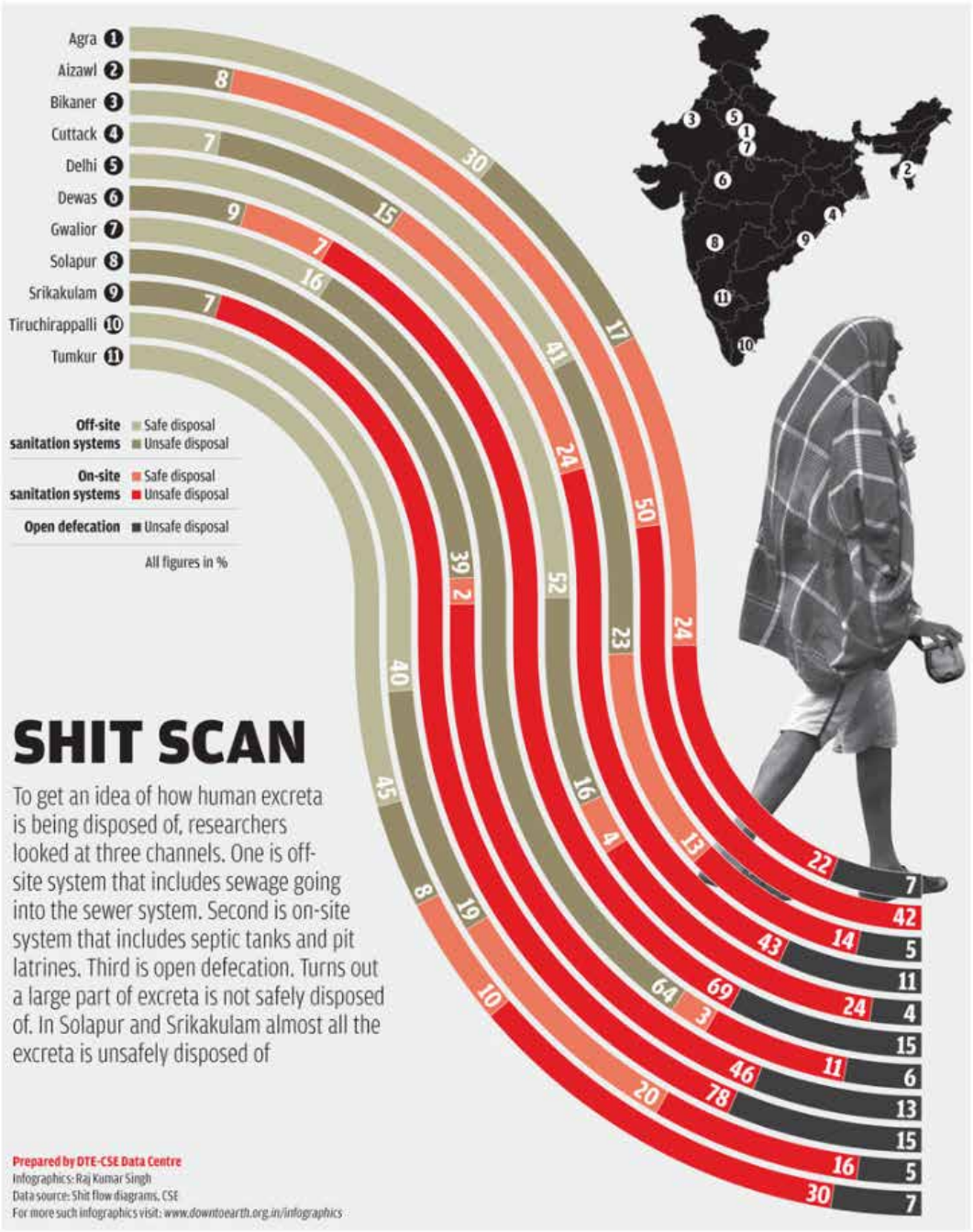
The system at Aravind Eye Care Hospital treats 270-320 kilolitres of wastewater every day and reduces dependence on fresh water.

Residents of the Ravindra Nagar colony in Ujjain, Madhya Pradesh, have built a reed bed covering 42 square metres for treating 13 kilolitres of sewage a day.

Wherever community-level solutions are not possible cities may need independent septage treatment plants. Such plants can be set up and maintained by charging a user fee.

Most importantly, cities should reuse the treated faecal sludge. "Septage is 100 per cent organic. If it is discharged into a sewer line, it will be mixed with toxic effluents, restricting its reuse," says Jha of the Foundation for Environment and Sanitation. Janicki Bioenergy Omni Processor in Dakar, Senegal, is a fitting example of reuse. This processor, funded by the Bill and Melinda Gates Foundation, takes one-third of the sludge in the city and converts it into electricity, ash and even drinking water. It produces up to 10,800 litres of clean drinking water every day from 12.3 cubic metres of sludge.

Cities can opt for a combination of these options depending on their topography, extent of urbanisation, population, land availability, proximity and availability of STPs, and proximity to residential areas. One good way to begin is by preparing the septage management sub-plan. After this one can flush and forget.



As part of the SFD Promotion Initiative, CSE followed the trail of excreta in 11 cities, right from its containment to treatment (or lack thereof) and end-use/disposal. We constructed shit flow diagrams for each of these cities to track excreta flow for off-site and on-site systems.

Some cities were absolute shockers: Take the case of Srikakulam, where none of the waste is safely managed. There is no treatment facility for sewage and septage and therefore, almost all of it finds its way untreated into private lands, agricultural lands and, mostly, the Nagavati River. Solapur was slightly better: 2 per cent of the waste generated in the city is safely managed. This 2 per cent is the waste contained in, but not emptied from, an on-site system. This can be expected: sewage generated in the city and conveyed through sewer lines to an STP cannot be treated as the only STP in the city is not operational. Septage collected by private emptiers is dumped in open drains and that collected by the municipal corporation is dumped into a solid waste dumpyard.

Mismanagement was rampant across all stages: The ideal case scenario as regards containment was observed only in Aizawl, where septic tanks were connected to a soak pit for safe disposal of effluent. Otherwise, tanks do not conform to design standards and completely neglect the effluent from a septic tank. Only three of the 11 cities have taken steps to regulate emptying services. As regards the transportation, treatment and disposal of fecal waste, there is no clarity on the norms that must be followed. There is no independent septage treatment plant in any of the 11 cities we surveyed. The interim solution of transferring the load of septage on an STP cannot work for cities that don't even have an STP in the first place, such as Srikakaulam, Solapur and Dewas.

Using an SFD, stakeholders and policy makers can easily pinpoint the broken leg in excreta management for a particular city. Following are the shit flow diagrams of the 11 cities:

There are a host of new and under-reported technologies to contain, treat and reuse faecal waste which, experts say, can address the water-toilet-waste-pollution nexus.

The first step in the flow of excreta from toilet to the environment is containment. While a septic tank is what first comes to mind when we think of on-site sanitation systems, entrepreneurs propose another solution called the bio-digester. A bio-digester is a mechanical stomach in which microorganisms act upon organic material to produce biogas and other materials which can be used as fertilizers.

"A bio-digester is not only more efficient than a septic tank, it is also considerably cheaper," said Manoj Jha, managing director of a bio-digester manufacturing company called Arkin Creations Pvt Ltd, while speaking at a workshop organised by Centre for Science and Environment (CSE) in New Delhi in April, 2016.

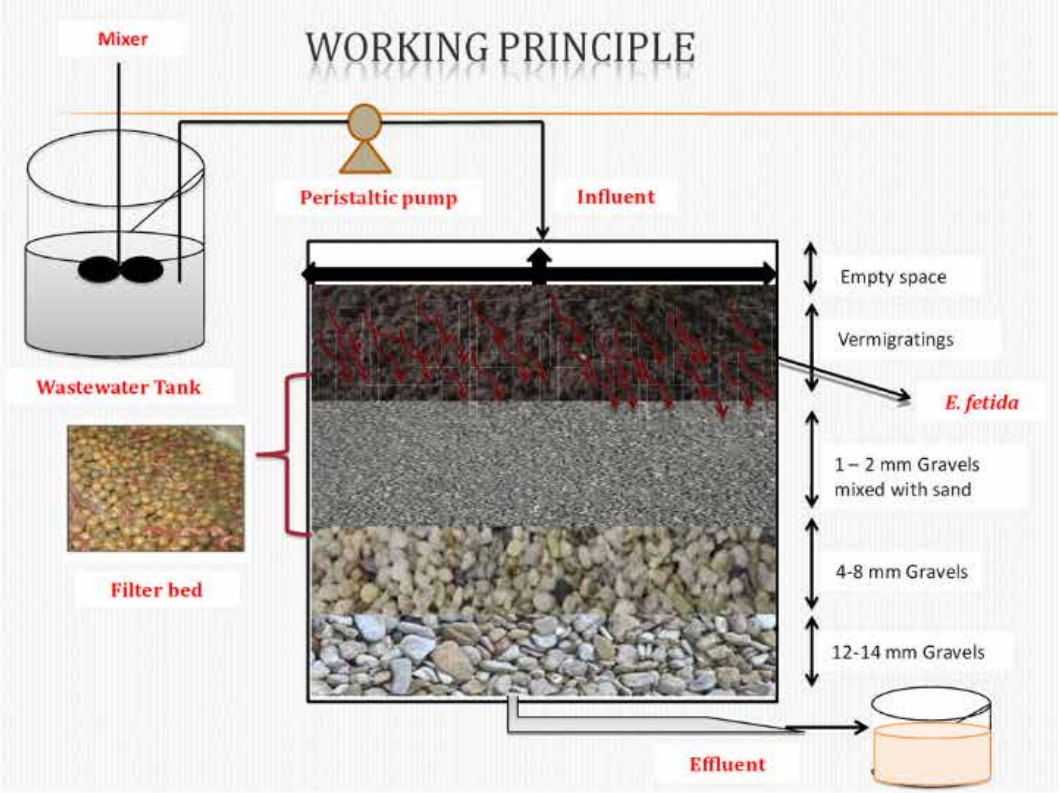
Consider the advantages of a bio-digester over a septic tank: Jha claimed it can achieve more than 90 per cent decomposition, while the decomposition achieved by a septic tank hovers around 40 per cent. Septic tanks may result in the emission of foul-smelling hydrogen sulphide, while bio-digesters release only natural methane and carbon dioxide. Over 99 per cent of disease-bearing pathogens are inactivated in a bio-digester. This figure is very low for a septic tank. The size of a bio-digester designed for a given number of people is nearly 50 per cent less than the size of a septic tank designed for the same number of people. Hence, the construction cost of a bio-digester is half of that of a septic tank. The Biological Oxygen Demand (BOD) and Total Suspended solids in wastewater from a bio-digester are also considerably lower than those for a septic tank, he said.

New treatment options

To treat faecal waste, experts propose vermi-filtration as "a novel, innovative and sustainable" technology based on the symbiotic relationship between earthworms and microorganisms. While microorganisms perform biochemical degradation of waste material, earthworms remove the harmful pathogens in wastewater by devouring them.

"Vermi-filtration encompasses all forms of treatment—primary as it leads to removal of silt, grit and so on; secondary as it helps in removal of organic matter; and tertiary as it involves disinfection and removal of pathogens," said Sudipti Arora, scientist at the B Lal Institute of Biotechnology.

In a vermi-filter, wastewater flows from a tank into a vermi-filter through a peristaltic pump*. The filter has 12-14 mm of gravel at the base, with 4-8 mm of gravel, 1-2 mm of gravel mixed with sand, vermi-gratings and a little empty space above in that order. The effluents that flow through a vermi-filter can be used for irrigation in parks, gardens and farms, while the vermi-compost can be used in agriculture. The operation and maintenance costs of a vermi-filter are 80 per cent lower as they do not require external aerating oxygen pumps, Arora explained.



The technology has been adopted by many institutions such as IIT Roorkee where vermi-filtration was used to treat domestic waste water as well as municipal solid waste on a pilot scale. The project was able to achieve very high BOD removal (nearly 90 per cent), COD (chemical oxygen demand) removal (nearly 80 per cent) and pathogen removal. Ammonia content was also found to be reduced. The concentration of nitrates and phosphates in treated waste water was high, which is desirable.

The main challenge that needs to be addressed before vermi-filtration can be adopted on a large scale is its dependence on earthworms which in turn depend highly on temperature, pH level and moisture. Also, isolation of earthworms by hand from the filter bed is a tedious process.

New reuse options

Among new uses of faecal waste is the extraction of biodiesel from faecal matter. Kartik Chandran, professor at Columbia University, and his team developed a pilot-scale research programme to achieve this objective. The programme was implemented in Kumasi, Ghana, and was subsequently improved at Columbia University.

In this video, Chandran talks about his pilot project in Ghana to convert faecal sludge into biodiesel.

In essence, biodiesel is manufactured from the reaction between lipids and methanol. The lipid quantity in faecal waste of a healthy adult is only about 7-10 per cent. "We therefore thought of employing the entire organic part of faeces and converting it into biodiesel," Chandran says. He cautions, however, that though the production of biodiesel from faecal waste is a novel method for its reuse, it is not comparable with production from the existing energy industry.

**Note: A peristaltic pump is a pump where water flows under pressure of a constriction along a tube or hose. Alternating compression and relaxation of the tube or hose results in the suction of water into it.*

A large portion of Delhi is unsewered. Almost half of the households use either septic tanks or defecate in the open. This film looks at the environmental and technological issues of faecal sludge management in Delhi.

Practical Action Bangladesh is converting faecal waste to compost and supplying it to farmers in the country. Hasin Jahan, country director for Bangladesh, talks about the challenges in dealing with faecal waste in her country.

THE TIMES OF INDIA

INDIA

Improving sanitation services in India: How can a citywide scheduled desludging model for onsite sanitation enable safely managed sanitation

July 14, 2022, 11:22 AM IST / Aasim Mansuri, Dhruv Bhaskar and Arwa Bharmal in Voices, India, TOI

"Earlier we had to pay INR 2000-3000 to the operator for desludging but now, since scheduled desludging started here, we do not have to pay for the services. This is a big relief for us. Another advantage of this service is that the people who come for desludging are professionals who use pipes and desludge / empty the whole septic tank. In fact, if they come to know of other septic tanks in the neighbourhood, they empty those as well as per the schedule," says a resident of Sinnar, a town in Maharashtra where scheduled desludging has been implemented. Most Indian cities, however, do not carry out scheduled / periodic desludging of septic tanks, which is an essential component to ensure hygiene and sanitation for all. This not only places the responsibility of desludging on households, but also proves to be a financial burden on people from economically marginalised groups. As a way forward to India's *swachhta* journey, holistic management of sanitation services is imperative.

The Swachh Bharat Mission has played a significant role in making India open defecation free. Access to toilets has ensured that people don't have to defecate in the open. This is where sanitation starts, but not where it ends. Bodies to provide this desludging services for a fee, but only when they are called upon to do so. Also, in many cities, it is the unregulated private operators who provide this service at a higher rate and are called only when there is backflow from the tank to toilets or the tank is overflowing. This service by local government / private operators is in 'complaint redressal' mode. There needs to be a paradigm shift to view this as a 'public service', wherein a sustainable and planned system of scheduled desludging is required which ensures regular desludging of septic tanks and transporting collected septage to the treatment facility. This is something similar to our solid waste door-door collection service, where the waste is collected on daily basis and under scheduled desludging the septage waste will be desludged once in three years or as per schedule from the onsite sanitation systems.

Wai and Sinnar in Maharashtra have set a leading example of successful implementation of scheduled desludging service. The local governments of these cities **introduced scheduled desludging through a public private partnership model** – which collected waste from septic tanks (every 3 years)

implementation of scheduled desludging service. The local governments of these cities **introduced scheduled desludging through a public private partnership model** – which collected waste from septic tanks (every 3 years) of residential, non-residential properties, low income households and urban slums and ensured its treatment at a solar powered faecal sludge treatment plant and reused for creating carbon sinks. The scheduled desludging contracts in these cities used a performance-linked annuity model with a pay-for-results contract between the desludging company and local government. Payment to the private provider is made by the local government and is based on the number of septic tanks desludged, with an annual target specified in the contract. Additionally, **a mobile-based application called SaniTab and SaniTrack** was set-up to capture information of on-site sanitation systems and monitor the performance of private sector operator, while the scheduled services were being provided. For financing the O&M cost of scheduled desludging services, these cities levied a **'sanitation tax'** as a part of the property tax. Combination of sanitation tax and property tax, is used to finance the payment to the private

multiple stakeholder involvement and coordination, a focus on awareness activities, strong monitoring systems, and the availability of a treatment facility of adequate capacity.

The promising experience of scheduled desludging in these two Indian cities underlines several benefits including **safe, inclusive, and affordable sanitation systems**. These two cities are among the first few cities to **implement citywide scheduled desludging with less investments**, and if this model is replicated, it could transform sanitation for more than 7400 towns (including census towns) like Wai and Sinnar having 50% of India's urban population.

GOVERNANCE now

Why sanitation should matter to you

A breakdown of the link between sanitation and public health

Khushi Desai | July 4, 2022

#Covid-19 #pandemic #Water #Sanitation #Hygiene #WASH #Swachh Bharat Mission #Jal Jeevan Mission #economy

(File Photo: Arun Kumar/GN)

How many times a day do you flush the toilet? This number is probably between five and eight times for an average person. How many times a day do you spare a thought towards what happens to the human waste after you flush it away? The answer to this is likely to be close to zero for most people.

While citizens with access to piped sewer networks rarely have a reason to worry about what happens to their waste, about two-third of Indian households with toilets are, in fact, not connected to sewer systems and rely on on-site sanitation systems. It is critical that members of the society acknowledge the challenges arising due to unsafe sanitation practices, such as adverse living conditions, for the most vulnerable groups and the society at large.

Currently, in India, it is estimated that 60% of faecal sludge is dumped illegally without any treatment – contaminating open land and water bodies across the country. The pathogen content in faecal sludge is extremely high and without proper treatment leads to the transfer of major infectious vectors. Nearly 70% of India's surface water is now polluted and contaminated by biological, toxic, organic and inorganic pollutants.

Currently, in India, it is estimated that 60% of faecal sludge is dumped illegally without any treatment – contaminating open land and water bodies across the country. The pathogen content in faecal sludge is extremely high and without proper treatment leads to the transfer of major infectious vectors. Nearly 70% of India's surface water is now polluted and contaminated by biological, toxic, organic and inorganic pollutants.

What does this mean for communities?

Many communities in India, especially those downstream from polluted rivers and without access to piped water, are afflicted by infectious diseases like diarrhoea, typhoid, intestinal worms, cholera, malaria, schistosomiasis. In 2019, approximately 33 people for every 100,000 of the Indian population died due to sanitation-related ailments, with a high incidence of disease among children under the age of five. Without safely managed sanitation, the disease burden devastates quality of life socially and economically.

Additionally, unsafe sanitation is increasingly being recognised as the cause for spreading anti-microbial resistance – infections that are resistant to antimicrobials and antibiotics. Anti-microbial resistant bacteria are known to have vast presence in wastewater and without treatment, go on to re-contaminate humans through drinking water or food. It is touted as one of the most enormous and historic public health challenges faced by India and countries around the world. Without building safe water and sanitation systems as protective frontiers, communities shall face more serious breakdowns of public health systems in the future.

The Covid-19 pandemic is not only a demonstration of the severe loss of human life due to infectious diseases, weak health and improper sanitation systems; it is also a paradigm of how safe water, sanitation and hygiene practices are key to provide resilience against adverse outcomes en masse. Many things from a rigorous hand-washing regime to adequate waste management were key levers that enabled the country to fight against the pandemic. Had these systems been in practice before the pandemic, there is a significant case to suggest that the pandemic would perhaps have been less destructive for the communities.

What can we do about it?

Think about it this way: a single truck of faecal sludge dumped into the open contains the equivalent of 5,000 people defecating in the open. This leads to public health and environmental challenges that are further magnified to large chunks of the population. However, there are ways to build preventive barriers to ensure that the waste finds its way to treatment plants. By developing an integrated and holistic sanitation value chain known as Faecal Sludge and Septage Management (FSSM), the waste can be safely treated and converted into a form safe for disposal into the natural environment. Moreover, the treated wastewater can also be utilised in agriculture and other use cases by extracting key nutrients and energy from the sludge – provided it meets the scientific standards set in policy.

Not only is safe sanitation one of the most integral Sustainable Development Goals (SDG 6.2), it is also a crucial component of the One Health approach to public health – a multi-level, multidisciplinary approach to achieve positive health outcomes through optimal human-environment interactions. While India has made significant progress on driving forward the safe sanitation agenda, there is much more that needs to be done even more rapidly, with support from the FSSM and safely managed sanitation construct. This is why sanitation should matter to you – for the healthier, safer and more sustainable communities of the future.

Khushi Desai is Analyst, Urban Sanitation, Dasra

THE TIMES OF INDIA

INDIA

Resolving India's sanitation issues with decentralized solutions

December 21, 2021, 3:48 PM IST / Drishti Basi in Voices, India, TOI

As we trace the focus of the Swachh Bharat Mission since 2014, the significance of toilets to the health and wellbeing of the community has been paramount. While there has been a remarkable progress in the country with cities becoming open defecation free (ODF), a much-neglected aspect is the aftermath of using a toilet. Humans on average defecate 140 KG of excreta each year and when multiplied with the 1.4 billion people residing in India, it becomes tough to equate access to toilets with access to sanitation. 80% of this excrement finds its way to open ground or water bodies. Therefore, we need to broaden the conversation regarding complete sanitation, and acknowledge that safe containment and treatment of human excrement is equally important.

This is where faecal sludge and septage management (FSSM) becomes relevant. It is the practice of safe containment, emptying and transportation of faecal sludge (mixture of human excreta, water and solid wastes) and septage (refers to the partially digested faecal solids) to a treatment plant. Let's understand it step by step:

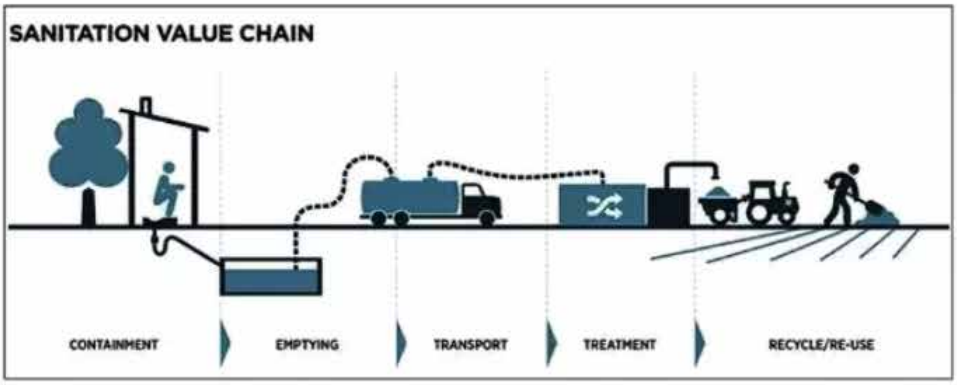
– **Onsite Sanitation System (OSS):** With only a third of the toilets in the country connected to a sewerage system, the alternate way to safely contain human and household liquid waste, is connecting that to underground containment systems (like septic tanks).

– **Emptying:** The containment systems need to be emptied periodically, with the help of a mechanized desludging truck which collects the waste from underground tanks.

– **Transportation and Treatment:** Desludging trucks transport this sludge and septage to a faecal sludge treatment plant (FSTP).

– **Reuse:** To complete the cyclic biological process, the by-products of treatment which include both water and bio-solids can be reused for agriculture purposes.

The entire process of containment to treatment of faecal sludge and septage, along with creating an enabling environment for the system to run smoothly and sustainably is FSSM.



Identifying the need for managing human and household waste early on, Ministry of Urban Development, Government of India, prepared a national policy on FSSM in 2017. Furthermore, faecal sludge and septage management is integral to government's strategy to achieve the ODF+ and ODF++ statuses, which address the holistic coverage of waste treatment, disposal, and reuse. It is also critical to acknowledge the need for FSSM from the perspective of its cascading effects on public health, climate, and water pollution. Unless safely contained and treated, the waste from toilets which are not connected to a sewage system, continue to pollute water bodies, contaminate underground resources, and add to the public health crisis.

A few Indian states have shown tremendous improvement in treating waste from on-site sanitation systems by implementing right policies, regulations, and infrastructure. Warangal in Telangana is the first Indian city to implement FSSM regulations. This involved identifying existing problems and challenges with sanitation. Post identification, training was carried out for stakeholders like masons on proper construction of septic tanks, and private desludging operators on emptying and use of PPE.

Licenses were issued, desludging trucks were fitted with GPS for real-time tracking via an app. FSTPs were constructed at identified point in the city for quick conveyance of sludge. A helpline was also launched to enable citizens to access masons and desludging operators and to seek technical help or convey their grievances.

Odisha too has been a frontrunner paving the path towards sustainable sanitation practices. The state has excelled in achieving 100% faecal sludge management with the help of a strong political will. Starting with two towns, Dhenkanal and Angul, faecal sludge and septage management in Odisha started in the year 2015 through project Nirmal. By 2020, the state had achieved 100% treatment of blackwater.

Furthermore, the government realized that more than 30% of the urban areas have narrow inaccessible lanes – a hindrance to large desludging vehicles. Therefore, to extend mechanized desludging services, the government has been actively procuring mini cesspool emptier vehicles with a capacity of 1000 liters. Following these successful FSSM implementations many other cities and states across the country are also executing innovative financing models, using technology, and working with women and transgender communities to ensure that inclusive and safe sanitation is realized at the grassroots. The process of delivering safe and sustainable services across the sanitation value chain is therefore made successful through multi-stakeholder collaborations across urban local bodies, state government, citizens, private sector players and sanitation workers, supported by the right set of governance frameworks, technology and training. The National Faecal Sludge and Septage Management Alliance (NFSSM Alliance) is one such collaborative body which focuses on creating impact through policy recommendations and supporting the government at a national and state level enabling effective FSSM service delivery to last-mile communities.

60% of India's urban population today, depends on OSS, which requires dedicated planning for FSSM – a model which can easily be implemented, scaled up and replicated across the country with adaptations as per local needs. Complementing the centralized sewerage networks, FSSM is a convenient, adaptable, and cheaper method which can enable us to achieve 100% sanitation sooner.

Non-Sewered Sanitation- Way to Achieve SDG 11.6

By Elets News Network 13-December-2021

Share:

The importance of environmental sanitation as an ally of other branches of public health in the control of preventable diseases is now recognised in most parts of the world[1]. Aiming to improve the quality of life through social development and break the cycle of diseases, environmental sanitation takes a broader look at the community and includes wastewater management along with greywater and faecal sludge as a key component, write **Gauri Srivastava** and **Laila Khan Khongthaw**, Programme Officers – Sanitation Capacity Building Platform (SCBP), **National Institute of Urban Affairs (NIUA)**.

The rapidly expanding cities are imploring new planning approaches to overcome the lack of sanitation services, causing diseases, environmental degradation, and stunting economic progress.

While we have recognised the urgency to reduce the adverse per capita impact of cities and are endeavouring to do this by 2030 under Sustainable Development Goal (SDG) 11.6, it is critical to check the unsafe discharge of wastewater into the environment which has contaminated 75 per cent of India's surface water and has been identified as the leading polluter of water sources[2].

In 2008, the National Urban Sanitation Policy (NUSP) highlighted that over 37 per cent of the total human excreta generated in urban India, is unsafely disposed of. Thus imposing a high risk to public health and the environment. In urban India, only 32.7 per cent of households are connected to centralised sewerage systems, which are very expensive to build, operate and maintain[3]. The remaining 67.3 per cent of households depend on On-Site Sanitation Systems (OSS)[4]. How is their waste handled? Where does it go? To address this issue and give emphasis to Non-Sewered Sanitation (NSS) which deals with OSS, the National Policy on Faecal Sludge and Septage Management (FSSM) was launched in 2017.

Uttarakhand, the origin of two major rivers- Ganga and Yamuna, having almost 86 per cent of its area under hills and 79 per cent of the urban population dependent on OSS systems[5] (see fig1), quickly embraced this concept of NSS (including FSSM and wastewater management) but the problem was the scale and pilot projects being run by NGOs. Significant variations in climate and geography also became a challenge.

The state soon realised that it is crucial to follow the complete FSSM value chain extending from the point of generation to point of disposal/reuse including safe containment, emptying, transportation and treatment to achieve the sanitation goals including SDG 11.6 and reducing per capita impact of cities.

Thus, Uttarakhand, in 2017, issued a Protocol for Septage Management as a guiding tool for all the ULBs. In 2019, the state signed an MoU with the National Institute of Urban Affairs (NIUA) to support the state on non-sewered sanitation through NIUA's Sanitation Capacity Building Platform (SCBP). The SCBP winged out and supported the state through capacity development, technical support, and policy, advisory and hand-holding to all 100 ULBs. An advisory was prepared by SCBP for Operationalising the Septage Management Protocol which was issued to all the ULBs by the Urban Development Directorate in December 2020.

A study by SCBP (2020) highlights that the emptying period of the majority of septic tanks in urban Uttarakhand is in the range of five to 10 years which far exceeds the standards. Also, many urban habitations discharge wastewater into open drains causing contamination of water bodies.

A River Rejuvenation Committee (RRC), formed in 2018 to address the critically polluted river stretches, recommended the construction of Interception and Diversion (I&D) Sewage Treatment Plants (STP). In 2020, SCBP based on a situational assessment of four towns along nine such stretches provided advisory and technical recommendations for FSSM.

Implicitly encompassing environmental sanitation and thus SDG 11.6, National Mission for Clean Ganga (NMCG) has initiated interception and treatment of open drains. Taking it as an opportunity, the state has also prioritised treating faecal waste in all 15 Ganga Towns. Under NMCG, so far 28 projects are completed in Uttarakhand, giving an additional treatment capacity of 153.17 MLD.

The learnings from the above interventions gave momentum to City Wide Inclusive Sanitation (CWIS) and a paradigm shift started transpiring. The importance of safe, equitable and financially viable sanitation services was realised.

Uttarakhand found the CWIS approach viable and inclusive for unserved and underserved groups as it does not oppose the conventional approach but improves it by combining centralised and decentralised systems as well as on-site and sewered solutions based on ground realities and linking it with reuse and resource recovery. It focuses more on enabling an environment for service provision, rather than simply building infrastructure.

Supporting Uttarakhand's commitment towards 100 per cent safe sanitation and upgradation of the environment, an advisory was prepared by SCBP to explore and initiate co-treatment in all the existing and proposed STPs. So far co-treatment has been initiated in six ULBs. The state has already started moving towards a cluster approach for the best utilisation of available resources. The first Faecal Sludge Treatment Plant (FSTP) of 125 KLD capacity for a cluster of seven ULBs is upcoming at Rudrapur city under AMRUT.

Further, for the financial stability of FSSM in Uttarakhand, it is crucial that funds must be properly channelised from new national missions/ programs such as AMRUT 2.0, SBM-2.0, and also from the 15th Finance Commission.

Urbanisation is inevitable, especially in a state like Uttarakhand, which has pristine natural beauty as well as cultural and religious tourism. It is time when cities must start 'thinking beyond toilets'. CWIS is the road to realise the dream of 100 per cent safe, inclusive, and financially viable sanitation in urban areas. A combination of technologies and planning approaches must be opted to leave no area unattended.

Reduction in adverse per capita impact of cities due to inefficiency of wastewater management and realisation of SDG 11.6 will only be possible through a 'multi-barrier approach' including stakeholder collaboration, behavioural change and pooling of complementary urban services like water supply, stormwater drainage, greywater management, and solid waste management.

DownToEarth

Rural Water and Sanitation

Swachh Bharat Mission: Sustaining ODF a multi-faceted process

Bangladesh took 15 years to become ODF, while Thailand took 40

Raghav Neti

Published on: 30 Sep 2019, 7:16 am

October 2, 2019 marks five years since India launched the Swachh Bharat Mission, the country's largest-ever drive to make India open-defecation free (ODF) and improve sanitation. This was the first time that the country has placed sanitation squarely on the national agenda, and set ambitious goals for Mahatma Gandhi's 150th birth anniversary.

India has much to celebrate. Ever since the Mission started, the country has reduced open defecation at an unprecedented speed and scale.

More importantly, the achievements go far beyond just numbers. Many rural communities have strongly engaged with the sanitation agenda and, in a number of instances, women have been in the forefront.

Making this progress permanent is now the key. Global experience tells us that sustaining the ODF status is a multi-faceted, medium to long-term process. Often, countries that have achieved ODF status tend to fall behind, and some take decades to achieve sustainability. Bangladesh, for instance, took 15 years to become ODF, while Thailand — where the campaign was personally led by the late King — took 40 years to do so.

Acknowledging the ongoing nature of the challenge, the government has announced ODF Plus to ensure sustainability. To make the progress permanent and to achieve a more holistic impact on sanitation, efforts are on to educate rural communities on the management of organic waste, plastic waste, water conservation, etc.

The World Bank is supporting Swachh Bharat Mission-Gramin (SBM-G) through a loan of $1.5 billion. This support incentivises states to achieve and sustain the ODF status and improve cleanliness in villages through solid and liquid waste management. Our efforts focus on behavioural change on the ground, ensuring environmentally sustainable outcomes and building capacity of institutions for effective implementation. Going forward, we stand ready to build on the results of SBM-G, and work with partners across the world to ensure that safe sanitation becomes a reality for all.

The author is the task team leader, Swachh Bharat Mission Support Operation, World Bank

This is part of Down to Earth *'s print edition dated 1-15 October, 2019*

DownToEarth

Water

Swachh Bharat Mission: Need focus on citywide sanitation, clean Ganga

Safe and equitable access to sanitation and ensuring behavioural change necessary for sustenance

Rahul Mankotia, Shantanu Kumar Padhi, Nida Ahmed

Published on: 14 Oct 2019, 12:57 pm

Citywide sanitation starts with equitable access to hygienic toilets. This means accessibility and affordability for the urban poor and marginalised sections of the society including the differently abled, elderly, women and children.

The construction of 100 million toilets across the country under the Swacch Bharat Mission is only the first step. To sustain the open-defecation free status of the country, it is not only necessary to keep the momentum of toilet construction going but also to ensure everyone uses the toilets.

Are the toilets user-friendly? Do women have privacy and feel safe while using it? Will children feel comfortable using it? Is it easy for the elderly or the differently abled to access these toilets? If there is a user fee, will people be able to afford it?

These are some of the questions that need to be asked while planning not only a community or public toilet but also those in households — Individual Household Latrines. And the best people to answer this question are representatives of communities. Representation and involvement of the community is necessary to ensure the toilets are planned for equitable access.

Behavior change

What about people's mindset? Behavior change communication and community engagement are critical for adoption of toilets in communities where open defecation is a norm.

Behavior change communication starts with capacity building and sensitisation of the community and creation of role models or change agent within the community to help achieve behavior change on a scale leading to improved sanitation practices of the community.

Change agents can include elected representatives, known personalities in the community or even schoolchildren or anganwadi workers.

Safe management of excreta

Where does your excreta go after you flush? If you live in a metropolitan city or a tier-1 city, there is a possibility that your toilet is connected to a sewerage network.

It is a large intricate system of underground pipes and pumping system that is ultimately connected to a sewage treatment plant (STP). But this is a western concept which Indian cities have been trying to adopt for many decades now, but only 30 per cent of the urban population in the country has been connected to a sewerage network.

The challenge of digging up narrow lanes and covering the entire city through a sewerage network is challenging. Even locating and operating a centralised STP is a challenge in the Ganga basin due to frequent flooding in low lying areas. Instead of lobbing only for one solution, alternate solutions should be looked at.

Decentralised wastewater treatment is an approach where instead of one big conventional STP in the outskirts of a city, many smaller STPs are developed within the city at community or ward levels.

The main advantage of such an approach is that sewage is not conveyed or pumped for long distances and the possibility of local reuse of treated water increases manifold. Depending upon the availability of land and skilled manpower, mechanized- or nature-based technology can be selected.

In the absence of a sewer system, majority of households are connected to onsite sanitation systems like septic tanks. These tanks need to be properly lined and designed according to the Bureau of Indian Standards (BIS) code to ensure it safely contains the excreta.

The waste from the septic tank — faecal sludge — needs to be emptied by a vacuum tanker at least every 2-3 years or else it can pollute waterbodies and become a public health concern. The tendency of households is to delay emptying the septic tank until there is an emergency.

Some cities in Maharashtra have adopted scheduled emptying service provided by the urban local body to prevent septic tanks from malfunctioning and become a health hazard.

The faecal sludge can either be treated at a dedicated faecal sludge treatment plant or in case of a city partially covered with a sewerage network, it can be co-treated with sewage in an STP. Before treating the additional organic load, the capacity of an STP needs to be assessed.

The management of grey water (water from bathroom and kitchen) in non-sewered areas can be addressed by innovative solutions like simplified sewers connected to decentralised wastewater treatment systems which are easier to construct and maintain.

Business models for sustainability and re-use

Sewerage projects are implemented on a big scale and are lucrative for bigger private sector players. But what about faecal sludge and septage management, where scope of work includes operating a vacuum tanker to safely empty and transport faecal sludge and operating a faecal sludge treatment plant (FSTP) which is comparatively less lucrative due to the smaller scale of the project?

Many states are opting for convergence with National Urban Livelihood Mission which includes involving self-help groups or community-based organisations in taking up operations of the treatment plant through skill development and capacity building.

To ensure sustainable revenue from sale of byproducts of FSTP, forward linkages can be tied with the horticulture department to be used in gardens and public parks.

Wastewater a resource: Plugging water supply and demand gap

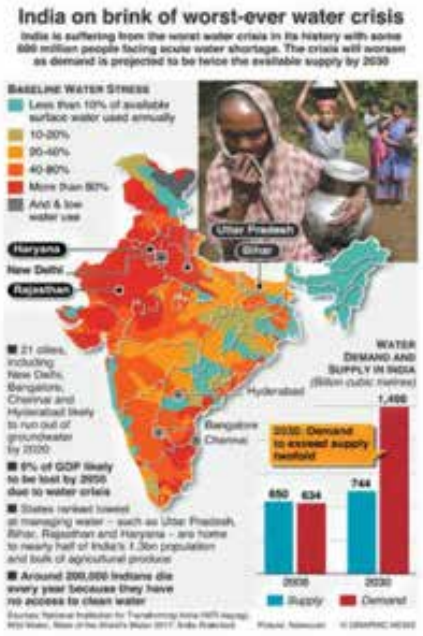
By Elets News Network 08-October-2022

Share:

India is on a move to rapid increase in urbanisation with an estimate of 590 million people to start living in cities by 2030, going up to 820 million by 2050. However, demand for a rapidly urbanising society comes when Indian cities are spiralling climate is changing, making cities more prone to extreme rain events and floods while water scarcity and pollution continues to grow, **writes Dr. Mahreen Matto, Program Manager, Sanitation Capacity Building Platform (SCBP), NIUA.**

Ground water, lakes and rivers are exhaustively overdrawn, yet no city is able to meet the service level benchmark of water supply.[1]

According to the Niti Aayog, Composite Water Management Index (CWMI) report, 100 million people are on the frontline of a national water crisis and many major cities are facing an acute water shortage.[2] The CWMI report also highlights that by 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual 6 per cent loss for the country's GDP.

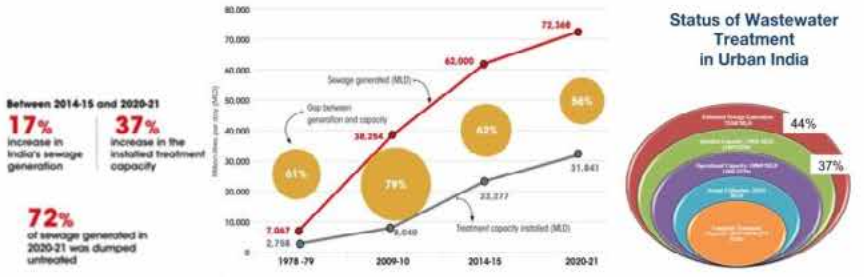


India's Water Crisis

Indian cities practise the colonial conventional water management approach, which focuses on supply of water. Furthermore, there is an increased dependence on long distance sources; pumping and piping the water means both loss in distribution as well as high costs of energy and infrastructure. Thus, focuses on hardware solutions and neglects future spatial development of cities. This approach is unsustainable, given that more water supply leads to more wastewater generation, which in turn increases the cost of treatment.[3]

About 80 per cent of the water that reaches households leaves as waste. In urban areas of the country, treatment of sewage/domestic wastewater is a big challenge. Since 2009, the pace of implementing Sewage Treatment Plants (STPs) has surpassed the pace of sewage generation. However, the statistics can be quite often misleading, because the gap between sewage generation and installed capacity was still 56 per cent in 2021. In the year 2020-21, 72 per cent of the sewage generated was discharged into the environment without treatment.

This clearly indicates that there is a huge gap between the wastewater generated and actually treated, that implementation and operation and maintenance of the sewerage network is cumbersome and financially unsustainable. As a result, most of the cities do not have fully functional wastewater management systems. Further, the growing pollution and the increasing demand exacerbates the inadequacy of treatment capacity which causes the disposal of untreated wastewater directly or indirectly into the water bodies. Thus deteriorating the quality of water bodies which poses a significant threat to human and environmental health.



Source: State of India's Environment 2021 by CSE

Source: CPCB- National Inventory of STPs (2021)

However, the question arises, how will Indian cities grow, without creating solutions for wastewater and practice recycling and reuse? The challenge is to reinvent the wastewater management system that reuses every drop of water discharged, at affordable cost for all.

Research shows that wastewater is increasingly being considered an untapped resource to augment water supply that can ultimately reduce water stress. It is a valuable resource from which energy, water, organics, phosphates, nitrogen, cellulose, rare earths and other resources can be extracted.[4]

According to estimates, if 80 per cent of urban wastewater is treated by 2030, there will be around 100 per cent more treated wastewater available, which is equivalent to nearly 75 per cent of the anticipated industrial demand in 2025 and nearly a quarter of the country's projected total drinking water needs.[5]

The National Missions such as Swachh Bharat Mission-Urban (SBM 2.0), National Mission for Clean Ganga (NMCG) and Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0) have prioritised wastewater treatment, along with the reuse of treated wastewater as key environmental interventions towards a more water secure India. According to MoHUA, it is now called 'used water' which recommends a used water management approach based on the Citywide Inclusive Framework. Few states like Gujarat, Jharkhand, Haryana, Punjab, Rajasthan, Maharashtra, Chhattisgarh, Karnataka, Jammu and Kashmir and Madhya Pradesh have announced wastewater treatment policies.[6] In states such as Delhi, Bengaluru, Gujarat, Chennai, Haryana, Maharashtra etc, the used water is used for horticulture, irrigation, construction and rejuvenation of lakes and waterbodies. Against this background, many municipalities across the country have started to pursue reuse projects:

- In 2014, Surat Municipal Corporation built a 40 MLD reuse plant to supply reclaimed water to Pandesara Industrial Estate
- In 2016, Chennai Metro Water Supply and Sanitation Board awarded a PPP based reuse project to develop 45 MLD reuse capacity on the design, build, and operate (DBO) model to supply used water to industries
- Bengaluru's water utility has built a 10 MLD tertiary treatment plant at Yellahanka to supply used water to Bengaluru international airport
- Maharashtra Generation Company and Nagpur Municipal Corporation have jointly invested in a reuse project where used water from an STP is used as cooling water
- In 2016, New Delhi Municipal Council started promoting decentralised STPs to deal with the wastewater load in the city and promote recycling of used water for horticulture and irrigation

While policy and guiding frameworks recognise the need for recycling of wastewater, there has been little in terms of detailed guidance on the treatment standards, types of reuse applications, design and O&M considerations for management of wastewater recycling projects and tariff structures for sale of recycled wastewater for various applications. Such projects, while being undertaken by various states and cities in India, are largely structured individually and developed in isolation at the local level.

In the absence of specific standards and guidelines, the wastewater reuse for irrigation is practised informally in India. Local governments and industries in several parts of the country earn income by selling treated or untreated wastewater to local farmers. However, a lack of comprehensive standards and policy framework is hindering the development of a formal market, appropriate technology and sustainable business/financial models.[7]

From a resource perspective, sustainable wastewater management requires to overcome following challenges:[8]

i) Lack of knowledge about the concept of water resource recovery and considering wastewater as a resource.

ii) Need for policies and regulations that support and incentive used water.

iii) Lack of regulatory frameworks and guidelines for used water, biosolids and energy generation from treatment plants.

iv) Lack of coordination and convergence for the implementation of measures to align local activities, strategies and policies with those at a regional and national level, to initiate the dialogue between various government institutions and stakeholders and eventually transfer experiences and good practices for scaling up and integrating in corresponding policies and plans.

v) Tailored technologies that enable fit-for-purpose treatment to optimise resource utilisation.

Application of the resource recovery concept as well as planned wastewater management programmes of the Centre and states would be integral to achieving a Swachh Bharat in the complete sense. Such a nationwide comprehensive model will not only rejuvenate water bodies and help recharge groundwater to provide a safer and cleaner access to water, but also a healthier ecosystem.

---

1. Shah, M. (2016). Urban water systems in India: a way forward (No. 323). Working Paper.
2. Aayog, N. I. T. I. (2018). Composite water management index. National Institution for Transforming India, GOI.
3. Rohilla, S. K., Matto, M., Jainer, S., Kumar, M., & Sharda, C. (2017). Policy Paper on Water Efficiency and Conservation in Urban India. New Delhi: Centre for Science and Environment.
4. Connor, R., Renata, A., Ortigara, C., Koncagul, E., Uhlenbrook, S., Lamizana-Diallo, B. M., ...& Hendry, S. (2017). The United Nations world water development report. Wastewater: The untapped resource. The United Nations World Water Development Report.
5. https://www.downtoearth.org.in/blog/water/covid-19-the-need-is-to-decentralise-how-we-manage-wastewater-70991
6. Government of Gujarat (2018) Policy for Reuse of Treated Waste Water; Government of Karnataka (2017) Policy for Urban Waste Water Reuse: Enabling Environment for Urban Wastewater Reuse; Government of Punjab (2017) The State Treated Waste Water Policy
7. Banerjee, A. Legal And Policy Framework For Wastewater Treatment And Reuse In India: A Background.
8. Wastewater? From Waste to Resource: Shifting Paradigms for Smarter Wastewater Interventions in Latin America and the Caribbean, 2018

DownToEarth

Waste

Union Budget 2019-20: Focus shifts to SBM phase 2, women's role in it

The mission will now aim to turn waste into energy and better solid waste management in rural areas

Photo: Getty Images

Rashmi Verma, Heli Shah

Published on: 05 Jul 2019, 12:12 pm

The Economic Survey of 2018-19 had indicated that, in the Union Budget 2019-20, the government will focus on the second phase of the Swachh Bharat Mission (SBM). Finance Minister Nirmala Sitharaman did just that while saying that SBM has had a positive impact on the state of health and sanitation.

After building more than 9.5 crore toilets and making 5.6 lakh villages open-defecation free under the mission, the focus will now move to technologies for turning waste in to energy and plan for solid waste management in rural areas, said Sitharaman in the Lok Sabha on July 5, 2019.

The Budget outlay of Rs 12,644 crore allocated for SBM (Gramin) in the current budget is around Rs 4,334 crore lower than the revised estimate of 2018-19.

The expenditure budget on externally aided programme under SBM (G) has increased between 2017-18 and FY 2019-20 and it is also the highest.

The Budget allocated Rs 10,000 crore for National Rural Drinking Water Mission — double than the previos year. This sharp shift is a sign of urgency in tackling constant qualitative and quantitative water issues the country faces.

The Economic Survey presented by Chief Economic Advisor KV Subramanian on July 4, 2019 identified the need of water sustainability, even in toilets.

Since the current Budget has aided the growth of self help groups (SHGs), this can very well work in convergence with solid waste management in rural areas. The Union Budget 2019 talks about creating SHGs in all districts.

Furthermore, for every verified woman SHG member with a Jan Dhan bank account, an overdraft of Rs 5,000 shall be allowed. One woman in every SHG will also be made eligible for a loan up to Rs 1 lakh under the Mudra scheme.

The SBM experience showcases the active role of SHGs in community mobilisation and toilet construction. In Himachal Pradesh's Mandi, 4,490 women groups, comprising about 70,000 women, take turns to clean villages and sensitise people about total sanitation and water conservation.

In fact, the SHG of Kothi gram panchayat has innovative ways to manage waste. They collect polythene bags from households and weave those to prepare a sheet, which is then used to line compost pits to regulate its moisture level and aid in composting. The women also prepare bin bags, which are hung from trees along trunk roads, so people do not litter roads.

The incentives for SHGs as proposed under Union Budget 2019-20 is expected to further strengthen the role of women in Swachh Bharat Mission, specifically in solid waste management.

डाउन टू अर्थ

स्वच्छता

ब्लॉग : स्वच्छ भारत मिशन 2.0 बन सकता है स्वस्थ भारत का मार्ग

स्वच्छ भारत मिशन (एसबीएम) के अंतर्गत हमारे देश में स्वच्छता और कचरा प्रबंधन के क्षेत्र में अभूतपूर्व प्रगति हुई है

शौचालयों से निकलने वाले मल के प्रबंधन के लिए दो गड्ढे बनाते ग्रामीण। फोटो: विकास चौधरी

Manish Mishra, Alka Kumari, Hari Prakash Haihyvanshi

Published on: 02 Aug 2024, 4:21 pm

अपनी विशाल और विविध आबादी के साथ भारत सभी के लिए स्वच्छता और स्वच्छता प्राप्त करने में अनूठी चुनौतियों का सामना करता है। 2014 में शुरू किए गए स्वच्छ भारत मिशन (एसबीएम) ने बेहतर स्वच्छता और स्वच्छता की दिशा में भारत की यात्रा में एक महत्वपूर्ण मील का पत्थर चिह्नित किया। अपने पहले चरण के सफल समापन के बाद, सरकार ने नए उत्साह के साथ स्वच्छ भारत मिशन 2.0 (एसबीएम 2.0) शुरू किया है, जिसका उद्देश्य अपने पूर्ववर्ती की उपलब्धियों को आगे बढ़ाना और शेष चुनौतियों से निपटना है। यह लेख एसबीएम 2.0, इसके उद्देश्यों, रणनीतियों, प्रभाव और आगे की राह का व्यापक विश्लेषण प्रदान करता है।

स्वच्छ भारत मिशन 1.0, जिसे एसबीएम (ग्रामीण) और एसबीएम (शहरी) के रूप में भी जाना जाता है, का उद्देश्य सार्वभौमिक स्वच्छता कवरेज प्राप्त करना, खुले में शौच को खत्म करना और पूरे भारत में सुरक्षित स्वच्छता प्रथाओं को बढ़ावा देना है। दो अक्टूबर 2014 को शुरू किए गए इस मिशन ने महात्मा गांधी की 150वीं जयंती के मौके पर दो अक्टूबर 2019 तक अपने लक्ष्यों को पूरा करने की समयसीमा तय की है। एसबीएम 1.0 ने महत्वपूर्ण मील के पत्थर हासिल किए: ग्रामीण भारत में 100 मिलियन से अधिक घरेलू शौचालयों का निर्माण किया गया, जिससे स्वच्छता सुविधाओं तक पहुंच में सुधार हुआ। मिशन ने व्यवहार परिवर्तन अभियानों पर जोर दिया, जिससे शौचालय के उपयोग में वृद्धि हुई और स्वच्छता प्रथाओं में सुधार हुआ। जलजनित रोगों में कमी और उन क्षेत्रों में बेहतर सार्वजनिक स्वास्थ्य परिणाम देखे गए जहां स्वच्छता कवरेज में वृद्धि हुई है। कई राज्यों और जिलों ने खुले में शौच मुक्त (ओडीएफ) का दर्जा हासिल किया, जो खुले में शौच से दूर एक उल्लेखनीय बदलाव को दर्शाता है।

स्वच्छ भारत मिशन 2.0 (एसबीएम 2.0) भारत के महत्वाकांक्षी राष्ट्रव्यापी स्वच्छता और स्वच्छता अभियान के अगले चरण का प्रतिनिधित्व करता है। 2019 में शुरू किया गया, एसबीएम 2.0 अपने पूर्ववर्ती, स्वच्छ भारत मिशन 1.0 की पर्याप्त उपलब्धियों पर आधारित है, और मिशन के लक्ष्यों को 2024 तक बढ़ाता है। एसबीएम 2.0 के मुख्य उद्देश्य सुरक्षित स्वच्छता सुविधाओं तक पहुंच सुनिश्चित करने और विशेष रूप से ग्रामीण क्षेत्रों में बेहतर स्वच्छता प्रथाओं को बढ़ावा देने में निहित हैं। हालांकि, मिशन एक समग्र दृष्टिकोण पेश करता है, न केवल खुले में शौच के उन्मूलन पर जोर देता है, बल्कि व्यापक अपशिष्ट प्रबंधन, पर्यावरणीय स्थिरता और व्यवहार परिवर्तन पर भी जोर देता है। एसबीएम 2.0 के भीतर प्रमुख पहलों में स्वच्छ सुंदर शौचालय (एसएसएस) कार्यक्रम, प्लास्टिक अपशिष्ट प्रबंधन, मल कीचड़ और सेप्टेज प्रबंधन (एफएसएसएम), ग्रेवाटर प्रबंधन और समुदाय के नेतृत्व वाली पूर्ण स्वच्छता (सीएलटीएस) गतिविधियां शामिल हैं। प्रौद्योगिकी का लाभ उठाने, नवाचार को बढ़ावा देने और सामुदायिक भागीदारी बढ़ाने पर एक मजबूत ध्यान देने के साथ, एसबीएम 2.0 एक स्वच्छ, स्वस्थ और अधिक टिकाऊ भारत बनाने का प्रयास करता है, स्वच्छता चुनौतियों को व्यापक रूप से संबोधित करता है और स्थायी परिवर्तन के लिए मंच स्थापित करता है।

एसबीएम 2.0 नए लक्ष्यों और रणनीतियों को पेश करते हुए पहले चरण के उद्देश्यों को बरकरार रखता है और उनका विस्तार करता है। एसबीएम 2.0 के प्राथमिक उद्देश्य हैं: ओडीएफ स्थिति को बनाए रखना, स्वच्छता प्रथाओं में बदलाव को स्थायी बनाना और समग्र स्वच्छता को बढ़ावा देना। मिशन ने शहरी और ग्रामीण दोनों क्षेत्रों में ठोस और तरल अपशिष्ट प्रबंधन पर ध्यान केंद्रित किया है। प्रभावी अपशिष्ट प्रबंधन न केवल पर्यावरणीय स्थिरता के लिए बल्कि सार्वजनिक स्वास्थ्य और स्वच्छता को बनाए रखने के लिए भी आवश्यक है। ठोस कचरे को कुशलतापूर्वक प्रबंधित करने पर जोर दिया गया है, जिसमें स्रोत पर अपशिष्ट पृथक्करण, विकेन्द्रीकृत अपशिष्ट प्रसंस्करण और रीसाइक्लिंग पहल शामिल हैं। तरल अपशिष्ट प्रबंधन में सीवेज और मल कीचड़ उपचार सुविधाओं का विकास शामिल है।

एसबीएम 2.0 में व्यवहार परिवर्तन एक महत्वपूर्ण पहलू है, जिसमें स्वास्थ्य और स्वच्छता शिक्षा और सामुदायिक जुड़ाव पर जोर दिया गया है। मिशन का उद्देश्य स्वास्थ्य और स्वच्छता के महत्व के बारे में व्यापक जन जागरूकता फैलाना है। सामुदायिक जुड़ाव के माध्यम से, समुदायों को स्वच्छता पहलों का स्वामित्व लेने के लिए प्रोत्साहित किया जाता है, जिससे आत्मनिर्भरता को बढ़ावा मिलता है और स्वच्छ परिवेश को बनाए रखने में गर्व का भाव आता है।

मल कीचड़ प्रबंधन (एफएसएम) स्वच्छ भारत मिशन 2.0 (एसबीएम 2.0) में एक महत्वपूर्ण भूमिका निभाता है।

एसबीएम 2.0 मल कीचड़ और सेप्टेज प्रबंधन (एफएसएसएम) पर एक महत्वपूर्ण ध्यान केंद्रित करता है, जो मानव अपशिष्ट को सुरक्षित रूप से प्रबंधित और उपचार करने के महत्व को पहचानता है। मिशन के तहत, एफएसएसएम को शहरी और ग्रामीण दोनों क्षेत्रों में बढ़ावा दिया जाता है। मल कीचड़ उपचार की चुनौती का समाधान करने के लिए, एसबीएम 2.0 फीकल कीचड़ उपचार संयंत्रों (एफएसटीपी) जैसी उपचार सुविधाओं के विकास को प्रोत्साहित करता है। ये सुविधाएं मल कीचड़ का सुरक्षित रूप से इलाज और प्रबंधन करने के लिए सुसज्जित हैं, जिससे इसके पर्यावरणीय प्रभाव को कम किया जा सकता है।

स्वच्छ भारत मिशन 2.0 ने अपने उद्देश्यों को प्राप्त करने के लिए कई प्रमुख रणनीतियों और पहलों का परिचय दिया है, जिनमें स्वच्छ सुंदर शौचालय (एसएसएस), प्लास्टिक अपशिष्ट प्रबंधन, फिकल स्लज एंड सेप्टेज मैनेजमेंट (एफएसएसएम), और प्रौद्योगिकी और नवाचार का लाभ उठाना शामिल है।

एसबीएम 2.0 के प्रभाव ने पहले ही भारत के स्वच्छता परिदृश्य पर काफी प्रभाव डाला है। मिशन ने कई क्षेत्रों में एसबीएम 1.0 के दौरान प्राप्त ओडीएफ स्थिति को बनाए रखा है, जिससे खुले में शौच को और कम किया गया है। बेहतर ठोस और तरल अपशिष्ट प्रबंधन प्रथाओं ने स्वच्छ और अधिक स्वच्छ शहरी और ग्रामीण वातावरण को जन्म दिया है। प्लास्टिक अपशिष्ट प्रबंधन पर एसबीएम 2.0 के फोकस ने प्लास्टिक प्रदूषण में कमी लाने में योगदान दिया है, विशेष रूप से जल निकायों और शहरी क्षेत्रों में। स्वच्छता सुविधाओं तक पहुंच बढ़ने से जलजनित बीमारियों में कमी आई है, बेहतर स्वास्थ्य परिणाम हुए हैं और समुदायों में समग्र कल्याण में सुधार हुआ है। व्यवहार परिवर्तन अभियानों ने व्यक्तियों और समुदायों को सुरक्षित स्वच्छता प्रथाओं को अपनाने के लिए प्रोत्साहित किया है, जिससे स्वच्छता की संस्कृति को बढ़ावा मिलता है।

स्वच्छ भारत मिशन (एसबीएम) के अंतर्गत हमारे देश में स्वच्छता और कचरा प्रबंधन के क्षेत्र में अभूतपूर्व प्रगति हुई है। इस मिशन की सफलता के आंकड़े इस प्रकार हैं: व्यक्तिगत घरेलू शौचालय (आईएचएचएल) के निर्माण में **63.57 लाख**, सामुदायिक और सार्वजनिक शौचालयों का निर्माण **6,36,826**, खुले में शौच मुक्त (ओडीएफ) शहर **4,576**, ओडीएफ+ शहर **3,913**, ओडीएफ++ शहर **1,429** हैं। कचरा मुक्त स्टार रेटिंग में **7 स्टार** की रेटिंग **3** शहरों को, **5 स्टार** की **15** शहरों को, **3 स्टार** की **229** शहरों को, और **1 स्टार** की **426** शहरों को प्राप्त हुई है। ये प्रगति हमें प्रेरित करती है कि हम स्वच्छता की दिशा में और सक्रियता से काम करें।

स्वच्छ भारत मिशन 2.0 स्वच्छता और स्वच्छता चुनौतियों को व्यापक रूप से संबोधित करने के लिए भारत सरकार द्वारा एक सराहनीय प्रयास का प्रतिनिधित्व करता है। यह एसबीएम 1.0 की उपलब्धियों पर आधारित है और स्वच्छता, अपशिष्ट प्रबंधन और पर्यावरणीय स्थिरता को बढ़ावा देने के लिए अभिनव रणनीतियों का परिचय देता है। जबकि चुनौतियों से पार पाने के लिए चुनौतियां हैं, एसबीएम 2.0 ने पहले से ही स्वच्छता में सुधार, खुले में शौच को कम करके और स्वस्थ समुदायों को बढ़ावा देकर लाखों भारतीयों के जीवन पर सकारात्मक प्रभाव डाला है।

Restoring the dignity of sanitation workers: Small acts make a big impact

Post by: | February 21, 2023 0

"I used to accompany my father (a sanitation worker) to learn sanitation work at the municipality. He passed away when I was eight, and I had to join sanitation work to support my family financially immediately," said Kanhu Naik, a sanitation worker.

Naik used to clean septic tanks manually in an unsafe environment.

"My income was never stable, and I remember spending months with less or no work. It was difficult to meet my family's expenses, and being the only earning member added to the problems," Naik added.

Kanhu Naik is not a case in isolation. India has approximately 5 million sanitation workers. Further, the Indian government told the Lok Sabha that in the past five years (2017-2022), at least 347 sanitation workers died in India, which made it important to focus on their safety.

Several other issues exist, and the severity of the situation calls for a collaborative effort and support to help sanitation workers out of this grim situation.

How collaborative efforts can improve the situation

Organisations working for the cause have the capability to come together and improve the situation on the ground for workers at the ground level. With this as an objective, NFSSM Alliance was created in 2016. The National Faecal Sludge and Septage Management (NFSSM) Alliance supports safe national, state and city sanitation. The Alliance is a collaborative body that drives the discourse of faecal sludge and septage management (FSSM) in India.

Under its GARIMA Scheme, the government started identifying and empowering sanitation workers by strengthening the sanitation infrastructure across the value chain. Further, the Urban Management Center (UMC), a part of the NFSSM Alliance, helped Naik and supported him and his work.

Today Naik is working as a loader for battery-operated vehicles for door-to-door collection. He is not involved in cleaning septic tanks in an unsafe environment, which risks his health.

"After implementing this scheme, I started working in a safer environment and can support my family efficiently. I have a regular source of income and can secure my family's needs and future well," he added.

Additionally, the NFSSM Alliance has worked with the Ministry of Housing and Urban Affairs (MoHUA) and the Department of Drinking Water and Sanitation (DWS) to create India's first national policy on FSSM in 2017.

The case of Sheetal Bastia

Sheetal Bastia is the Secretary of Bahucharamata (a trans-Self Help Group). The SHG started with the production of home-based phenyl and soap and went on to volunteer with NGOs to raise awareness on health and sanitation.

"Our work earned us recognition from the Cuttack Municipal Corporation (CMC), and they selected us to operate and maintain the Septage Treatment Plant (SeTP) in the city," said Sheetal Bastia.

However, this requires proper training. Hence, Ernst & Young, again a part of the NFSSM alliance, provided the group with the necessary training.

She along with her team, underwent rigorous classroom and on-site training to understand the importance of the FSSM value chain, operational components of the plant, and its functioning, periodic and daily maintenance activities for operation and maintenance, among other important aspects.

"We were also trained in sustainable business models, leadership, communication, and problem-solving, which have really helped us in our work," she added.

"Today, each member of this SHG is financially independent and is capable of leading their life the way they want, Bastia concluded.

Way Forward

Despite the importance of their work, sanitation workers often face discrimination, poor working conditions, and low wages, which can lead to poor health outcomes and a lack of social mobility. By providing sanitation workers with fair wages, decent working conditions, and respect, we improve their lives and help empower them by attaching a sense of dignity to their lives and livelihood.

Additionally, living with dignity helps sanitation workers take pride in their work and feel valued, increasing their motivation and job satisfaction and leading to better work performance and outcomes. This eventually helps in the overall socio-economic development of the country.

Ready to make a positive impact in the world?

The intersection of urbanization, housing, and sanitation in India: Challenges and solutions

By: Shweta Singh | **Published:** 17-Nov-2023

In the relentless tide of urbanization sweeping across India, the challenges faced by low-income communities in accessing basic sanitation infrastructure and services have become increasingly pronounced. The National Faecal Sludge and Septage Management (NFSSM) Alliance works towards fostering the discourse on Faecal Sludge and Septage Management (FSSM) and Inclusive Sanitation. With the collective expertise of over 35 organizations, the NFSSM Alliance drives innovation in sanitation planning, infrastructure and services to ensure safe and inclusive sanitation outcomes for all.

In this insightful interview with TheCSRUniverse, **Anindita Mukherjee, Urban Economist and Senior Policy & Urban Development Consultant, SCI AI at GWSC** sheds light on the interplay between urbanization, housing, and sanitation and discusses the role of NFSSM Alliance in the broader landscape.

As metropolitan cities burgeon, low-income communities find themselves grappling with inadequate access to sanitation infrastructure, perpetuating a cycle of poverty with dire consequences for health and productivity. Mukherjee delves into the intricate challenges faced by these vulnerable communities, emphasizing the essential link between urban housing, sanitation, and overall quality of life.

The discussion spotlights the critical role of urban planning in ameliorating these challenges, with a focus on the Pradhan Mantri Awas Yojana and its limitations in addressing the needs of slum dwellers. Drawing inspiration from Odisha's innovative JAGA Mission, Mukherjee underscores the importance of tenure security and targeted policies for inclusive urban development.

Read the full interview for an in-depth understanding of the challenges and possible solutions of urban sanitation in India:

Q. In the context of rapid urbanization and rise of metropolitan cities, there has been a growth of low-income communities with informal employment in cities. What are the current challenges faced by urban poor communities in terms of access to sanitation infrastructure and services?

A. Cities have always been seen as centers of opportunity offering employment prospects, comparatively higher wages and better access to education and health facilities. Cities also contribute about 60% of the India's GDP which re-affirms their economic potential for residents and migrants.

However, with the increased inflow of people, the system capacities of cities remain severely inadequate to provide for quality services, land and housing for everyone in the city – especially the economically vulnerable communities. This trend, over the years, have given rise to many underserved or unserved areas typically characterized by high density, dilapidated housing, and limited or no access to basic civic amenities such as sanitation infrastructure and services like toilets, water supply, drains, sewerage systems or non-sewered waste water management systems, among others.

Absence or lack of infrastructural access is further exacerbated by the precarity of land tenure where they live in perpetuating the vicious cycle of poverty for vulnerable communities, burdening them with higher cost of health care and loss of productive time.

Q. Urban housing has emerged as an immediate challenge to be solved for in this context of rapid urbanization. How can cities and governments work together for improving urban planning and housing to ensure the interconnected goals of sanitation and housing can be holistically approached?

A. One of the critical markers of decent quality of life is sanitation in living areas and decent housing conditions that provide safety and security for communities. The COVID-19 pandemic made the importance of housing very clear – many people were rendered homeless and resorted to renting or living in their workspaces – in the very cities where they lived for many years and contributed significantly to its progress.

Understanding the importance of securing housing for all - Government of India embarked on implementing Pradhan Mantri Awas Yojana – at an unprecedent scale – benefitting more than 11 million households across India's urban areas through providing subsidies for self-built houses, credit linked subsidies and construction of Affordable Housing in Partnership. However, owing to the precarious tenurial status of the slums, PMAY largely failed to address the upgradation of slum houses. Many urban poor in cities – owing to their nature of insecure employment fail to provide documented evidence of income. Further, this is coupled with erratic income patterns rendering them ineligible for institutional finance. Since many urban poor communities live in habitats which are not legally recognized, they experience tenure insecurity which further exacerbates their lack of documented identities - despite being critical pillars of city making such as sanitation workers, drivers, domestic workers, delivery agents among others. Tenure security is also crucial in enabling access to essential urban services such as sanitation.

A key enabler to holistically achieve the interconnected goals of sanitation and housing is to **visibilise** underserved urban poor settlements and acknowledge their contribution to the city systems within the urban planning frameworks. This will warrant that Governments (at all levels) and city planners **account for urban poor settlements while planning for the cities** instead of keeping them invisible on the city plans. This includes:

- Targeted policy making
- Making service delivery including sanitation services universal irrespective of tenure
- Reducing opportunity costs of the slum dwellers by servicing these areas adequately with basic infrastructure
- Enabling them to join productive employment opportunities
- Enabling them to access housing subsidies to afford a decent housing

Odisha has set a progressive example of slum upgrading and delisting by making the slum dwellers legitimate citizens in urban areas by integrating them into the city fabric and securitizing tenure, through the JAGA Mission.

Q. In your experience as an Urban Economist, what innovative solutions or best practices have you come across for improving access to water and sanitation in urban areas, particularly for marginalized communities? Are there any states which have emerged as champions in this regard?

A. Odisha has emerged as a frontrunner with regards to ensuring last-mile access to water and sanitation, amongst other essential urban services, for vulnerable communities. The state has recognized the crucial role of tenure security in enabling access to such urban services, and has implemented pioneering interventions for the same.

In 2017, Odisha enacted Land Rights to Slum Dwellers Act 2017 for its cities enabling them to grant Land Rights Certificates (LRC) and Land Entitlement Certificates (LEC) to all its slum dwellers. Subsequently Odisha Introduced two complementing schemes in the wake of COVID-19: the Urban Wage Employment Initiative(UWEI) and a statewide scheme for Slum Upgradation and Delisting under their flagship programme Jaga Mission.

Through the UWEI, slum dwellers, many of whom were migrants returning from various states in severe economic distress, were gainfully engaged in upgrading the infrastructure of their own slums. 9 critical categories of civic infrastructure were identified:

1. Piped Water Supply
2. Individual Household Latrines (IHHL)
3. Storm Water Drainage
4. Paved Roads
5. Street lights
6. In House Electricity
7. Children Play Area/ Zone
8. Open Space Development
9. 'Parichay' Community Centres

These civic services and amenities improved the erstwhile unserved areas to bring them at par with the city infrastructure. Much of the housing upgrades were done through convergence of PMAY subsidies wherever households could receive the LRCs.

To unlock tenure security and enable access to basic infrastructure services for all – Odisha did not stop at this. It went on to undertake land negotiations for slums on private land, Raja Land, Forest land among others which cannot be accorded to the slum dwellers on the sole discretion of the State governments. It has successfully leveraged theTHE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT, 2006 (FRA 2006)to enable provision of services to slums on forest land. The state developed detailed strategies for each of the land parcels across the land tenure continuum and ensured that relocation would be undertaken only in unavoidable circumstances. Wherever relocation was undertaken, the state ensured the inclusion of the residents by requiring the consent of each slum dweller for the same and select from the two possible land parcels identified for their relocation.

Odisha's model of slum upgradation, strategies for tenure unlocking, creating gainful employment for its urban poor population enabled them to become not just the beneficiary of the upgrades but a partner in development – holding valuable learnings for many states in India and countries in the South Asia region.

Q. What role does the NFSSM Alliance play in working with urban poor communities in addressing urban sanitation issues and enabling city-wide inclusive sanitation in India?

A. Urban Sanitation and Inclusion agendas have remained key in Odisha's development journey for the last decade. Through its many urban programmes, Odisha has emerged as a flag bearer for charting a development agenda with the poor and the vulnerable at the center. The state's urban development has been supported by complementary initiatives which holistically address the needs of its urban residents.

Odisha has not only ensured the provision of toilets to every household in its urban areas, but has also made sure that no faecal waste is dumped into the environment untreated. It became the first state in India to have at least one Faecal Sludge Treatment Plant (FSTP) in all its cities – leap-frogging to its goals for safely managed sanitation. The state has also launched the Garima scheme to ensure that sanitation workers, who are pivotal in providing sanitation services are safe guarded, recognizing them as change agents by providing them a dignified work environment protected from health hazards through state of the art safety gear like PPE kits.

Odisha's Citywide Inclusive Sanitation (CWIS) approach demonstrates that service and systems outcomes are possible to reach at the State scale only when these are backed by robust and sustained political will.

The NFSSM Alliance has remained an early partner to the Government of Odisha in its journey through the last decade by specifically supporting the government in recognizing the importance of FSM through early research on indiscriminate dumping of faecal waste into river bodies causing degradation to river health, and piloting FSTPs in two small cities of the Odisha which enabled the state to take these up across Odisha. Further, to ensure better coordination and holistic outcome-driven action on ground, the NFSSM Alliance has played the critical role of bringing together key partners working in the state to work collaboratively towards safe and inclusive sanitation outcomes by forming a dedicated Odisha State Chapter. The State Chapter has been providing support to the state's flagship ongoing initiatives like Garima, Jaga, FSM and institutional building by harnessing the power of people through partnerships in development.

Through such collaborative action across cities and states in India, the NFSSM Allianceaims to achieve its vision of an India where all 7900+ cities and towns safely manage their waste with inclusion, equity and sustainability.

Q. The NFSSM Alliance addresses faecal sludge management (FSM) among other things. Could you elaborate on the significance of FSM in urban areas and its impact on sanitation services?

A. Our cities are overwhelmingly dependent on on-site sanitation systems (OSS) such as Septic Tanks, twin pits and single pits. Together, these are referred to as non-sewered solutions. Given the rapid pace of urbanization, the gains in sewer networks have been unable to keep pace and are currently servicing only 40% of the urban population. Of the remaining urban population which lacks access to sewer networks, 3 out of 5 urban residents build OSSs like septic tanks at their households to contain and provide primary treatment to the faecal waste emerging from toilets. These systems require periodic emptying and the collected waste remains highly laden with pathogens which are hazardous for human and environmental health.

In the absence of any treatment facilities, most of the waste from these systems is emptied from homes remained untreated, only to find its way back in our rivers, water bodies and empty ground patches which results in contaminated water and soil. Faecal Sludge Management (FSM) provides a robust solution to this issue. It mandates the development of a self-contained sanitation value chain, beginning with containment at an OSS, which is emptied into a specialized vehicle for transportation to a treatment facility where the waste is safely treated and either responsibly disposed of or reused.

Without FSM, the unsafe practice of dumping untreated waste in the open remains one of the greatest threats to human health, aquatic life, soil and river health. Climate change and disasters exacerbate such risks exposing large number of households to sustained public health hazards. FSM, a low tech and low cost solution, when complimented with sanitation worker safety measures has the potential to have far reaching positive impacts to enhance the quality of public life and improve the health of rivers, water bodies and soil.

Q. In terms of the Alliance's priorities and experience, what is the role inclusion and urban poor communities can play as active decision-makers in the sector? How does an inclusive workforce impact sanitation outcomes?

A. When large scale FSM infrastructure such as Faecal Sludge Treatment Plants (FSTPs) were being created, the critical enabler to sustain such infrastructure was private sector-driven operations and management (O & M). Odisha, however, adopted low-tech, nature based solutions which could be easily managed independently by the people for whom the infrastructure was built – largely underserved communities. Through a notification, the Government of Odisha decided to engage Mission Shakti Self-help Groups (SHGs) to manage the infrastructure making them critical partners in the development process.

This had significant positive impacts:

- SHGs obtained gainful employment opportunity with upskilling - Educated women/transgender members being trained as lab technicians, data entry operators while other members of the SHGs managed the Faecal Sludge Treatment Plant (FSTP) operations – which otherwise are a largely men-dominated employment sector.

- Voice and Agency to community members – By recognizing community-based platforms as partners in development – Transgender and women members are gaining voice and agency within their communities as well as are empowered to negotiate and cooperate with the Urban Local bodies to ensure continued service delivery for the city.

- Creating a cadre of Community-based Agents of Change – Through these community-based platforms of inclusion and empowerment, larger communities, through SDAs and SHGs, could be sensitized about safe sanitation practices like the need for regular desludging of OSS, safe practices for emptying etc. thereby nudging communities towards positive behaviour change.

Q. How important is collaboration among civil society organizations, government stakeholders, funders, sector practitioners, expects and other diverse stakeholders in achieving sustainable urban sanitation solutions, and could you provide some examples of successful collaborations?

A. The National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative of 35+ diverse leading organizations working in urban sanitation and allied sectors, spanning NGOs, CSOs, Academic Institutions, Think Tanks and more, was formed in 2016 after recognizing the need for collaborative action. It recognized the need for a unified voice to inform national/state policies, and driving the discourse on Faecal Sludge and Septage Management (FSSM) nationally. Since then, the priorities of the NFSSM Alliance have evolved to take a more holistic approach towards urban sanitation in India, to encompass – *Mainstreaming and comprehensive scaling of Citywide Inclusive Sanitation (CWIS) in all national/State/local priorities, using acombination of methods to achieve circularity through used-water management, and facilitating systems innovation towards building efficiency in Inclusive Urban Sanitation.*

As part of these priorities, the NFSSM Alliance has engaged with 10+ national government ministries and agencies to inform policies, including collaborating with the Ministry of Housing and Urban Affairs (MoHUA) to co-create India's first National Faecal Sludge and Septage Management Policy in 2017. The Alliance has also engaged with other key government agencies to inform policies and contribute knowledge to the sector, including the NITI Aayog, the 15th Finance Commission. Haryana State Finance Commission and several state governments.

The Alliance plays a critical role by bringing together key partners working in states together to work collaboratively towards safe and inclusive sanitation outcomes. One such example is the formation of the dedicated Odisha Chapter which brings together the key Alliance members working in the state for better coordination and holistic outcome-driven action on ground.

The work of the Alliance is geared towards achieving its vision of an India where all 7900+ cities and towns safely manage their waste with inclusion, equity and sustainability.

Hindustan Times

How community-based platforms are changing India's sanitation sector

By Kavita Wankhade, Akhila Sivadas

Oct 19, 2023 07:00 PM IST

Community management committees, desludging operators federation, and SHGs contribute to equitable and inclusive sanitation services in various Indian regions

Sanitation staff sweep a road in Sector 31 in Gurugram on Wednesday. (Parveen Kumar/HT Photo)

The Swachh Bharat Mission (SBM), launched in 2014 by the Government of India, has made significant strides in sanitation through the construction of toilets and encouraging greater toilet usage. SBM 2.0, the second phase of the mission launched in 2021, focuses on sustaining India's open defecation free (ODF) status and ensuring proper treatment of human waste to ensure better public health and environmental protection. In both phases, engagement with citizens has brought sanitation into people's direct consciousness.

One such example is that of community-based platforms that have played a vital role in ensuring sanitation services reach their communities. Community-based platforms have significantly contributed to promoting community ownership, strengthening monitoring and evaluation activities, enabling behaviour change and ensuring the sustained utilisation of sanitation facilities by tailoring solutions to local needs. Community-led sanitation is only set to assume greater significance in enabling equitable access to sanitation services for all, especially marginalised communities. Several models of community engagement have proven successful and have the potential to be replicated across different states.

Access to essential public services such as water and sanitation continues to be a challenge, especially among urban poor communities who are at a disproportionate disadvantage. A community management committee (CMC) is a settlement-level forum of women, who believe in taking ownership and responsibility for their lives and making a positive impact on their communities. Each CMC consists of 10-15 women who work towards ensuring the provision of essential services such as water, sanitation, and hygiene within their settlements. They act as intermediaries between service providers and households and collaborate closely with local councillors and urban local bodies (ULBs) to improve sanitation services in their respective settlements.

Banita Digal, a resident of Bhubaneswar, realised the urgent need to tackle water, sanitation, and hygiene (WASH) issues during the COVID-19 pandemic and joined a CMC. She had a strong drive to bridge the gap in facilitating these vital services for tribal households. Recognising the crucial need for essential sanitation facilities to reach tribal households, Banita familiarised herself with mechanised desludging and through a comprehensive series of training sessions, honed her skill in using online tools such as QR codes to register demand for desludging services.

Notably, Banita's exceptional efforts enabled desludging services for over 1,000 households including 150 tribal households. Improved access to desludging services for tribal households plays a vital role in helping them minimise the risk of their septic tanks overflowing and putting them at health risk. Banita's experience demonstrates how inclusive platforms like the CMC can address communities' needs and make sanitation services equitable and accessible. CMCs act as a bridge between service providers and users, reflecting the power of collective action for community development.

Tiruchirappalli, a city in Tamil Nadu, has limited sewerage infrastructure covering about 30-35% of the area. Most households thus rely on on-site sanitation facilities. In on-site sanitation systems, regular desludging is essential for the effective functioning of septic tanks. It can help prevent septage from overflowing and mixing with drinking water

sources. Hardening of septage at the bottom forces manual intervention, which is avoided at best. The surge in septic tank cleaning vehicles – from around 20 trucks to 70 trucks in eight years in the region – suggests a worsening situation. To streamline queries about the desludging, a collaborative approach was required to provide an effective solution to manage the entire sanitation value chain in the district.

The desludging operators in Tiruchirappalli have joined hands to form a desludging operators federation to help address the growing need for scheduled cleaning of septic tanks in the region. The federation, currently joined by 53 desludging operators, owns around 72 desludging tankers that will help expedite septic tank cleaning operations for more than 2,74,538 households in the district. The federation plays a key role in delegating desludging requests to the operators and in standardising rates. The federation has helped to collectivise desludging operators, which has helped them to secure their livelihood, amid growing competition in the sector.

Karuppaiya, a desludging operator from Trichy who initiated the formation of the federation, recounted, "Our larger goal is streamlining the sanitation work in our region. We are happy to ensure parity among operators and use a collaborative approach for long-term results in the sector. Everyone came together to ensure that we came up with implementable solutions that led to better accountability and better sanitation services. More than a profession, we are pursuing this as a service to our people and the sanitation sector. There have been instances in which we did not charge money for the service we delivered, like a query from a

disabled person or an ultra-poor family living in a slum area. Our vision is to nurture models which contribute to the entire sanitation value chain."

Recognising the crucial need for safely managed sanitation, the government of Telangana is taking a proactive approach to providing high-quality sanitation services in its urban areas, where 40% of its population lives in 142 towns. To ensure that these facilities are well-maintained, the government has enlisted the support of self-help groups (SHGs), generating meaningful livelihood opportunities for them.

Telangana has established a robust community outreach structure for women's SHGs; about 12.6 lakh women have formed into 1.20 lakh registered SHGs. The process started with guidelines for all ULBs to implement an effective operational and maintenance (O&M) plan following standard operating practices and formalising contracts with SHGs. Capacity-building sessions were conducted with SHG members on procedures for managing community toilets, bookkeeping, monitoring usage, implementing cleanliness protocols, etc.

Capacity building was crucial not only in ensuring that SHGs are equipped to carry out proper operation and maintenance of public toilets but also in enabling members to access skilled, remunerative professions. As a result, 1,500 women have received training, and more than 150 contracts have been awarded to members of CBOs for the O&M of public and community toilets for a year. Similar kinds of initiatives have been taken in Andhra Pradesh, Maharashtra, Uttar Pradesh, Odisha, and Tamil Nadu.

Collaborating with community-based platforms in sanitation programs has demonstrated tangible benefits in improving service delivery through inclusive and people-centric solutions. It fosters increased ownership and representation and opens doors to community-driven decision-making. This bottom-up approach allows communities to make decisions on crucial matters that directly impact their lives. It also addresses challenges that urban service providers such as ULBs grapple with. The learnings and experiences of communities can help scale inclusive sanitation practices across India, building resilient cities and accelerating progress towards Sustainable Development Goal 6 of Clean Water and Sanitation for All. Prioritising community engagement and participation fosters sustainable and equitable development, paving the way towards a safe and inclusive sanitation system for all.

Kavita Wankhade, Head -Practice, Indian Institute for Human Settlements and Akhila Sivadas, Executive Director, Centre for Advocacy and Research. Indian Institute for Human Settlements and Centre for Advocacy and Research are members of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a leading collaborative body in India, with 35+ sector experts working across 14+ states to drive timely inclusive sanitation outcomes. The views expressed are personal

APN NEWS

'Tracing the Tracks' Documentary Sheds Light on the Lives of Sanitation Workers

by NS — September 5, 2023 in General 0

New Delhi: Dasra, a strategic philanthropy organisation, has launched a groundbreaking documentary titled 'Tracing the Tracks' to spotlight real, uncensored stories on the lives and journeys of sanitation workers. As part of the documentary, ten sanitation workers have been featured, across Odisha and Tamil Nadu, as they recount their experiences and journeys in their own words. While these sanitation workers play a crucial and unmissable role in ensuring the safe management of human waste, which benefits all citizens, their journeys and voices remain absent from public consciousness.

Dasra is the Secretariat of the National Faecal Sludge and Septage Management (NFSSM) Alliance: a collaborative body driving discourse on faecal sludge and septage management (FSSM) forward in India with a key emphasis upon the need to ensure safe and dignified livelihoods for sanitation workers.

The thought-provoking documentary 'Tracing the Tracks' has been produced by Teepoi, a film production company based out of Bengaluru, Karnataka. Dasra partnered with the Indian Institute for Human Settlements (IIHS) and the Urban Management Centre (UMC), whose crucial work in direct engagement with sanitation workers to ensure their safety and wellbeing has helped in documenting sanitation workers across the sanitation value chain.

India has more than 5 million sanitation workers who play a crucial role in managing human waste across the entire sanitation value chain. They face the brunt of deep social stigma associated with handling human waste and often have to work in hazardous, unsafe conditions. Due to the informal nature of the sanitation sector, workers are not properly recognised for their work, lack access to safety equipment, adequate and timely remuneration and coverage under social protection schemes. 'Tracing the Tracks' seeks to build awareness and recognition of sanitation work. The documentary showcases the lives of these unsung champions and presents a solution-oriented approach, showcasing solutions and best practices for the implementation of safe and dignified livelihoods for sanitation workers.

Meghna Malhotra, Deputy Director, Urban Management Centre (UMC) says, "Over time, India's expanding urban population has exerted considerable pressure on sanitation services in urban areas. Consequently, State and national schemes have prioritized enhancing sanitation infrastructure. Improving the working conditions of India's 5 million-strong sanitation workforce is also now becoming a focus area. States like Odisha have taken the lead by implementing GARIMA, a state-wide scheme that promotes safe and dignified livelihoods for sanitation workers. The GARIMA initiative, implemented by the Govt. of Odisha in collaboration with the Urban Management Centre, has made significant progress in furthering occupational health and safety while also making efforts towards breaking the intergenerational cycle of labor in sanitation. Previously unrecognized, sanitation workers are now acknowledged as skilled

professionals under GARIMA, granting them the recognition and dignity they deserve. Witnessing the positive transformation in the lives of sanitation workers in Odisha, the state of Tamil Nadu too has implemented the Sanitation Worker's Development Scheme and nationally- the NAMASTE scheme is being implemented by the Ministry of Social Justice and Empowerment to ensure safety and wellbeing of sanitation workers."

Kavita Wankhade, Head – Practice, Indian Institute for Human Settlements (IIHS) says, "Sanitation workers, numbering over 5 million across the country, play a pivotal role in ensuring access to safe and inclusive sanitation. But their contributions are often overlooked. They are exposed to hazardous working conditions and face deep-rooted stigma and social discrimination. It's crucial that we address these issues and ensure safe and dignified livelihoods for sanitation workers. The Tamil Nadu Urban Sanitation Support Programme (TNUSSP) works to improve the overall quality of life of sanitation workers. This includes supporting them in accessing welfare schemes and healthcare, improving their occupational safety and standards of living, and helping them adopt alternative livelihood options."

Stressing upon the need to bring to light the work done by sanitation workers, Chitrakala, Community Toilet Caretaker (In-charge, public toilet 58th ward) from Tiruchirappalli, Tamil Nadu, said, "We handle the public toilet as a group. Initially, only a few people used it and ladies did not come because it was being managed by a man, and other men used to gather there to drink, gossip and fight. We have focused on making toilet access better and safer for ladies as well as children. Also, we don't collect money from women as well as visually impaired, persons with disabilities and trans people. We are using safety equipment, like gloves and glasses, and machine for cleaning. I don't feel embarrassed about my work and feel proud when people praise the cleanliness of our toilets."

Another sanitation worker featured in the documentary, Muthulakshmi, School Sanitation Worker from Tiruchirappalli, Tamil Nadu, said, "I have been employed as a sanitation worker through a self-help group. I am the bread winner for my family and have been doing this for seven years. Cleanliness has been a major change after the COVID-19 pandemic. I have received proper training and safety equipment like PPE kit, masks etc. I teach students how to use the incinerator, and how to put used pads in it during menstruation. I feel proud to do my job."

Babuli Nayak, Sewer Worker, Bhubaneswar, Odisha, said, "I consider my work to be very important. If we don't clean the sewer line, people in the vicinity may fall sick. Earlier, I used to face health issues every few days but due to the GARIMA Scheme, now there are facilities for our safety. We have received recognition and now I feel proud of the uniform I wear. However, people get repulsed by us and ask us to go away. I want to ask these people to not be disgusted with us, because what we do is service to mankind."

Likewise, sharing her past journey and details about her work, Tanushree Behera, FSTP Worker and President of Bahucharamata Transgender group from Cuttack, Odisha, said, "I am well educated and before joining the sanitation sector, I tried searching for jobs in various other sectors. However, I couldn't find any job due to my gender identity due to which I faced discrimination and social prejudices. So, we decided to create a self-help group in Cuttack and received training for sanitation work. We have been provided with complete support right from the training, including travel expenses, stipends, safety equipment etc. We are provided with gloves, helmets and other safety gear. No job is small and we are proud of our work. Initially, our friends and family opposed this job but we gradually got their acceptance when our work received due recognition."

The complete documentary can be viewed on https://youtu.be/B30mMDyfQuU

By showcasing the lived realities of sanitation workers, 'Tracing the Tracks' hopes to ignite conversations, inspire empathy, and advocate for better working conditions and recognition for sanitation workers across the nation.

Firstpost.

City-wide inclusive sanitation: Why it is pathway to scaling sustainable and safe sanitation systems

Niladri Chakraborti And Sugantha Priscilla • February 9, 2023, 09:30:17 IST

Implementation of CWIS practices in Trichy has resulted in sanitation services reaching the most marginalised and vulnerable communities

Universal access to safely managed sanitation is a human right. It's also a core public service, critical to building resilient cities and empowering communities. However, 3.6 billion people globally lack access to safely managed sanitation services. This exposes them to increased health risks and gendered violence.

In 2002, the UN's Millennium Development Goal 7 aimed to halve the population without access to basic sanitation services by 2015. This target was missed by a margin of nearly 700 million.

In India, the Swachh Bharat Mission (SBM), launched in 2014, accelerated our journey towards safe sanitation. Now, we have progressed to SBM 2.0, for which safely managed sanitation is a priority.

The next milestone in India's sanitation journey: City-wide inclusive sanitation

Over the past few years, significant progress has been made towards approaches focused beyond infrastructural sanitation goals, towards the more sustainable approach of City-Wide Inclusive Sanitation (CWIS). CWIS stands on the key principles of ensuring all citizens have access to services targeted at safely managing human waste.

India is home to four out of eight CWIS cities in the world – Narsapur, Trichy, Wai and Warangal. In Trichy, CWIS is being implemented by the Indian Institute for Human Settlements (IIHS), a national education institution committed to the equitable, sustainable and efficient transformation of Indian settlements.

Around 81 per cent of households in Trichy currently have individual toilets, and 33 per cent have underground drainage connections. It has 54 desludging operators (DSOs), who own a total of 72 cesspool trucks. There's one sewage treatment plant with 88 MLD capacity. These interventions focus on improved desludging services, the safety and rights of sanitation workers, and dignified livelihood opportunities.

Enabling equitable and sustainable service delivery for urban poor communities

Ensuring toilet access and improving sanitation services for low-income communities emerged as a priority in Trichy. Recognising the need for the fair distribution of quality services to marginalised communities, the Tiruchirappalli (Trichy) City Municipal Corporation (TCC) identified 1,900 households with space available to construct Individual Household Latrines (IHHL) under SBM-Urban.

TCC further implemented initiatives such as installing Community and Public Toilet (CT/PT) features like sanitary pad vending machines and incinerators for the safe disposal of menstrual waste. Social audits and periodic O&M assessments were introduced to ensure that services are gender-friendly and reach the most vulnerable. Septic tanks with improved treatment systems and an earthworm-based bioreactor effluent treatment were also piloted in a few community toilets to identify the maximum acceptable load for safe containment, thereby promoting safe Faecal Sludge and Septage (FSSM) practices.

TCC is now in the process of scaling such technical solutions across the city. Trichy also addressed unsafe disposal practices through the Standard License Agreement, which enabled smooth and improved functioning of desludging operations. It mandated load disposal only at prescribed decanting stations, initiated annual license renewal, and allowed only TCC-licensed DSOs to operate desludging trucks.

Nurturing a dignified workplace for service providers

The city of Trichy identified the crucial need to recognise, empower and establish safer working conditioners for sanitation workers. To promote equity and safety of sanitation workers, awareness campaigns detailing sanitation workers' entitlements were held, and mechanisation of services was promoted to ensure that they are not exposed to hazardous situations.

Informal sanitation workers were registered under the Tamil Nadu Manual Workers Welfare Board under the Labour department and Sanitation Workers Board under Tamil Nadu Adhi Dravidar Housing and Development Corporation (TAHDCO), an initiative that established them as sanitation "professionals." Based on key learnings from the Occupational Health and Safety (OHS) study conducted by IIHS, appropriate safety tools and equipment, emergency protocols, and gender-differentiated PPE kits were developed.

Customised first-aid training for sanitation workers and DSOs, including sensitisation sessions on the safe disposal of fecal sludge, were also conducted to build capacity and increase the uptake of safety measures amongst service providers. A Memorandum of Understanding (MoU) was signed among urban local bodies and private sector charitable hospitals which institutionalised health camps for sanitation workers and their families. These initiatives directly impact the lives of sanitation workers and enable the growth of a dignified workplace for service providers.

Solutions to integrate gender mainstreaming in service delivery

Gender mainstreaming in sanitation services emerged as a priority area for the city, with focus on enabling women sanitation workers.

In an effort to mainstream and empower women sanitation workers as entrepreneurs and service providers, IIHS-led CWIS built the capacities of 50+ women on entrepreneurial skillsets that enabled them to identify business opportunities in the sector, and trained them in services which improve menstrual product disposal.

To further scale socio-economic development opportunities, 550+ informal women sanitation workers across 57 self-help groups were trained on group dynamics, record keeping, revolving fund handling and enterprise development, and linked with the National Urban Livelihood Mission (NULM).

CWIS efforts have also made huge strides towards inclusive sanitation for trans communities. This was done by creating exclusive facilities for trans people, sensitising caretakers of CT/PTs and concerned officers from TCC to ensure that trans people can access sanitation facilities as per the gender they identify with, and also appointing trans persons as caretakers in some CT/PTs.

Implementation of CWIS practices in Trichy has resulted in sanitation services reaching the most marginalised and vulnerable communities and creating safer service delivery by widening the focus from infra delivery to service delivery. It has also emerged as a multi-dimensional approach that enabled solutions required to solve for rapid urbanisation and to empower service providers, i.e., sanitation workers. The learnings and challenges from Trichy can be utilised to further scale CWIS practices across India, build resilient cities and accelerate India's contribution towards SDG Goal 6 of sustainable and safe sanitation.

IIHS is a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative body driving the discourse of Faecal Sludge and Septage Management (FSSM) in India.

Niladri Chakraborti is a Senior Lead in Practice at IIHS and heads the City-Wide Inclusive Sanitation Program (CWIS) in Trichy. Sugantha Priscilla is a senior specialist in social development at IIHS with extensive experience in promoting economic empowerment of women and inclusive growth of societies. Views expressed are personal.

ARTICLE

Achieving total sanitation through inclusivity and climate resilience

By Elets News Network 05-August-2022

Share:

Universal access to adequate sanitation is a fundamental need and a human right. Securing access for all would go a long way in reducing illness and death, especially among children, writes **Dr. Mahreen Matto**, Team Lead, SCBP, **NIUA** and **Shantanu Padhi**, Senior Program Officer (Technical), SCBP, **NIUA**.

The recent Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report, leaves no room for doubt that climate change is intensifying the water cycle. Thus impacting on people's rights to water and sanitation, by causing floods and droughts, changes in precipitation and temperature extremes, that result in water scarcity, contamination of drinking water and exacerbation of the spread of disease. It's a common sight in Indian cities during monsoon that heavy rain of a few hours floods the roads and drainage systems, as a result of sewage water from sewer holes, and open drains enter the houses which are located at lower ground level, thus creating havoc. The marginalised and low income settlements are especially the worst affected, often. Furthermore, heavy precipitation and flood events can lead to physical damage of non sewered sanitation infrastructure, especially pit latrines and septic systems, making them non functional when filled with water, especially in densely populated urban areas and informal settlements.

Similarly, during drought situations, due to lack of water, unhygienic conditions prevail for both population dependent on onsite systems and sewered network systems.
Furthermore, sanitation systems contribute to greenhouse-gas emissions (GHGs), in the events such as during breakdown of excreta stored in onsite systems, indiscriminately discharged of excreta into the environment, at treatment processes, and indirectly through when the energy is required in treatment steps[1].

India has walked a commendable journey of moving from a country with 60 per cent of its urban population defaecating in the open (Census 2011), to open defaecation-free (ODF) within 5 years of Swachh Bharat Mission (SBM) implementation. The focus of the SBM 1.0 (Urban) remained largely on providing basic facilities to households by building toilets at Individual and community scale – precisely superstructure. Moreover, with this focused agenda, we see ~100 million toilets built on ground. Nevertheless, post providing the toilets-to-all, the question that has very well come out is 'What happens to the waste after it is flushed down the toilet?' Thus, we see time-to-time various guidelines and advisories being released by the Ministry of Housing and Urban Affairs (MoHUA), Government of India, addressing issues and challenges and recommending guidelines across sanitation value chain irrespective of centralised or decentralised waste management.

The recently launched SBM 2.0 has moved to the next step, from building toilets to providing treatment facilities for wastewater and septage treatment to the small and medium cities, realising that only providing conventional infrastructure in sanitation will not be enough and will not lead us towards sustainability with changing time. Hence, there is a need to adopt inclusive and resilient infrastructure, which would be able to safely manage wastewater, faecal sludge and septage. The marginalised, low income, woman, children and transgenders population of the cities have to be considered during planning across the sanitation value from User Interface to End-use/Reuse.

We need to integrate our strategies and solutions with the factors of climate change, in addressing the concerns of sanitation in India. The range of mitigation and adaptation opportunities related to sanitation and wastewater systems indicate that opportunities for climate action are overlooked, as there is very limited inclusion in climate policy and finance. Sustainable Development Goal (SDG) target 6.2 talks about achieving access to adequate and equitable sanitation and hygiene for all and end open defaecation, paying special attention to the needs of women and girls and those in vulnerable situations by 2030. Closely linked is SDG 6.3 which talks about improving water quality, wastewater treatment and safe reuse prove water quality, and wastewater treatment. Climate change impacts existing sanitation systems and impedes progress to achieving these targets. Such dangers further pose a serious challenge to India's sustainable development since they disproportionately affect marginalised and vulnerable groups of the society with limited capacity for adaptation.

Measures to be taken

The emphasis on integration throughout the SDG Agenda has highlighted that the target for SDG 6 (Water and Sanitation) is imperative, which must be achieved in order to attain a number of other outcomes of SDG, including good water quality, healthy aquatic ecosystems, gender equality, health and well being. The possible options in this direction could be as follows:

- Need to develop effective information systems to access updated and reliable data, and to make informed decisions for ensuring climate resilient services
- More systematic assessment of GHG emissions from different sanitation technologies is needed to better inform decision making in the sector, whether it involves selection of on-site technologies or upgrading of wastewater treatment plants
- Identifying appropriate technologies that are most effective in reducing negative climate impacts and reaching the most vulnerable populations of the country. Thus, selection of affordable technology should also be based on climate performance, in addition to other environmental, technical, social and financial concerns
- Expanding the WHO's Sanitation Safety Planning (SSP), which provides a structure to bring together various stakeholders, to conduct local level assessment and management of health risks across the sanitation service chain, to include climate considerations beyond the identification of hazardous events related to seasonal or climatic factors[2].

Having said that, sanitation and climate change need to be used in the instruments of research, advocacy and capacity building to pitch it into the next sanitation programmes of Government of India. Need to incorporate climate resilience, nature based solutions, diversity & inclusion and net zero into 'business as usual'. Strengthening the urban environment from a climate lens requires holistic understanding of risks and vulnerabilities and incorporating the same in the design and implementation of new urban development projects.

Way Forward

Based on the context presented, unfortunately we are still trying to solve new issues with old solutions and our past experience turns to be our greatest enemy when it comes to changing our attitude. We are still investing in linear systems, 'big pipes in and big pipes out' transfer model, focusing on 'hard' infra- technological solutions. We continue to operate in silos; our policies are set without aligning objectives with the required resources; we depend on public funds that are insufficient; and the new sources of finance for water and sanitation constrained by regulatory, institutional and other barriers. These factors are further exacerbated by the impacts of climate change and other environmental stressors, ultimately heightening the challenges, and constraining the availability and the quality of urban water and sanitation management. It is high time that we take our water and sanitation sector seriously and retrospect the way we manage it, as it will help in taking serious actions that will lead towards sustainable water and sanitation management.

1. Dickin, S., Bayoumi, M., Giné, R., Andersson, K., & Jiménez, A. (2020). Sustainable sanitation and gaps in global climate policy and financing. NPJ Clean Water, 3(1), 1-7

2. Sanitation safety planning manual for safe use and disposal of wastewater, greywater and excreta- https://www.google.co.in/books/edition/Sanitation_Safety_Planning/a1o0DgAAQBAJ?hl=en&gbpv=1&printsec=frontcover

DownToEarth

Urbanisation

A holistic water management system in urban areas for a sustainable future

An integrated approach can bring healthy coordination between all stakeholders

Water management needs to undergo a revolution to ensure most urban areas can be self sufficient in the future. Photo: Wikimedia Commons

Krishna C Rao

Published on: 29 Sep 2022, 11:42 am

With the rapid growth of cities, water demand has exponentially increased. Even as aspirations cause people to migrate to urban areas, water depletion and scarcity remains a huge challenge staring at people's faces in the near future.

Water demand is going to increase even more, with India's population in urban areas expected to double by 2050. Around 35 per cent of India's population lived in urban areas as of 2020.

In urban areas, only 45 per cent of the demand is met using groundwater resources. Apart from this, climate change, pollution and contamination have also added to the burden on water resources.

As water demand exceeds supply in most cities, water management needs to undergo a revolution to ensure most urban areas can be self-sufficient in the future.

In India, there are different water management systems based on utilities like sanitation, urban water, stormwater and wastewater that deal with water-related issues in different localities. Since areas and localities define distribution and water allocation, it is often a challenge to find a unified solution.

With climate change and population growth leading to increased water use, new solutions have to be conceived for better urban water management. More people in different local contexts need to be made aware of the challenges.

Similarly, there are changes required in institutions like local departments that play a crucial role. It is essential that holistic and systemic solutions are implemented to solve water issues.

Integrated urban water management system for reliable supply

Integrated urban water management system (IUWM) is a process, which ensures water supply, used water management, sanitation and stormwater management can be planned in line with economic development and land use.

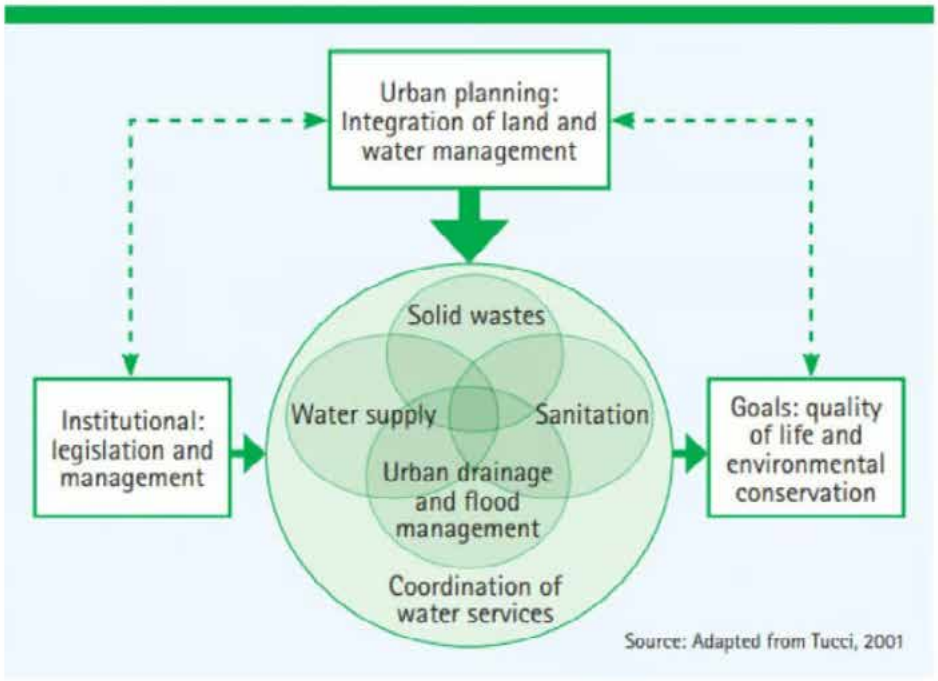
This holistic process makes coordination among water departments easier at the local level. It also helps cities adapt to climate changes and manage water supply more efficiently.

Here are a few approaches to successful urban water management:

- **Collaborative action**
- **Shift in perception of water**
- **Understanding water as a resource**
- **Customised solutions for different cities**

Collaborative action is one of the leading principles of IUWM. It focuses on a collaborative approach involving all stakeholders. While effective legislation will help guide local authorities, engaging local communities will lead to faster solutions in water management.

When there is clear coordination between all the stakeholders, it is easier to define priorities, take action, implement changes and take accountability.



The coordinating structure that will ensure communication between departments, levels of government, local communities and stakeholders

The shift in perception must view water in connection with other urban sectors. It is essential to understand how water is inseparable in its connection to economic development, city infrastructure and land use.

Earlier, many solutions focused solely on seeing water as an independent sector, but now the perception has shifted and it is necessary to view the interdependence with other sectors.

Once the water situation is gauged, it will be easier for urban local bodies to link a city's development plans with the water management process.

To understand water as a resource, we need to realise water is used for different purposes like domestic use, industrial use, freshwater, agricultural use and wastewater.

This means it cannot be just seen as an end product for consumers but rather as a resource for various end goals. Once all sources are clearly defined, it will be easier to treat different kinds of water based on agricultural, industrial and environmental purposes.

IUWM ensures water management can be done based on the quality and quantity of water targeted toward specific uses.

Different cities also need customised solutions. Since IUWM focuses on specific contexts and local requirements, it prioritises a rights-based solution approach over one-size-fits-all approach.

Conventional methods did not focus on stakeholder engagement, however, IUWM's integrated system brings in healthy coordination between all stakeholders. This helps to build climate resilience among communities and also produces decisions that are more holistic, catering to different industries and communities.

Water for all

One of the reasons we are talking about IUWM is that it prioritises access to water for the most vulnerable communities. This means incorporating a few changes in the entire system.

Integrated policies can help secure sustainable development and also ensure there is innovation, efficiency and sustainability at every level.

Institutional practices in large cities will have to be transformed, but a different approach to stakeholder resource management might yield a positive result.

IUWM has proven to be a successful practice, but budget constraints, inadequate guidance from authorities and lack of awareness have limited the implementation of this solution. However, recent policies by the central government can help pave the way for state wise planned implementation of IUWM.

The Centre has started initiatives by implementing the Swachh Bharat Mission (SBM) for inclusive sanitation solutions and Jal Jeevan Mission for ensuring piped water supply.

The government has also allowed reuse of water based on circular economy principles. No sustainable development goals (SDGs) can be accomplished without running water, therefore, it is imperative that water is managed efficiently.

This will help India achieve SDGs in health, sanitation, education, livelihood and education. Adopting IUWM will also help us tackle water scarcity, address public health risks and make cities climate resilient. It is the one-stop solution to ensure good health and clean water for all.

Krishna C Rao is advisor, program and management, Water Sanitation and Hygiene Institute

Views expressed are the author's own and don't necessarily reflect those of Down To Earth

BW BUSINESSWORLD
Wednesday | Sep 25 2024 | 05:00:24 PM

MoHUA, NFSSM Alliance Celebrate Independence Day With SafaiMitra Suraksha

BW Online Bureau | Aug 20, 2022

National Faecal Sludge and Septage Management (NFSSM) Alliance, celebrated *Azadi ka Amrit Mahotsav* on Saturday along with Ministry of Housing and Urban Affairs (MoHUA) and Ministry of Social Justice and Empowerment (MoSJE).

On the occasion, a virtual event was organised around the topic of '*SafaiMitra Suraksha*: Manhole to Machine hole' chaired by Manoj Joshi, Secretary, Ministry of Housing and Urban Affairs (MoHUA) and R. Subrahmanyam, Secretary, Ministry of Social Justice and Empowerment (MoSJE).

The event saw other dignitaries including Manvita Baradi, Director, Urban Management Centre, Manjul Kumar, National Head - Finance & Banking, Dalit Indian Chamber of Commerce and Industry (DICCI), R K Khandelwal, Secretary, National Commission for Safai Karamcharis (NCSK), MoSJE, Roopa Mishra, Joint Secretary & National Mission Director, Swachh Bharat Mission - Urban, MoHUA and Yogita Swaroop, Senior Economic Advisor, MoSJE.

The discussions during the event spotlighted some of the key challenges for sanitation workforce like need for mechanised solutions and equipment to ensure their safety, provisions of social security and financial stability and overall support required to improve their working conditions.

The government laid emphasis on streamlining sanitation operations and formalising the sector through welfare schemes, capacity building initiatives and spotlighting best practices.

Scheduled to be implemented across 500 cities from 2022 to 2026, the scheme will also aim to enumerate workers engaged in sewer line and septic tank maintenance and cleaning and provide them insurance scheme benefits and livelihood assistance.

To highlight leading practices adopted by various cities and states to ensure non-hazardous working conditions for sanitation workers, a compendium – *Safaimitra Suraksha Aur Samman* was launched during the event.

Manoj Joshi, Secretary, Ministry of Housing and Urban Affairs (MoHUA) said, "I am delighted to see cities across India rapidly progressing towards our target of achieving full mechanisation by enumerating and training all sanitation workers, providing them with safety equipment and promoting an entrepreneurial spirit amongst them. The experiences shared today by various ULB representatives have been truly inspirational and I congratulate everyone for their perseverance and positive outcomes. The combined efforts of national and state governments, municipal bodies and all associated organisations have translated into great work till now and we look forward to further strides in this direction."

Further to the launch of Safaimitra Suraksha Challenge in 2020, 100 cities that were in the advanced stages of mechanisation and sanitation delivery, were designated as 'Lighthouse Cities'.

Manvita Baradi, Director, Urban Management Centre & Meghna Malhotra, Deputy Director, Urban Management Centre, member, NFSSM Alliance said, "The increase in India's urban population has put significant pressure on the sanitation sector while exacerbating the conditions of the sanitation workers including endangering their lives. Unfortunately, more than 50 per cent of workers enter Sanitation work as they could not get any other job. With limited access to social and financial safety net more than 90 per cent of sanitation workers do not have insurance cover. Collaborative efforts towards introducing schemes like Namaste, enabling cross learning through showcasing best practices and enhancing occupational safety while breaking the intergenerationality of sanitation work will bring positive change to our SafaiMitras."

Roopa Mishra, Joint Secretary and Mission Director, Swachh Bharat Mission-Urban, Ministry of Housing and Urban Affairs (MoHUA), said, "The *SafaiMitra Suraksha* Challenge, launched in 2019, identified 100 Lighthouse cities that were well equipped in terms of sanitation infrastructure and facilities. We have managed to achieve a great milestone of 500 cities across India declaring themselves as *SafaiMitra Surakshit Shehar* and are providing safe working conditions for sanitation workers. It has taken us 75 years to reach this level, however, we are committed to convert every 'manhole' into 'machine hole' under Swachh Bharat Mission – Urban 2.0. Going ahead, our target is to make all Indian cities SafaiMitra Surakshit by March 2024."

The event also witnessed participation from Urban Local Bodies (ULBs) from Jharkhand, Madhya Pradesh, Odisha and Andhra Pradesh who showcased initiatives being taken at a state and city level to improve the overall ecosystem for sanitation workers.

SOCIALSTORY

My relatives who once laughed at us, now look up at my children and the heights they have reached

In this week's Survivor Series, we present to you the story of Pasupatham, a toilet cleaner from Coimbatore, who shares the stigma attached to her job and how she faces it with positivity.

Pasupatham • 1 Stories

Tuesday April 26, 2022 , 2 min Read

My name is **Pasupatham** and I am a toilet cleaner at Muthu Mariamman Street in Trichy. I have four children to whom I dream to provide quality education so that they lead an independent and better life.

Before working as a sanitation worker, I used to work as a house help at four-five houses. But, the job involved long traveling hours and it started to severely affect my health.

During this time, I was offered the job opportunity to maintain the community toilet in Muthu Mariamman Street. I accepted it, and haven't looked back since then. I work as a caretaker and toilet cleaner of the community toilet and the residents of my area are very appreciative of the work I do.

My job empowers me and gives me the confidence to make my own decisions, support my family and secure the brightest future for my children.

Representational image

ALSO READ

Survivor Series: I now want to fight against domestic and gender-based violence

My relatives used to laugh at me for my job as a toilet cleaner. Despite the criticism, I continued to work with honesty, leading with the belief that no job is less.

My job secures my family's needs and ensures that my children are provided with quality education, which will empower them as individuals. This is my motivation to keep moving ahead every day.

After all these years of hard work and dedication, today I feel extremely proud to say that my elder daughter has accomplished her Ph.D and all my other children, and my husband and I are well-settled. My relatives who used to laugh at me now look up at my children with admiration for what they have achieved in life. Being a sanitation worker has ensured a dignified and safe life for me and my family, and is a medium for me to channel my energy and strength.

Pasupatham works as a toilet cleaner in a community toilet in Trichy. The Indian Institute of Human Settlements (IIHS) led-TNUSSP works with many community toilets in the city as part of their interventions across the sanitation value chain. IIHS is a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative body driving the discourse of Faecal Sludge and Septage Management (FSSM) in India.

Edited by Megha Reddy

Opinion: Individual Household Toilets Are Essential In Reducing Exposure To Covid And Gender Based Violence

For the urban poor in India, a section that depends upon shared toilets, the risk of contracting Covid is much higher, say experts

Published 3 years ago on March 20, 2022
By
Written By: Dhruv Bhavsar and Arwa Bharmal | Reviewed By: Dr. Vivek Chauhan |

Image Credit: istockphoto.com/yogesh_more

Women and girls using shared toilets remain under constant exposure to harassment while accessing these facilities, say experts

The significance of the old, proven adage about prevention being better than cure has been firmly reinforced during the COVID-19 pandemic. People collectively around the nation took precautions like wearing masks, maintaining distance, and avoiding public places to protect themselves. There remains, however, a large section of people for whom some of these precautions aren't a choice. For the urban poor in India, a section that depends upon shared toilets, the risk of contracting the disease is much higher – as many studies have since demonstrated. A feature by Observer Research Foundation,1 noted that in Mumbai "presence of overused and poorly maintained mega community toilets are seen to be the 'major reason' for the explosion of Covid-19 cases in the city". Already burdened with the loss of employment and lack of access to healthcare facilities, people living in urban slums are further left with meagre resources to sustain through prolonged stress caused by communicable diseases. Women and girls using shared toilets remain under constant exposure to harassment while accessing these facilities. Being burdened with care economy roles and other needs of managing their menstrual hygiene, they suffer more inequality. These inequalities were further aggravated during COVID when access to shared facilities added further jeopardy in terms of the transmissibility of infections.

In this scenario, Individual Household Toilets (IHHTs) are instrumental in addressing the overall health & wellbeing of the communities. Having a toilet at home can address privacy and safety concerns for women and adolescent girls and fulfil their needs for menstrual hygiene management. For the elderly, people with disabilities, and transgender persons a household toilet can be a remedy. Even as awareness and incentive-based approach has been adopted to motivate citizens to construct toilets in their homes, there are several obstacles in building these toilets. Some of the key concerns include:

- Lack of space in high-density areas with small dwellings
- Other infrastructural issues such as lack of water supply, inability to get a sewerage connection, especially in compact settlements of cities
- Behavioural issues like the preference of community toilets facilities, lack of perceived need and hesitation among community members to build a toilet inside the house

Several experiences from different cities have suggested possibilities and ways to address these constraints. Appropriate measures are adopted intently by community members and government stakeholders in providing adaptive reuse of space in small dwellings, possibilities of group facilities, access to sanitation credit through self-help groups and providing sewerage access in urban slums. For instance, Pune Municipal Corporation in partnership with Shelter Associates (SA) has constructed 3186 IHHTs through their One Home One Toilet (OHOT) program. Under this model, SA covers the cost of materials required to construct the toilets, members of the community cover the labour cost and the materials are delivered to their doorsteps to help quicken the process of construction. The constant emphasis laid on the construction of these toilets, especially from point of view of the safety of women and girls, encourages community members to take a step in this direction.

Similarly, to address the constraint of adequate space for the construction of toilets, some cities like Wai, Mahad, Sinnar, Vadagaon and Vita in Maharashtra have introduced the idea of Group Toilets, wherein joint families or two to three households share a toilet. Group toilets, even though not completely used by a single household, exponentially limit the access to a large number of people, facilitate the maintenance of hygiene and reduce multiple risks associated with community and public toilets.

Sanitation credit through banks and micro-finance institutions(MFIs) through self-help groups has also helped women and other groups belonging to vulnerable communities to construct individual household toilets. Living in a small house of only 12 square meters did not stop Suman from constructing a toilet cum bathroom in her one-room house in Jalna, Maharashtra. Suman is a member of a Self Help Group (SHG) through which she was able to borrow Rs. 11,000 from a private bank and Rs. 5500 as an internal SHG loan for her toilet. Sanitation loans were mobilized for over 300 women by linking SHGs to scheduled commercial banks in Jalna.

Collected data and behaviour change programs enhance the understanding of communities' sanitation needs. These, when combined with community awareness programs highlighting the necessity of toilets at home and hazards of open defecation, and information on the usage of adequate measures, have generated optimal results. With an objective of showcasing the role of communities, especially the critical role played by women and local government in constructing individual household toilets in the most vulnerable areas across the country, Centre for Water and Sanitation at CRDF, CEPT University, along with partners from the National Faecal Sludge and Septage Management Alliance (NFSSM Alliance), has developed a compendium of cases to showcase how these perceived barriers to constructing IIHTs have been successfully addressed.

The Sustainable Development Goal (SDG) 6 and its target 6.2 for 2030 emphasizes access to adequate and equitable sanitation and hygiene for all, ending open defecation, and paying special attention to the needs of women and girls, and those in vulnerable situations. Given the inter-connectedness of social issues, the multi-fold impact of access to safe sanitation can be evidenced by improvement in public health indicators, improved access to education and livelihood opportunities for women and girls, and security for marginalized persons and groups. There cannot be sanitation for all insofar as the price for accessing a toilet is a person's health and safety. This makes individual household toilets significant in addressing the multitude of issues that are compounded by improper maintenance of community toilets and therefore their construction requires a sustained impetus.

(Dhruv Bhavsar is a Senior Program Lead at the Center for Water and Sanitation (C-WAS) and Arwa Bharmal is a Program Lead at the Center for Water and Sanitation. C-WAS of CEPT University (formerly the Centre for Environmental Planning and Technology) has been on urban water and sanitation related action research.)

(Dr. Vivek Chauhan (Phd.) is the Manager- WASH at Reckitt)

Disclaimer: These are the personal opinions of the author.

NDTV – Dettol have been working towards a clean and healthy India since 2014 via *Banega Swachh India initiative, which is helmed by Campaign Ambassador Amitabh Bachchan. The campaign aims to highlight* the inter-dependency of humans and the environment, and of humans on one another with the focus on One Health, One Planet, One Future – Leaving No One Behind. It stresses on the need to take care of, and consider, everyone's health in India – especially vulnerable communities – the LGBTQ population, indigenous people, India's different tribes, ethnic and linguistic minorities, people with disabilities, migrants, geographically remote populations, gender and sexual minorities. *In wake of the current COVID-19 pandemic, the need for WASH (Water, Sanitation and Hygiene) is reaffirmed as handwashing is one of the ways to prevent Coronavirus infection and other diseases. The campaign will continue to raise awareness on the same along with focussing on the importance of nutrition and healthcare for women and children, fight malnutrition, mental wellbeing, self care, science and health,* adolescent health & gender awareness. Along with the health of people, the campaign has realised the need to also take care of the health of the eco-system. Our environment is fragile due to human activity, that is not only over-exploiting available resources, but also generating immense pollution as a result of using and extracting those resources. The imbalance has also led to immense biodiversity loss that has caused one of the biggest threats to human survival – climate change. It has now been described as a "code red for humanity." *The campaign will continue to cover issues like air pollution, waste management, plastic ban, manual scavenging and sanitation workers and menstrual hygiene. Banega Swasth India will also be taking forward the dream of Swasth Bharat, the campaign feels that only a Swachh or clean India where toilets are used and open defecation free (ODF) status achieved as part of the Swachh Bharat Abhiyan launched by Prime Minister Narendra Modi in 2014, can eradicate diseases like diahorrea and the country can become a Swasth or healthy India.*

Addressing the gaps in sanitation

By Elets News Network 05-August-2022

Share:

Water, Sanitation and Hygiene, inclusively known as WASH, is the principal aspect at community level, with respect to health, livelihood and economy. Functional WASH interventions thus play the role of predominant factor in SDG 6.2 under SDG 6, that focuses on Sanitation and Hygiene, writes **Jheelam Sarkar**, Program Officer (Technical), Sanitation Capacity Building Platform (SCBP), **NIUA** and **Amita Pathria**, Program Officer, SCBP, **NIUA**.

In spite of the initiatives being taken to eradicate the risks of unsanitary livelihood, India still has higher rates of stunting and wasting among children under five years of age, due to poor sanitation[1]. Even though access to water has improved, access to sanitation is still on the verge of augmentation, with a coverage of 59.5 per cent[2]. Though the circumstances are challenging, enumerating the challenges and devising proper strategies to overcome these would surely lead to successful achievement and safe sanitation for all by 2030.

SDG 6.2 states that access to adequate and equitable sanitation and hygiene for all needs to be achieved by 2030, putting an end to open defaecation and paying special attention to the needs of women and girls, and those in vulnerable situations.

There was a prodigious improvement seen in the statistics of Indian population defaecating in the open, and suffering from indignity, lack of access to toilets, from around 568 million to an estimated 450 million people; all in the account of Government's flagship programme Swachh Bharat Mission (SBM) (Clean India Campaign); which now in its second phase of execution aims to extend the sustainable use of toilets and hygiene practices, besides proper waste (solid/liquid) management[3].

Proper sanitation and hygiene implies to appropriate construction of toilets, safe management of human waste including safe confinement, treatment and disposal; availability of water, wastewater management, solid waste management, control of vector-borne diseases, and taking care of domestic and personal hygiene. While SBM Phase I accomplished its targets by subsidising construction of single/ twin pit toilets at household and community levels, in both rural (71.3 per cent access) and urban (96.2 per cent access) areas, and SBM Phase II is working on the sanitation chain, leading towards the objectives of SDG 6.2[4], why is there a gap in provision of basic sanitation still pertaining?

The lack of basic sanitation is the result of the challenges that are being faced at every level with respect to awareness, behavioural change, and education. Rapid urbanisation initiates the emerging demand for sanitation, which would grow along, eventually by 2030.

Improving the toilet infrastructure cannot solely eradicate the faecal or oral transmission of pathogens. The technical and behavioural components conducting the gap, contributing to the need for behavioural change are:

- Lack of access to clean water and properly constructed sanitary toilets being a key issue[5].
- Unavailability of basic amenities like soap, menstrual hygiene products for emergency and disposal bins (for women and girls) etc.
- Lack of ergonomic design of public/community toilets, as they might be used by people of all ages, men, women, the third gender, and people with disability, following gender disparity.
- Lack of proper containment and disposal without treatment is still a persisting issue, due to inappropriately engineered toilet outlets/septic tanks, leading to overflow of septic tanks.
- Disposal through open drains reflecting improper management of faecal waste.
- Inappropriate framework of toilets, with no access for the third gender, and inconsideration of individual attitude towards the use of toilets.
- Lack of sanitation facilities fabricating psychological stress among girls and women, due to environmental obstacles such as unsafe toilets, leading to fear of sexual violence and social factors[6].

To understand these concerns from a layman's perspective, involvement in sanitation programs, awareness creation, and involvement in various social movements are much needed. With the trend in change of traditional sanitation approach of centralised system to a safer system like Non-Sewered Sanitation (NSS) and Citywide Inclusive Sanitation (CWIS); that looks into core sanitation under the principle heads of safe, equitable, responsible, accountable and financially viable system with proper resource planning and management; the existing issues could be dealt with in a better way.

Talking about solutions, ULBs need to realise the urgency for continuous supply of water, parallelly with sanitation. Going ahead with the CWIS principles, firstly, for providing safe sanitation, responsibility should be taken into account for construction of technically designed toilets with containment systems following appropriate norms (IS 2470).
Secondly, in many cities dependent on on-site sanitation, sludge flows mostly through underground drainage system, followed by stormwater drains to open drains; which should be sermonised with the need for Sewage Treatment Plants/ Faecal Sludge Treatment Plants, along with understanding of the concept of drainage system.

To address these issues from the very core of the problem, first it has to be realised that sanitation is a public service. Keeping that in mind·

- The education system needs to include modules for decoding the link between sanitation, hygiene, health and economic development.
- Addressing gray and black water management within training courses would help to understand the concept of sanitation chain, as per the second phase of SBM.
- Creating work designations and encouraging more women centric jobs/positions in the sector would ensure security as well as gender equality.
- Socially recognising and providing sanitation workers with financial, health benefits and social security, to give them recognition at the ground level.

Such steps would surely emphasise Information Education and Communication (IEC) and Behaviour Change Communication (BCC), as they are the cue towards the shift in attitude and mentality among the municipal bodies and common people.

Even though some premiere institutions under the NFSSM Alliance are already moving forward with capacity building for a better understanding of entire sanitation progress, a chain of champions and change makers is much needed for training the trainers, government officials as well as the educators. Building capacity does not only signify gaining knowledge, but also working together as a community. Organising exhibitions, theatrics, nukkad nataks, hoardings, mobile messages, and wall paintings to disseminate awareness and education through IEC and BCC are also a part of capacity building. In the same context, social media and the digital world should be persuaded to bring these issues to the forefront through more movies like 'Toilet', series like 'Panchayat' and different articles on such varied topics.

As a part of contribution to social and behavioural communication, the Malasur campaign – demon of defaecation – was launched by the Ministry of Housing and Urban Affairs (MoHUA) for spreading awareness about the risk of the mismanagement of faecal sludge, leading to pollution of water, under IEC and BCC with various artworks representing Malasur which are used by the ULBs for conducting the campaigns at respective local levels.

Acknowledging the issues is not enough, unless solutions are followed accountably. Only then could the indicators for monitoring usage of improved and safe sanitation along with proper maintenance of hygiene, lead to the fulfillment of SDG 6.

DownToEarth

Water

World Toilet Day: So far, we have overlooked sanitation in the climate resilience discourse

Safe and inclusive sanitation solutions can play a pivotal role in safeguarding against risks imposed by climate change

There is an urgent need for collaborative action that can prioritise climate intersectional narrative in service delivery including access to safe and sustainable sanitation services. Photo: iStock

Parnasha Banerjee

Published on: 19 Nov 2022, 3:55 am

The emphasis on developing a response to the climate crisis has steadily increased over the past few years. This year alone, the world has seen calamitous events. Over a third of Pakistan was flooded even as heatwaves killed thousands across south Asia.

This has sent across a clear message: There is an urgent need for humanity to act in order to safeguard against the impacts of climate change. This is especially true for poor and developing countries which will be the most adversely affected and least able to cope.

India witnessed a localised climate disaster every day in the first nine months of 2022. India is the seventh most vulnerable country to extreme climate events, coupled with low capacities to sustain shocks.

A global momentum towards climate action is building. But, a crucial aspect of building resilience has remained out of sight: The missing link of sanitation.

Safe and inclusive sanitation solutions can play a pivotal role in safeguarding against risks imposed by climate change such as heightened water scarcity and the risk of natural disasters.

India is the 13th most water-stressed country in the world, with rapidly depleting groundwater levels and close to 70 per cent of surface water being contaminated.

India's urban population is projected to expand to 50 per cent by 2050, which is bound to inflate the strain on water sources. It is essential to ensure access to safe and improved water quality so that communities can thrive and live with dignity.

The health and development of communities is under threat as climate change compounds water scarcity issues.

It is thus important to integrate preventative solutions at the root. Disposing untreated waste into water bodies is the single biggest source of water resource pollution in India, rendering water unfit for consumption and magnifying urban water stress.

India's sewage treatment plants treat only a third of the sewage generated daily. Investing in sanitation solutions which focus on the entire sanitation value chain — from treatment to disposal of human waste — can play a pivotal role in tackling water pollution and making cities more resilient to handle the anticipated increase in water stress.

Such stress is due to get worse because of climate change-driven factors like variable and unreliable precipitation. Economically and socially marginalised communities will be inordinately stung by heightened water scarcity.

Resilient sanitation services

Consequences of climate change are being felt through more frequent and intensified natural disasters such as floods, cyclones, earthquakes, etc.

These hazards end up disrupting access to safe sanitation through direct damage to sanitation infrastructure such as toilets and pipelines. They also disrupt services such as water supply which are crucial to keep sanitation services running.

Communities have to resort to open defecation and unhygienic practices in disaster-affected zones in the absence of water and sanitation. This impacts their health.

Service delivery infrastructures must be built in a resilient manner to manage disasters more holistically. This will enable cities and towns to be better prepared to provide safe and dignified sanitation to their populations especially during disaster / climate change events

India happens to be the third worst-affected country due to climate-induced natural disasters, disproportionately impacting vulnerable communities such as women, marginalised castes, people with disabilities, etc.

Low-income households or people living in informal settlements often reside on marginal land more prone to climate hazards and are more exposed to the health risks of poor sanitation and polluted water.

Marginalised communities are going to face the worst brunt of the climate crisis and there is a pressing need to keep the inclusion of marginalised communities at the core and augment their adaptive capacities.

It would be a grave oversight to not address this issue. Different stakeholders such as the government, private philanthropists and experts must come together to foster an enabling ecosystem for this.

For instance, there is a need to include aspects and components of safe and inclusive sanitation service delivery in disaster risk reduction and management guidelines and programmes in close convergence with the governments departments at a national as well as at a state level.

This must be solved by design rather than disaster and ensuring that government, civil society and communities are working in close coordination with each other.

There is a time-sensitive need to move away from a siloed approach to an intersectional, inter-sectoral understanding that can enable access to safe sanitation in the wake of the climate crisis. Collaborative action towards these topics, backed by data and stories from ground, will be critical.

As the future becomes more unpredictable, adaptability and continual learning from different actors become key to creating a more resilient world.

There is an urgent need for collaborative action that can prioritise climate intersectional narrative in service delivery including access to safe and sustainable sanitation services. So that there a transformed world where everyone lives with dignity and equity.

Parnasha Banerjee is Associate Director, Urban WsH, Dasra

Views expressed are the author's own and don't necessarily reflect those of Down To Earth

WATER SCIENCE POLICY

Reshaping and making decentralized wastewater management sustainable

March 27, 2021 11:05am GMT

Circular Economy **Governance and Regulation**

- COVID19 has brought to the fore the long-lasting challenges in water and wastewater management, and the need for smart investments
- Decentralized Wastewater Management (DWWM) plays a crucial role in the circular economy, being economically affordable, ecologically sustainable and socially accepted
- There is a need to shift focus from infrastructure to regulatory governance, considering the factors paramount for the sustainability of DWWM

COVID19 is taking us on an emotional journey, and while we wait for the effectiveness of a vaccine, we can look ahead to assess how we can work towards a more sustainable future. COVID19 has brought to the fore long-lasting water and sanitation management challenges, which highlight the need for smart investments to achieve public health benefits, environmental improvement and enhance quality of life. The pandemic constitutes a huge opportunity to revisit strategies implemented till date, and to build a more sustainable society meeting basic needs such as water and sanitation for all. Thus, lessons learned from the pandemic may pave the way to build a more resilient future.

With the paradigm shift from "waste" water treatment to "resource recovery" in the circular economy, significant opportunities for emerging economies to leapfrog and establish sustainable approaches in the wastewater sector has been established. One such approach is Decentralized Wastewater Management (DWWM) which plays a crucial role in delivering this new reality, being economically affordable, ecologically sustainable and socially accepted. The approach emphasizes leakage reductions, energy conservation, , reuse and recycling of wastewater and nutrients by treating wastewater close to its source. Keeping in of developing countries, a combination of centralized and DWWM can help mainstreaming access to wastewater services.

Taking an example of a developing country, India, it is estimated that out of the 61,754 million litres per day (MLD) of sewage generated, only 22,963 MLD is treated – a huge gap in wastewater treatment capacity of the current mostly centralized systems. In this context, DWWM is gaining momentum as an alternative approach towards citywide inclusive sanitation. However, even after numerous successful case examples, DWWM has not seen to wide-scale replication. Thus, in order to expand access to sanitation through DWWM approaches, we must shift focus from infrastructure to regulatory governance, requiring consideration of the following factors:

- Comprehensive legal regulations and policy level intervention

In India, the responsibility for provision of infrastructure projects such as DWWM lies with the state. Moreover, as per the 12th Schedule; Sanitation, Sewerage and Drainage lies with Urban Local Bodies (ULBs). The national government plays an important role in providing direction, guidance and funding of DWWM projects through policies (National Urban Sanitation Policy 2008, etc) and programmes (Atal Mission for Rejuvenation and Urban Transformation, Smart Cities Mission, Pradhan Mantri Awas Yojana – Housing for All, Swachh Bharat Mission [SBM] of Ministry of Housing and Urban Affairs [MoHUA]; Namami Gange, Jal Jeevan Mission [JJM] of Ministry of Jal Shakti, etc).

However, the policies and programmes lack clear guidelines and frameworks to support the implementation of such projects. The problem is further exacerbated by weak enforcement of laws and regulations and insufficient penalization. More detailed policies and stronger enforcement is needed for DWWM projects to be viable.

- Provision of dedicated funds

Numerous studies have indicated the cost of setting and sustaining these decentralized systems as potential barriers to their adoption. To increase the adoption, the national flagship programmes mentioned in the previous section provide funds for DWWM. For instance in the recent union 2021 budget, Rs1,41,678 crore and Rs 2.87 lakh crore is allocated to SBM 2.0 and JJM, respectively. Both include wastewater management, aiming to help in achieving SDG 6 by 2030. Hence it is important for states and cities to consider the convergence of funds and activities from various programmes.

Apart from government schemes, a range of private funding sources could be considered: Subsidies and/or Grants; Public–Private Partnerships; Microfinance; Crowd-funding; Corporate Social Responsibility; Commercial banks; Output-based Aid and Carbon Credits.

- Stakeholder involvement

Aiming towards functional model, a DWWM project will also require sectoral bodies, water utilities, sewerage boards, communities and entrepreneurs to collaborate. The active participation of different stakeholders should span the entire development process – from planning to final evaluation. This ensures stakeholder commitment and participation towards increased performance and sustainability of the project.

TABLE 5.1 - PARTICIPATION LEVELS OF STAKEHOLDERS AT VARIOUS STAGES OF A DECENTERALIZESD SANITATION INITIATIVE

		Participation levels			
		Information	Consultation	Collaboration	Empowerment / delegation
Planning	Launch of the planning process	All stakeholders		Municipality, Utility	
	Detailed assessment of current situation		Key stakeholders	Municipality, Utility	
	Identification of service options		Key stakeholders	Municipality, Utility	
	Development of Action Plan	All stakeholders	End-users	Municipality, Utility, operators, NGOs	Empower weak & unorganised groups
Implementation		Households, opinion leaders	End-users	Municipality, Utility, operators, NGOs	Empower and delegate to Municipality, utilities, operators, NGOs
Monitoring and Evaluation		Key stakeholders	Households, operators, end-users	Municipality, Utility, selected NGOs	

Source: Fecal Sludge Management - systems approach for implementation and operation, Edited by Linda Strande, Mariska Ronteltap and Damir Brdjanovic, 2014

The Jakkur lake rejuvenation project in Bengaluru is a classic example of stakeholder engagement. The lake is treated through a combination of conventional and natural treatment wetland. Sewage is treated in a STP, the effluent of which is passed through a constructed wetland (which is a DWWM technology), before it enters the lake. Keeping in view the quality of lake, in 2014, the lake was adopted by the citizen group Jalaposhan for restoration. They collaborated with wide range of stakeholders (local government, private sector representatives and civil society) to conserve and preserve the lake. The successful model is being replicated in other waterbodies across the country.

- Strengthening monitoring and redressal system

The current state of monitoring DWWM projects is inadequate. Monitoring systems can be improved by standardization of O&M activities which includes delegation of O&M to a responsible agency (along with performance-based contracts), certification and licensing of O&M service providers, developing financial incentives (e.g. property tax rebate). Also includes developing effluent standards for treated wastewater and reuse purposes.

- Coordination among Institution/Agencies

Different ministries, departments, authorities and government organizations are involved in DWWM projects (see box below). They work in silos with some coordination among them, thus creating a state of confusion and lack of ownership. The bodies need a clear division of responsibility of roles within different agencies for law enforcement, capacity building, technical support and monitoring.

Project	Policy	Capital Investment	Implementation	Effluent Standards	Monitoring
Large Scale	MoHUA; State Urban Development Department (SUDD)	MoHUA; SUDD; WSSB; ULB	State Urban Water Supply and Sewerage Board (SUWSSB); WSSB	Centre Pollution Control Board (CPCB); State Pollution Control Board (SPCB)	SPCB
Small Scale	Ministry of Environment, Forest and Climate Change; SUDD; SPCB	Real Estate Companies; Builders; Developers	CPCB; SCBP	SPCB; ULB	

Source: Reymond, P., Chandragiri, R., & Ulrich, L. (2020). Governance Arrangements for the Scaling Up of Small-Scale Wastewater Treatment and Reuse Systems–Lessons From India. Frontiers in Environmental Science, 8.

- Human resource management

The shortage of competent and qualified practitioners is one of the hurdles in scaling up DWWM. The various sanitation programmes have capacity building goals aiming at improving urban governance and service delivery. However, since they operate until the project finishes, they need to be systematically planned and sustainable. In addition, they must expand their target from government officials, to also include non-state practitioners.

Thus, keeping in mind the contributing factors for the sustainability of DWWM, the approach could combat the growing water and wastewater crisis by providing innovative solutions. Enabling the overall concept of sustainability in terms of economic viability, social equity and acceptance, technological and institutional applicability, environmental protection, and resource recovery including protecting human health. With a shift in priorities, 2021 will be a year of healing, underlining the need for solutions that deliver concrete results and catalyze progress on multiple SDGs at the same time.

DownToEarth

Water

How to sustain municipal sanitation: Delhi's Aya Nagar offers some lessons

The pilot project is a prototypical model for evolving a sanitation management programme in a high density settlement

Plants growing in the reedbed system at Aya Nagar in Delhi. These have roots containing rhizomes which further clean the waste water generated by the project at the site. Photo: CSE

Sumita Singhal, Mahreen Matto, Suresh Kumar Rohilla

Published on: 30 Oct 2020, 11:43 am

CORRECTION: This blog was published first on October 30, 2020. According to that version, the capital cost of the project mentioned in the piece was Rs 1.2 crore. This was corrected to Rs 2.1 crore on November 1, 2020. We regret the error

The fast pace of urbanisation is leading to the outgrowth of cities, expansion of peri-urban areas and increase in the number of urbanised villages, informal settlements and unauthorised colonies. These generally lack access to infrastructure services, particularly sanitation facilities. This often leads to environmental pollution and endangers the health of local residents.

This article attempts to examine how and the extent to which residents of one such unauthorised colony get access to improved sanitation. The findings show that community-led initiatives, partnerships and context-specific decentralised solutions are instrumental in improving the access to sanitation in such unauthorised colonies.

The case of Delhi

Take the instance of Delhi, the capital of India, which is urbanising at a fast pace. Over the years, the number of villages has reduced to 112 in 2011 from 300 in 1961. The number of urbanised villages, meanwhile, has increased to 135 in 2011, from 20 in 1961.

Official statistics indicate that over four million people are living in unauthorised colonies. However, these unauthorised colonies lack the municipal services and utilities such as proper water and sanitation systems.

In a recently concluded socio-economic survey of Delhi, 0.6 per cent households were found to still practice open defecation, 60.1 per cent of the households were connected to piped sewerage, 36.7 per cent had septic tanks and 1.2 per cent used toilets linked with open drains or open areas.

This leads to aesthetic nuisance, threat of organic pollution and several infectious diseases in epidemic proportions due to the contamination of ground water and drinking water resources.

Laying sewer networks is a cost-intensive and time-consuming project, keeping in view the city's dynamics. It may not be financially viable to all areas of the city. On- site sewage management is gaining momentum as an alternative approach to the current conventional practice.

The advisory on *On-site and off-site Sewage Management Practices* by the Central Public Health and Environmental Engineering Organisation, Union Ministry of Housing and Urban Affairs, Government of India is a timely initiative to guide states / Union territories and other stakeholders on safe and holistic management of sewage and faecal matter.

Case study of Aya Nagar

Aya Nagar, situated in southwest Delhi and adjacent to the Delhi-Haryana border, is one such provisionally regularised unauthorised colony and is majorly settled by migrants from all parts of the country.

Being an unauthorised colony, there was no provision for drainage. Hence, the storm water which flowed in open channels along the roads, also got mixed with sewage.

In a few cases, the sewage of houses was stored in a sump below them that were emptied by portable vacuum pumps and discharged in an unregulated manner, leading to unsanitary and extremely unhygienic living conditions for all citizens.

The open channels also became extended garbage bins, choked with plastic bags and other forms of solid waste. The open channels would overflow on the roads, especially when it rained — resulting in serious health hazards.

GREHA, a non-profit primarily consisting of environmental design and planning experts based in Aya Nagar, spearheaded the challenge to improve the sanitation scenario of the neighbourhood.

The then-chief minister of Delhi, Sheila Dikshit, visited Aya Nagar in 1999 and declared it to be a model village. The Aya Nagar Vikas Samiti was then constituted and registered in 2001 to be the voice of local people, along with a task force to implement the plans proposed for development by the government.

In 2008, the government of Delhi, under a scheme of the Delhi Kalyan Samiti, granted research aid to GREHA, to propose options and possibilities that could be initiated to make Aya Nagar a role model.

On-site sanitation approach

After extensive research and consultation with experts, GREHA proposed a new technology called small-scale (bore) sewer system in combination with the Biodigester technology developed by the Defence Research & Development Organisation (DRDO), that could be installed below the roads without entering private houses.

The project was started by mapping and surveying the neighbourhood, which included physical surveys, documenting the internal layout of the houses and conducting a demographic survey.

An important part of the project was to engage and consult with community members. A scale model was created and used as a planning tool. Delhi Urban Shelter Improvement Board (DUSIB) spearheaded the project.

Sewage treatment in the biodigester takes place through the action of a specially designed bacteria which is the inoculum introduced into the airtight container. The inoculum has the property of regenerating through its action with faecal bacteria to produce treated effluent.

Biodigester installation is 50 per cent cheaper than septic tank and gives out natural methane and carbon dioxide (minimal air and water pollution) and requires 25-30 per cent less space, compared to septic tanks. Per unit of biodigester for household costs Rs 30,000-50,000, based on the location.

The treated effluent from the biodigesters, along with grey water from the households and rainwater undergo secondary treatment through bio-remediation in a 100 kilolitres per day reedbed system in the nearest suitable open space available.

Technical support for implementation of the reedbed system was provided by Delhi-based nonprofit, Centre for Science and Environment (CSE). In the reedbed, wastewater is circulated through a crushed stone medium. Within this are growing plants that have roots containing rhizomes which further clean the waste water.

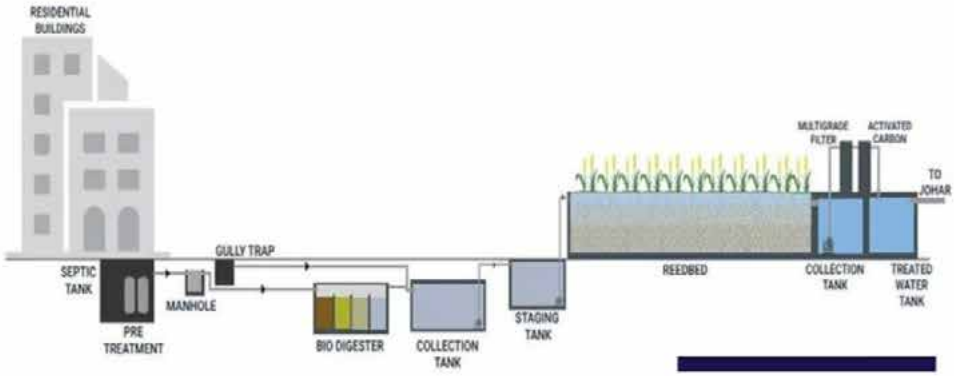
The reedbed helps in removing nutrients from the wastewater. Reedbed-treated effluent is then passed through multi-grade filter and activated carbon filter for final treatment and disinfection.

The proposed reuse for the treated water is for road cleaning, horticulture, etc. Alternatively, it can be used for reviving the nearby *Johad* or percolation ponds. Currently, the treated water is being discharged in the open drain after the treatment due to the lack of funds.

Thus, the scheme shows a way of creating a closed loop water supply system, which, if carefully engineered to an extent across the urban area, could also play a major role in controlling the pollution of the river Yamuna.

This hybrid system has been put up in Z-block, Ayanagar which caters to the population of around 1,200-1,500, without disturbing the privacy of households and with no special maintenance requirement. The whole system cost approximately Rs 2.1 crore.

Project Key highlights of the sanitation system			
Scale of Service	Community Level	**Year of Installation**	2020
pH of treated water	7.6	**Capital Cost**	Rs. 2.1 Crores
BOD of treated water (mg/l)	14	**Proposed reuse of treated wastewater**	Non-potable (Road cleaning, horticulture, etc)



Technical layout of the project (Credit: GREHA)

"The Aya Nagar project, devised and facilitated by GREHA, demonstrates a new urban paradigm which places the concerns of the marginalised majority at the forefront, using techniques to make urban systems responsive to the imperatives of social justice and ecological viability. Foremost being the management of the water cycle by decentralised sewage treatment and waste water re-use," says MN Ashish Ganju, Principal Architect, GREHA

"The Aya Nagar project was an extremely challenging project where within an existing, high density slum-like habitation, underground systems were required to be laid out with minimal disturbance to the local residents. Once the fruits of the labour became visible in terms of management of sewage in the most sustainable manner, the ease and comfort that the installed systems provided to the local residents were extremely satisfying professionally. We also learned many things which will make designing and commissioning future decentralised sewage treatment system in high density habitations much easier and smoother compared to the one that we did at Aya Nagar," says Manoj Jha, chief executive, Arkin Creations Pvt Ltd

Way forward

The Aya Nagar project has been instrumental in representing the will of the local community. The project is an example of a good, successful model for effective sanitation improvement by a decentralised sewage treatment system in a high density habitation. It was done with little political help and technical support. The project has caused remarkable improvement in the drainage and sanitation scenario of the Z block.

However, to make it a more robust and sustainable system, the following recommendations can be considered.

- To work rigorously upon the information, education and communication of the community by using pamphlets and make them aware about the system
- For proper operations and maintenance of the system, self help groups can be created in the community
- New avenues for the reuse of treated water can be explored, which can ensure financial aid to the community

Through a community-embedded approach, the aim was to devise techniques for making the urban system responsive to the imperatives of social justice and ecological viability.

The Aya Nagar pilot project is a prototypical model for evolving a sanitation management programme in a high density settlement. The methods and techniques evolved will serve as a guide for informal settlements in Delhi and across the country.

THE ASIAN AGE
Delhi | Mumbai | Kolkata | London

Women in Uttarakhand village fight penury to become entrepreneurs

Life

Mona Parthsarathi

15 June 2017 4:37 AM

They all attended a training programme in January and build the first toilets this month in Veerpur.

Tata Steel targets to have 20 per cent women in its workforce by 2020. (Representational Image)

Rishikesh: Daily wager Rajeshwari Devi and Beena Devi, a worker in agricultural fields, struggled to make ends meet but thanks to a sanitation initiative, they have now become not only small-time entrepreneurs but are also ensuring that the villagers embrace hygiene.

They are a part of a group of 25 women from Lal Dhang in Mithi Beri gram panchayat and surrounding villages in Haridwar district of Uttarakhand and belong to extremely poor families.

They have joined the Women for WASH (Water, Sanitation and Hygiene for All) initiative which is to enable women from villages and slums to become entrepreneurs.

Together, they are assembling to build toilets, sell toilets and wage their own local revolution against pollution, hardship and disease by helping to ensure their neighbours embrace, and have access to toilets and clean water.

"We have faced problems of not having a toilet at home. So when they approached us for the project, we immediately said yes. We belong to a conservative society, so people opposed our decision to step out of the house for this," says Beena.

She says she is happy that the women have learnt something which will enable them to have a better future for the children.

Rajeshwari also says that the hurdles did not demoralise them and now they are looking forward to build toilets in nearby villages after receiving training at the World Toilet College at Parmarth Niketan here.

They all attended a training programme in January and build the first toilets this month in Veerpur.

"Now we can build twin pit pour flush toilets on our own. We have just built toilets in Veerpur village in Rishikesh which has been commissioned as Ganga gram now," says Rajeshwari.

Two villages on the bank of river Ganga — Veerpur Khurd in Dehradun and Mala in Pauri Garhwal — were adopted by the Union drinking water and sanitation ministry for making them model Ganga villages, in collaboration with Global Interfaith WASH Alliance (GIWA) this month.

The next step for the women is to learn about bio digester toilets. They will also have their own brochures soon for getting employment in other villages or states.

"They can work only during the non-agriculture season and some villages are in remote areas where it is difficult to reach during monsoon. These are some hurdles but the women are determined to overcome these and earn self employment," says Samuel Herbert, the field officer associated with

DownToEarth

Health

Swachh Bharat Mission may have saved 60,000-70,000 infant deaths every year between 2011-2020

Infant mortality rate dipped more rapidly in post-SBM period, shows study

Districts with over 30 per cent toilets constructed under SBM corresponded with 5.3 fewer infant deaths and 6.8 fewer child deaths per 1,000 births. Photo: iStock

Shagun

Published on: 05 Sep 2024, 6:38 pm

The construction of toilets at a national scale under India's Swachh Bharat Mission (SBM) may have averted 60,000-70,000 infant deaths annually between 2011-2020, a new research has found.

SBM was launched by Prime Minister Narendra Modi on October 2, 2014 with an aim to ensure that India becomes Open Defecation Free (ODF).

From 2014 to 2020, the government constructed 109 million household toilets and declared that more than 600,000 villages were free from open defecation.

To investigate the association between SBM and infant mortality rate (IMR) and under five mortality rate (U5MR) in India, public health researchers from International Food Policy Research Institute (IFPRI), University of California and The Ohio State University analysed data from 35 Indian states and 640 districts over 10 years (2011–2020).

The findings

The research, published in the journal *Scientific Reports*, found that districts with over 30 per cent toilets constructed under SBM corresponded with 5.3 fewer infant deaths and 6.8 fewer child deaths per 1,000 births.

In absolute numbers, this coefficient would scale to an estimated 60,000–70,000 infant lives annually.

Further, every 10-percentage-point increase in district-level toilet access following SBM, corresponded with a reduction in district-level IMR by 0.9 points and U5MR by 1.1 points, on average.

Sanitation has been considered as one of the most important public health interventions of the past century, with dramatic declines in IMR following improved sanitation in the United States and other western countries in the early 1900s.

The current study observed that IMR reductions occurred more rapidly during the post-SBM period.

In the pre-SBM period (between 2000 and 2015), the IMR exhibited an annual decline of three per cent. This showed that the rate of IMR reduction in the post-SBM period was eight to nine per cent per year higher than the pre-SBM rate of reduction.

"The post-SBM period in India exhibited accelerated reductions in infant and child mortality compared to the pre-SBM years," the study said.

After SBM started, there was a twofold increase in toilet availability and a decline in open defecation to 19 per cent from 60 per cent in the first five years of the campaign. Meanwhile, for the period spanning 2015–2020, SBM averaged an annual budget of around 1.25 billion USD.

Prior research in the field has documented a phenomenon known as 'Asian Enigma', wherein disproportionately higher growth faltering in early childhood resulted in child stunting (low height for age) rates in India, despite rapid economic progress, relative to other Low and Middle Income Countries (LMICs).

This, researchers had argued, presumably arises from the widespread practice of open defecation.

Currently, the government is implementing phase two of the mission, under which villages which have sustained its ODF status along with implementing either solid or liquid waste management systems, will be declared ODF plus.

DownToEarth

Water

Fair price: UP now uses a calculator to scientifically fix fee for transporting faecal sludge to treatment plants

The calculator's flexibility allows for its use across India and even in countries that use trucks to handle faecal waste

A truck dumps human excreta in an empty field near the Delhi-Ghaziabad border (Photograph: Vikas Choudhary)

Subrata Chakraborty

Published on: 17 Apr 2024, 9:41 am

Ever since Uttar Pradesh released its latest guidelines on faecal sludge management on November 7, 2023, more than 20 cities have passed their own bylaws for managing faecal waste. Among the issues tackled by these bylaws, a critical aspect has been the establishment of fees for transporting faecal waste or human excreta in trucks.

This development is significant, especially against the backdrop of the Swachh Bharat Mission. As reported by the Union Ministry of Jal Shakti in March 2023, the initiative led to the construction of over 110 million individual toilets and an additional 0.2 million community toilets in the country, resulting in over 95 per cent of households now having access to toilets.

To effectively manage excreta waste, two primary approaches exist. While one strategy involves connecting toilets to sewage treatment plants through pipelines, the more practical solution, given the rapid urban expansion, entails the implementation of decentralised septic tanks for waste collection, followed by transportation to nearby faecal sludge treatment plants (FSTPs). As per the Uttar Pradesh Faecal Sludge and Septage Management Policy 2019, at least 86 per cent of the state's urban population relies on on-site sanitation systems.

The challenge, though, is that the market for transporting faecal sludge is largely unregulated. Currently, the fee for this service is determined arbitrarily by truck operators, often leaving low-income households unable to afford it. While some urban local bodies have attempted to fix the fee, they too have done it arbitrarily, failing to address the underlying issues. The absence of a fair and consistent pricing structure has severe consequences, leading to improper waste disposal practices that include dumping in open fields or even local waterbodies, posing significant risks to public health through water contamination. A study conducted by the Delhi-based non-profit Centre for Science and Environment (CSE) on selected cities in Uttar Pradesh in 2023, reveals a startling disparity in fees, ranging from Rs 500 to Rs 3,500 per trip.

The November 2023 Uttar Pradesh guidelines have addressed this challenge of establishing scientifically sound transportation fees by embracing a new tool: a faecal sludge desludging fee calculator developed by CSE. The calculator takes into account the key cost components of providing desludging service (see 'Gaining popularity'). It has three columns titled cost component, default value (derived during the CSE study in Uttar Pradesh) and user input, to calculate the fee in different cities. The calculator factors in the equal monthly instalments operators will have to bear if they purchase vehicles on loan, and also has a cell to input government subsidies.

Gaining popularity

More than 20 cities in Uttar Pradesh have standardised their faecal sludge transportation fees considering the calculator developed by the Centre for Science and Environment and guidelines issued by the state government. The calculator can be used in all urban areas

Do not change User input cell

COST COMPONENT	DEFAULT VALUE	USER INPUT
Number of trips (per annum)	1,000	0
Average distance per desludging (km)	18	0
Average distance covered Per Year (km)	18,000	0
Fuel cost per year*	₹ 4,05,000	₹ 0
Driver's salary per year	₹ 1,82,500	₹ 0
Helper salary per year	₹ 146,000	₹ 0
Maintanence per year	₹ 35,000	₹ 0
Registration/license per year	₹ 5,000	₹ 0
Insurance of vehicle per year	₹ 10,000	₹ 0
Cost of PPE (safety kits) per year	₹ 5,000	₹ 0
Other expenses per year	₹ 15,000	₹ 0
Interest charges on vehicle per annum#	₹ 26,300	₹ 0
Office cost (yearly)	₹ 1,20,000	₹ 0
Admin and general expenses (yearly)**	₹ 47,490.00	₹ 0
Profit per annum	₹ 0	₹ 0
Total desludging cost per annum		₹ 9,97,290
Desludging cost per trip		₹ 997
Desludging fee per trip		₹ 1,200
Profit per trip		₹ 203
Government subsidy		₹ 0

*Fuel cost/litre ₹ 0 #Consider interest charges No **Admin cost % 0.0

The guidelines, based on the calculator, show that for every trip of up to 10 km, operators can charge between Rs 700 (if the truck makes four or more trips a day) to Rs 2,200 (if it makes only one trip a day). For distances between 10-15 km, the fee varies between Rs 800 and Rs 2,300. In the next slab, for distances of 15 to 20 km, the recommended fee is Rs 900 to Rs 2,400. Finally, if the distance is more than 20 km, the fee should be between Rs 1,100 and Rs 2,600. The new fees have a profit margin of more than 50 per cent per trip.

Clear impact

In Sitapur, which has an FSTP almost 15 km outside the city, the fee has been revised from Rs 2,500 to Rs 1,000. Similar fee corrections have also taken place in Pilibhit and Moradabad, which earlier had a fee of up to Rs 3,000. In Pilibhit, the fee has now been revised to Rs 2,000, and in Moradabad, it stands at Rs 1,500. Meanwhile, cities like Raebareli have fixed a fee for the first time. Modinagar town has set differential desludging fees, Rs 750 for the poor households and Rs 1,500 for the non-poor households.

Though developed based on data from Uttar Pradesh, the calculator's flexibility allows for its use across India and even in countries that use trucks to handle faecal waste. Fixing a fair transportation price is crucial for balancing viability for operators and affordability for users.

This was first published in the 16-30 April, 2024 print edition of Down To Earth

THE TIMES OF INDIA

The catalyzing role of dedicated investments in sanitation to empower vulnerable communities

July 19, 2023, 5:10 PM IST / Parnasha Banerjee in Voices, India, TOI

Sanitation has been a crucial priority of urban development in India, with dedicated political will towards advancing the sector. Urban India was officially declared open defecation-free in October 2019, largely due to the thrust provided by the Swachh Bharat Mission (SBM) 1.0. SBM 1.0 was impactful due to the efforts towards building infrastructure with dedicated at scale construction of toilets. A large reason why India has been able to maintain an ODF status and move towards its journey of becoming ODF++ with an increasing focus on safe treatment of waste, has been due to the efforts of about 5 million sanitation workers engaged in diverse kinds of work across the sanitation value chain along with behaviour change amongst communities.

Despite their indispensable role in ensuring safe sanitation outcomes, sanitation workers continue to face social ostracism, economic hardships, and risks to their health and wellbeing due to the hazardous nature of their work, which sometimes may include forced manual scavenging. Additionally, other vulnerable communities such as urban-poor communities, women and transgender groups find it harder to access and use safe infrastructure. It is hence crucial to take decisive steps to support the safety and wellbeing of sanitation workers who hold the entire sanitation value chain together. and to ensure vulnerable communities are receiving quality sanitation services.

Government investments alone will drive limited socio-economic development for espeically vulnerable groups, including sanitation workers, women, trans persons, persons with disabilities and the aged. Thus, it becomes necessary to **complement government's efforts** with private sector and philanthropic investments to ensure innovative solutions in the sector are scaled, reaching under-served communities. Philanthropists and private sector players are placed at the extraordinary position of ensuring transformative solutions remain scalable and sustainable, improving quality of lives for both service providers and users from vulnerable communities.

Ensuring sanitation worker safety by scaling innovative technologies in urban sanitation

The sanitation sector faces various roadblocks on its journey to ensure dignified livelihoods for its service providers. These roadblocks include excessive load on manual labor, hazardous working conditions and the prevalence of forced manual scavenging due to inefficient infrastructure or availability of technology. The advancement of mechanization and innovative technological solutions in the sanitation sector can play a critical role in safeguarding the health and dignity of sanitation workers by offering **mechanized solutions** to reduce risk and occupational hazard including offering alternatives to forced manual scavenging.

Over 40 cities including Bhubaneswar and Warangal have been identified by the Ministry of House and Urban Affairs (MoHUA), as having reached advanced levels of mechanization in sanitation service delivery, towards converting man-holes into "machine-holes". These cities have invested in technology which would enable the desludging of septic tanks and cleaning of sewers without the sanitation worker having to enter the man-hole. With philanthropic and private sector investments aiding government efforts, scaling of technology for mechanized service delivery can be faster and sustained across the country. Additionally, philanthropists can play a key role in lending their voice and influence towards the need to look at the safety, security and wellbeing of millions of sanitation workers in the sector.

Scaling Inclusive Sanitation Services Across India through Public-Private Partnerships (PPP)

According to a report released by Water Aid, investment in safely managed sanitation can have a notable economic impact and unlock net benefits of $86 billion for countries. Additionally, a WHO finding highlights the significance of sanitation in socio-economic improvement: a dollar spent on sanitation saves $9 in treatment, health-care costs and gains from more productive days. Private players and philanthropists can play a crucial role in creating this ripple effect on both allied sectors and the country's economy, by supporting inclusive sanitation initiatives through Public-Private Partnerships with government bodies.

A Public-Private Partnership (PPP) involves the collaboration of government bodies and private sector experts towards ensuring the delivery of public services. PPPs help to ensure faster implementation, scale-up and financial sustainability of services. There have been numerous such PPPs implemented in sanitation across the country. Warangal in Telangana was the first city to use the PPP model to construct public toilets. PPP has helped in meeting short term investment needs, and with the involvement of private desludging operators, government bodies have found it easier to monitor and ensure technical progress and quality assurance at every level. Telangana took path-breaking steps to strengthen this model leveraging third party monitoring and defining success indicators for private parties during contracting. The PPP model also helped the state prioritise private parties who had technology with low land cost and low operations and maintenance cost, making it more environment-friendly. The 71 ULBs with 11 towns each went on to become ODF++ by 2019, an achievement enabled through effective implementation of PPP models.

Investments from philanthropists and private sector funders could play a pivotal role in scaling such successful PPP models across India to ensure service delivery to vulnerable communities, as well as ensure sustainability of sanitation services to ensure the health and safety of all involved.

Enabling empowerment and inclusion through dignified livelihoods for vulnerable groups

Women and other vulnerable groups face the risk of being unable to access to safe sanitation services. About 30% of women from vulnerable communities in urban India are assaulted every year while fulfilling their sanitation needs. Additionally, nearly 23 million of young girls drop out of school every year due to a lack of accessible sanitation facilities and inadequate menstruation support facilities. In order to tackle these issues of safety and access, it is crucial to ensure that women, trans persons and other vulnerable are always at the centre of planning, execution and maintenance of sanitation services.

In Odisha, for instance, the state has been promoting sustainable livelihood initiatives by engaging with Self-Help Groups. Around 3200 SHGs of women and trans persons are engaged in various interventions in the sanitation ecosystem. As a major step towards inclusion, the SeTP in Cuttack city (Cuttack Municipal Corporation) was handed over to an SHG for trans communities (Bahucharamata SHG) for Operations and Maintenance (O&M) in June 2020. While women and trans persons are often viewed majorly as users of sanitation facilities, they play an important role in ensuring that these facilities are safe, inclusive and accessible when empowered as sanitation professionals.

Collaborating to Accelerating Impact

Considering that financing is the first of the five accelerators identified by the United Nations (UN) for the timely realization of the Sustainable Development Goals (SDGs), it is crucial to ensure that the financial requirements of the sector are being addressed. Given inclusive sanitation outcomes has a cascading impact on a number of other SDGs including those which involve Gender Equality, Health and Wellbeing, Decent Work and Economic Growth, Sustainable Cities and Communities, investments in sanitation will accelerate India's impact in achieving the 2030 agenda of the sustainable development goals.

The emergence of collaborative platforms in the sector over the past decade have enabled catalytic change across the country and beyond. Collaboratives such as the National Faecal Sludge and Septage Management (NFSSM) Alliance, anchored by the Bill and Melinda Gates Foundation, have succeeded in impacting the inclusive sanitation ecosystem. The Alliance collaborated with the Ministry of Urban Development on the first National Faecal Sludge and Septage Management policy in the country, leading to 19+ states drafting specific guidelines for the safe management of waste. Bringing together 40+ leading sector practitioners and technical partners, the NFSSM Alliance is unlocking pathways to accelerate impact in sanitation systems across the country.

Philanthropists and private sector funders are at a crucial turning point, to build on the current momentum around sanitation in India and use their influence and resources to move the needle towards empowering vulnerable communities and ensuring 100% safe, inclusive and equitable sanitation for all by 2030.

DownToEarth

Governance

Sanitation workers deserve an inclusive ecosystem — here are 5 best practices for their safety and dignity

Urban India has an estimated 2 million sanitation workers

A majority of the sanitation workforce comes from the most marginalised socio-political communities and are engaged in the workforce informally. Photo: iStock

Meghna Malhotra

Published on: 30 Mar 2023, 6:02 am

A functional toilet is a necessity for a good quality of life. Sanitation workers, who improve the quality of our lives, need to be recognised and given financial stability and dignity for their invisible labour.

The Swachh Bharat Mission generated immense momentum towards strengthening sanitation infrastructure in India, particularly for the construction of individual, shared and community toilets. Bridging the gap between sanitation infrastructure and sanitation services are Safai Mitras.

These workers not only maintain toilets but also facilitate the proper functioning of the entire sanitation value chain.

Urban India has an estimated 2 million sanitation workers engaged in nine different categories of work across the sanitation value chain, including cleaning toilets, cleaning and emptying sewers, septic tanks, drains and operating sewage treatment plants.

It is imperative to focus on improving their working conditions, preserving their dignity and providing them with avenues for financial improvement. Here are five best practices that can help in building an inclusive ecosystem for sanitation workers:

1. Enumerating the sanitation workforce

The first step towards ensuring safety and dignity of sanitation workers is to make the sanitation workforce be seen through an exhaustive enumeration process.

Both formal and informal workers need to be covered, ensuring no one falls through the cracks. Odisha and Tamil Nadu are some of the states leading the enumeration effort.

Non-profit Urban Management Centre is collaborating with the central and state governments to conduct extensive surveys to identify and map every sanitation worker using a digital enumeration tool against all the safety and social welfare schemes.

The non-profit has worked to map sanitation workers for the Sanitation Workers Development Scheme in Tamil Nadu, GARIMA scheme in Odisha and NAMASTE scheme across the country.

A majority of the sanitation workforce comes from the most marginalised socio-political communities and are engaged in the workforce informally. This makes it difficult for them to access financial and social security measures, along with the heightened threat of discrimination.

Enumerating and enrolling help them access the welfare measures they are entitled to, like life and health insurance, pensions, etc. Additionally, this will ensure their families' security through educational and marriage-related assistance for children, aged dependants, etc.

2. Integrating mechanised solutions and protective equipment

Manual intervention and contact with faecal sludge must be minimised for the health and safety of Safai Mitras. Thus, mechanised solutions for cleaning sewers and septic tanks become essential. They are pivotal to reducing fatal incidents and improving working conditions.

Providing sanitation workers with good quality and durable Personal Protective Equipment (PPE) comes down to no more than the cost of providing workers with a Rs 10 cup of tea every day over time. Employers and contractors must be sensitised to ensure they are providing PPE and safety devices as per the required procedure and frequency.

The Odisha government has provided uniforms to all sanitation workers and designated areas to rest and practice hygiene under the GARIMA scheme. It has resulted in a shift in how citizens approach sanitation workers; from an informal Safai Karamchari, they've transitioned into GARIMA professionals in service delivery.

3. Upskilling Safai Mitras to use machinery, safety devices and PPE

There should be an emphasis on building the capacities of sanitation workers, so that they can effectively use the machines. Illustration-based training handbooks in local languages, live demonstrations, workshops, etc help workers better understand how to use machines and follow safety protocols.

Further, sanitation workers must be sensitised towards the use of standardised, job-specific PPE such as wader suits, helmets, goggles, gloves etc. Urban Local Bodies (ULBs) can engage existing state training institutes to conduct sessions to improve technical skills and ensure the occupational health and safety of sanitation workers.

Odisha Water Academy, for instance, is engaged in developing and delivering trainings and certification for sanitation workers (among other stakeholders) in the sanitation sector.

Post-training, proper assessment should be conducted to provide certification and recognition to Safai Mitras. Recognition as certified sanitation professionals through government interventions shall provide sanitation workers with a dignified identity in the communities they serve, ensure their safety at work and reduce discriminatory situations.

4. Self-Help Groups and community platforms as vehicles for sanitation service delivery

Leveraging Self-Help Groups (SHGs) and similar community-based platforms can be instrumental in bringing together people from marginalised groups. Women, or members of the transgender community can be provided with opportunities for a dignified livelihood in the field of sanitation.

By including vulnerable groups in sanitation service delivery, the SHG model provides these groups with the safety of a community. This can then take collective strides towards empowerment by accessing opportunities to improve their skills and socio-economic well-being.

Federating women and transgender sanitation workers into SHGs will make it easier to link them with existing national and state government social and financial entitlements. Additionally, it is also easier for ULBs to contract SHGs and Area Level Federations as sanitation service providers.

Odisha government's women-centric Mission Shakti Group, Swagat, has been a trailblazer. It has paved the way for women to get engaged in desludging operations for cleaning of septic tanks across the state.

Being recognised in their role as desludgers by the Cuttack Municipal Corporation has provided them with financial stability, dignified livelihood and recognition.

5. Setting up Emergency Response Sanitation Units

While mechanised solutions for cleaning sewers and septic tanks are being deployed, in a few cases human intervention becomes critical for preventing the overflow of sewage into public spaces and safeguarding citizens from exposure to serious health hazards.

In these cases, an Emergency Response Sanitation Unit (ERSU), which is equipped with all required safety devices and protocols and responsible for meeting sanitation emergency requests, becomes important.

It can ensure that only trained sewer-entry professionals (SEP) enter confined spaces with all required safety gear and protocols. This will minimise hazards due to manual entry into sewers and septic tanks without proper adherence to security protocols.

Odisha, under the GARIMA scheme, has pioneered the way in setting up ERSUs and making them effective by establishing systems for hazard assessment, providing medical check-ups and seeking consent from SEPs.

Meghna Malhotra is the deputy director for Urban Management Centre. Urban Management Centre is a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative body driving the discourse of Faecal Sludge and Septage Management (FSSM) in India.

Views expressed are the author's own and don't necessarily reflect those of Down To Earth

Firstpost.

How unique business models in effective implementation of fecal sludge and septage management help

Meera Mehta And Arwa Bharmal • July 24, 2023, 17:47:29 IST

While access to sanitation facilities is the first essential milestone towards an equitable sanitation ecosystem, the regular emptying and conveyance of human waste is a crucial, yet often undervalued aspect of ensuring a safe and strong sanitation ecosystem

India has witnessed unparalleled growth in the sanitation sector in the past few years. The thrust provided by policies like Swachh Bharat Mission (SBM), AMRUT, and the support of persistent collaborative action led by civil society organizations has progressed India into becoming Open Defecation Free in 2019. This achievement was enabled by targeted commitment towards ensuring access for all and engaging the most vulnerable communities.

While access to toilets and strengthening sanitation infrastructure is one part of ensuring safe sanitation systems, the effective treatment and disposal of fecal sludge is the crucial next step. Almost 60% of toilets in India rely on Onsite Sanitation Systems (OSS), with most of the fecal sludge being discharged into water bodies and open fields. Rising urbanization puts further pressure on sanitation infrastructure and safe disposal of waste poses itself as

a challenge directly affecting the well-being of communities. Accelerating its commitment towards the safe management of fecal waste, India launched the National Fecal Sludge and Septage Management (FSSM) Policy in 2017. FSSM has since emerged as a low-cost, decentralized, scalable solution to safely and effectively treat and dispose of fecal waste. Over 20 States and Union Territories have already successfully adopted FSSM policies to work towards safe and inclusive sanitation services.

States have identified the key challenges of infrastructure, capacity building, and technology, and leveraged them as opportunities to integrate newer technologies, introduce innovative service and business models, adopt state and local level approaches, private sector intervention models, and community engagement tools to further strengthen FSSM. Many of these services and business models have the potential for replication and scalability across states. The state of Maharashtra has emerged as a frontrunner state in the country to implement sustainable financing models for scaling access to sanitation services.

Providing Sanitation Credit to ensure Access to Individual Household Toilets (IHHTs):

The first part of the sanitation value chain – containment of human waste through increasing coverage of sanitation infrastructure focuses on equitable and inclusive access to IHHTs, Community Toilets and Public Toilets. To achieve city-wide inclusive sanitation and move closer towards achieving SDG 6, it is imperative to increase access to safe sanitation infrastructure for urban poor communities. IHHTs can mitigate critical challenges like lack of privacy and safety, exposure to unhygienic conditions during menstrual cycles, and non-inclusive infrastructure for the differently-abled people. Government officials, public agencies, private bodies and civil society organizations collectively play a crucial role in building and sustaining inclusive infrastructure like IHHTs for the most marginalized communities. Despite urban slums facing space constraints, lacking monetary resources and adequate sewerage access, the state of Maharashtra has implemented the unique **Sanitation Credit Model** as a solution for financing toilets in urban poor communities.

Piloted in Jalna by the Center for Water and Sanitation (CWAS) in collaboration with Mahila Arthik Vikas Mahamandal (MAVIM) , the model successfully leveraged Community Management Resource Centres (CMRC) to mobilize sanitation loans for 260 women by linking Self-Help Groups (SHGs) to scheduled commercial banks. The model also created opportunities for the empowerment of women who had taken complete ownership of their decision to own a toilet, lead its construction and repay the loans. It also enabled

collaborative action with public agencies, SHGs, local resources like Community Resource Persons (CRPs) and Sahayoginis, and private players who worked collectively to provide technical support for loan facilitation, toilet construction and monitor timely repayment of loans. The project showed that given affordable sanitation credit, households, and particularly women, could access safe and hygienic sanitation. The sanitation credit model piloted in Jalna, and now being implemented across the state of Maharashtra has the potential to be scaled as a sustainable financing model for urban poor communities.

Ensuring scheduled desludging through PPP with a performance linked annuity model

While access to sanitation facilities is the first essential milestone towards an equitable sanitation ecosystem, the regular emptying and conveyance of human waste is a crucial, yet often undervalued aspect of ensuring a safe and strong sanitation ecosystem. It is therefore referred to as "the missing middle". Routinely desludging septic tanks is of vital importance towards ensuring the health and well-being of communities and sanitation workers. Currently, the common practice is "demand-based desludging", which tends to be irregular, may lead to manual scavenging or unsafe desludging practices, and has a negative impact on public health and the environment.

To tackle this challenge, the towns of Wai and Sinnar in Maharashtra implemented scheduled desludging on a three-year cycle as a municipal service, linked to output-based annuity payment for private desludging service providers. The service is inclusive since it covers all properties including slums and urban poor communities and is linked to sanitation tax which is collected as part of property tax payments - ensuring that poor households pay less. As a result of this initiative, Wai completed its first three-year cycle of desludging by serving 6,800+ properties and 3600+ septic tanks with a 95 per cent acceptance rate and Sinnar served 6,500+ properties and 4,300+ septic tanks with acceptance rate of 93 per cent. All the septage has been treated and reused at the FSTP. .

This plan has immense potential to be scaled and replicated across Indian cities, with thrust provided by the recognition of scheduled desludging of septic tanks as a mandatory requirement for ODF++ protocol certification under SBM 2.0 and as part of Swachh Survekshan.

Given India's diverse topography and vast population, states and cities have been adopting unique approaches that cater to the needs of their communities to ensure sanitation service delivery. These pioneering models developed and successfully implemented in Maharashtra have immense scope for replication and scalability across geographies to enable city-wide inclusive sanitation. The implementation of these models is also a key example of how collaborative action amongst stakeholders has the potential to accelerate India's progress and positively impact communities. With every emerging challenge, the scope to think, innovate and create widens; it is now an opportune moment for stakeholders to identify these scalable solutions, adapt and action upon them in their cities and states.

Meera Mehta is Executive Director, Centre for Water and Sanitation and Arwa Bharmal is Program Lead, Centre for Water and Sanitation. Centre for Water and Sanitation is a member of the National Faecal Sludge and Septage Management (NFSSM) Alliance, a collaborative body driving the discourse of Faecal Sludge and Septage Management (FSSM) in India. Views expressed in the above piece are personal and solely that of the author. They do not necessarily reflect Firstpost's views.

ARTICLE

Practice Oriented Policy: Localising national level FSSM policy in Uttarakhand

By Elets News Network 05-August-2022

Share:

Safe sanitation practices and access to improved sanitation facilities are vital for public health and the environment. This is globally recognised in the form of the UN Sustainable Development Goals (SDG), particularly SDG 6.2, which aims to achieve universal access to adequate and equitable sanitation and hygiene by 2030, writes Program Officers for NIUA's Sanitation Capacity Building Platform – **Laila K Khongthaw, Doab Singh, Aparna Unni, and Gauri Srivastava**.

The importance of safe urban sanitation was first highlighted with the launch of National Urban Sanitation Policy (NUSP) in 2008, which emphasised on city sanitation plans and sanitation strategies for states. Later, when Swachh Bharat Mission (SBM) was launched in 2014, its focus on social behaviour change ensured open defaecation-free status with 100% access to Individual Household Latrines (IHHL).

This progress under SBM saw a greater dependence on On-site Sanitation Systems (OSS). Subsequently, the Ministry of Urban Development (MoUD), now Ministry of Housing and Urban Affairs (MoHUA), recognised that the end objectives and corresponding benefits of sustainable sanitation cannot be achieved without proper management of faecal sludge and septage (FSS) across the sanitation chain. Thus, MoUD launched the National Faecal Sludge and Septage Management (NFSSM) policy in 2017. The policy addresses synergies between FSSM and sewerage systems, and its primary goal is to establish the context, priorities, and direction for nationwide implementation of FSSM services in all Urban Local Bodies (ULBs). It applies to all Central government schemes, programs, and projects that facilitate sanitation services in India's urban and peri-urban areas.

In urban Uttarakhand, the focus of this article, over 94% of the households have IHHL access and less than 5% rely on community or public toilets (Census 2011). According to the officials, 22 of the state's 103 ULBs have sewerage network access, but only 6 have sewerage network coverage of more than 50%. The state's hilly topography poses technical and economic challenges in retrofitting an entire city for laying a sewerage network; achieving 100% access to a sewerage network is impractical and cost-intensive.

Since almost 80% of urban Uttarakhand is dependent on OSS systems, it is imperative to implement FSSM in cities across the state to ensure safe sanitation.

A study by National Institute of Urban Affairs' (NIUA) Sanitation Capacity Building Platform (SCBP) in 2020 highlights the state of sanitation in different cities of Uttarakhand. The salient observations were:

- Majority of septic tanks do not conform to the IS code 2470 standards for installation of septic tank systems
- OSS emptying period ranges from 5 to 10 years, which is not as per the SBM guidelines of ODF++ Protocol 2020
- The state lacked registered private desludging operators in most cities
- Mechanical desludging in hill towns is impeded by lack of access to OSS from motorable roads
- Majority of cities lack treatment facilities and safe septage disposal provisions

Apart from such issues associated with septage management, the state also has to contend with lack of greywater management. Municipal sewage is the cause of 80% pollution in river Ganga, according to a report published by State Program Management Group 1, Namami Gange, Uttarakhand, leading to widespread water-borne diseases.

Pollution from sewage carried by municipal drains and overflow of OSS systems also affects other smaller rivers in the state such as Bhela, Dhela, Kosi, and Pilakhar. This is highlighted in the River Action Plans, prepared by River Rejuvenation Committee, Uttarakhand, for restoring the nine critically polluted river stretches identified by Central Pollution Control Board (CPCB).

Uttarakhand State's Efforts to Regulate FSSM

The national FSSM policy provides stakeholders, whether city or state, the direction they need for addressing gaps in the sanitation chain and provision of FSSM services. Recognising the importance of this, Uttarakhand state has taken several decisions and actions in accordance with the national policy.

The state issued the State Septage Management Protocol in 2017, shortly after the NFSSM policy was launched, as a guiding tool for all ULBs for effective and safe septage management. In 2019, the Urban Development Directorate (UDD) of Uttarakhand signed an MoU with NIUA to support state-wide FSSM implementation through capacity development, technical, policy advisory, and hand-holding support.

The state's Septage Management Protocol addresses some of the key features of the NFSSM policy locally at the state and ULB levels. These are reflected in the initiatives taken by the state, as shown in the table below.

Additionally, some cities have begun developing an OSS database through household surveys, and rolled out IEC on FSSM. Capacity development is one of the key components of NIUA-SCBP support to the state. The Uttarakhand Academy of Administration (UAoA) facilitates orientation and advanced training on FSSM for state officials and other practitioners in line with national priorities through its partnership with NIUA-SCBP. To date, state officials from over 80 ULBs, including 15 Ganga towns, have been trained either online or offline.

Way Forward

Most ULBs in the state are small with less population3, and lack infrastructure for used water treatment. Therefore, to maximise utilisation of existing infrastructure, the Uttarakhand government is considering the clustering approach for streamlining FSSM across all the ULBs. Here, cities with existing or upcoming treatment infrastructure would serve as 'hosts' and smaller ULBs within 25 km would be the clusters.

For this, the state will seek to mobilise funds from SBM 2.0, which has allotted it Rs 203 crore for addressing the used water challenges. In this regard, UDD and Uttarakhand Urban Sector Development Agency (UUSDA), in consultation with NIUA, are preparing a sanitation plan for all 103 ULBs, to recommend appropriate septage management approaches. To strengthen the process, NIUA, in consultation with UDD, is also developing a strategy and investment plan which will help plan and secure funds from SBM 2.0 and AMRUT 2.0, while also identifying potential treatment clusters for all ULBs. There is also a commitment to ensure co- treatment in all existing and upcoming STPs within the state. The National Mission for Clean Ganga (NMCG) recently approved the implementation of co-treatment in existing STPs of Haridwar, Srinagar, Rishikesh and Devprayag. The state also intends to strengthen the capacity building on urban issues by establishing the State Urban Development Institute (SUDI) at UAoA, Nainital. This is envisioned as a state-funded training and research institute that will focus on urban issues including FSSM through training, research and documentation. The state government will fund SUDI for the coming four years.

Uttarakhand state is taking steps towards achieving sustainable sanitation by addressing different aspects – policy regulation, capacity development, technical details – in an integrated manner. There is, however, a long way to go, given the unique challenges it faces as a mountain state, and catchment of the nation's major rivers, while also being especially vulnerable to climate- induced disasters. The state's experience can, therefore, offer insightful learnings for pursuing the Sustainable Development Goals.

References:
- https://scbp.niua.org/sites/default/files/Uttrakhand%20Report_Now%20MatterLOW%20Size_1.pdf
- https://scbp.niua.org/?q=content/septage-management-protocoluttarakhand
- https://scbp.niua.org/?q=content/advisory-operationalising-protocolseptage-management-uttarakhand
- https://scbp.niua.org/sites/default/files/Guideline%20for%20implementing%20Deep%20Row%20Entrenchment%20in%20Uttarakhand-%20English.pdf
- https://scbp.niua.org/sites/default/files/Co-treatment%20AdvisoryNote_UK.pdf
- https://nmcg.nic.in/writereaddata/fileupload/40_MoM%2042nd%20EC.pdf

THE NEW INDIAN EXPRESS

Telangana

ASCI to collaborate with Telangana government

With this Telangana has become one of the first States in India to implement Faecal Sludge and Septage Management (FSSM) policy.

Administrative Staff College of India
Leadership through Learning

HYDERABAD: The Administrative Staff College of India (ASCI) is collaborating with the Telangana government to support implementation of scheduled de-sludging in 142 Urban Local Bodies (ULBs) across the State. With this Telangana has become one of the first States in India to implement Faecal Sludge and Septage Management (FSSM) policy.

The ASCI has joined hands with the Telangana government as knowledge partner to provide support for training and hand-holding of ULBs to ensure proper planning, implementation, and monitoring of the scheduled de-sludging.

"In a scenario where the larger part of the country is dependent upon on-site sanitation systems, FSSM is essential to ensure city-wide inclusive sanitation. The safe management and treatment of faecal sludge goes a long way in securing public health and environment. Proper and timely de-sludging, along with safe disposal and treatment are of prime importance. Timely de-sludging of septic tanks will improve its treatment efficiency," Director of the Centre for Urban Governance, Environment, Energy and Infrastructure Development at ASCI, Prof V Srinivas Chary said."While FSTPs are necessary for ensuring the safe disposal and treatment of faecal sludge, the maximum utilisation of their capabilities can only be actioned through regular desludging," he added.

Forbes

Why private philanthropic funding needs to urgently shift focus to sanitation

Since 2006, the private sector has invested about $620 million, mostly towards Swachh Bharat schemes and behavioural change communication. However, driving investments towards other aspects of the sanitation value chain, that ensure safety and equitable inclusion of marginalised groups, is crucial

BY NEERA NUNDY

5 min read

UPDATED: Apr 20, 2022 05:45:39 PM UTC

FOLLOW ON: Full Bio

A WHO finding highlights the significance of sanitation in socio-economic improvement: A dollar spent on sanitation saves $9 spent on health, education, and economic development. Image: Shutterstock

Urban sanitation in India is a complex amalgamation of social issues that needs collaborative action, community participation and focused problem-solving. India's sanitation journey has progressed with cities becoming open defecation free (ODF) and adopting sustainable sanitation practices. Through schemes such as Swachh Bharat Mission (SBM) and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), the government has undertaken various initiatives to ensure safe access to sanitation services, provide a safer livelihood to sanitation workers, improve the socio-economic status of urban poor, adopt decentralised methods like faecal sludge and septage management and mechanised technologies. While we have seen significant progress over the years, adequate funding can bolster opportunities towards ensuring inclusive and equitable approaches to benefit the most marginalised communities and overcome the challenges of rapid urbanisation.

Majorly bolstered by public funding, urban sanitation has seen low private sector investment, mainly in isolated CSR activities. Since 2006, the private sector has invested about $620 million, mostly towards Swachh Bharat schemes and behavioural change communication. However, driving investments towards other aspects of the sanitation value chain, that ensure safety and equitable inclusion of marginalised groups, is crucial.

One of the possible reasons for this limited investment in sanitation is the lack of awareness around aspects of sanitation that are beyond the purview of accessibility and therefore invisible. The Iceberg Syndrome in philanthropy dictates that giving is strongly linked to issues where tangible outcomes—the tip of the iceberg—can be seen. For example, funding infrastructural initiatives such as building schools or building toilets. However, investments in the invisible and massive part of the iceberg—representing the underlying causes and systemic issues—can create a deeper and sustainable impact.

These invisible outcomes can be achieved by shifting the conversation from infrastructural sanitation goals to a more sustainable approach to city-wide inclusive sanitation (CWIS). It ensures universal access to safely managed sanitation through solutions tailored to the realities of rapid urbanisation. Since philanthropic investment has proved vital in combatting critical challenges, its augmentation is a must for achieving inclusive sanitation outcomes.

Investment in inclusive sanitation solutions

About 30 percent of women in urban India are assaulted every year while accessing sanitation facilities. Marginalised groups, particularly transgender persons and people with disabilities, struggle to access safe sanitation. Further, it is also essential to ensure the safety and dignity of sanitation workers through appropriately designed Personal Protective Equipment (PPE), skill-building, and enhancing opportunities for their livelihood.

With recent infrastructure creation, it becomes pertinent to evaluate the extent and mechanisms to which sanitation services are accessed by all. This further underscores the need for the inclusion of marginalised sections across the sanitation value chain and the creation of road maps in outlining a CWIS. Philanthropists are well placed to use their influence to move the needle towards truly inclusive sanitation where women and transgender persons have access to safe sanitation services, authority, and representation as decision-makers.

Strengthening urban local bodies (ULBs)

Most ULBs in the country are currently understaffed and lack adequately skilled human resources. The private sector and philanthropists can support the capacity building of ULBs to ensure the efficiency of sanitation solutions. Timely payments to grassroots sanitation entrepreneurs and professionals can achieve inclusive policies and outcomes. Legally, a minimum of 1/3rd of seats in ULBs must be reserved for women—many states even raising this to half. Investing resources in the empowerment and leadership of women councillors in ULBs would bring an inclusive, gender-sensitive lens. It could be the best bet we make for transforming cities and, in the process, surmount the foremost societal challenges of the 21st century (climate change, water and sanitation, gender equality, employment, migration and economic growth, social cohesion, and so on).

Building resilient cities

It is estimated that India will add 416 million urban dwellers by 2050, further stressing the fragile urban systems which can barely support the urban poor. Thus, it is imperative to invest heavily in supporting cities to manage this growth sustainably and equitably through long term interventions focused on city resilience. Building resilience in cities requires collective action at the local level and bridging the gap between citizens and the government. Keeping this in mind, it is essential to build the capacities of India's 85000+ councillors. They can bring transformative thought processes to the table—a prerequisite to ensure accessibility to water and sanitation facilities, eco-friendly and economical travel, safe living options, and a deep understanding of environmental concerns and their impact on vulnerable groups.

Philanthropic support and thought leadership can influence local governments to leverage opportunities to make sanitation inclusive, promote thought leaders who can drive the discourse, and direct attention towards the sanitation needs of vulnerable communities. A systems approach to philanthropic contributions can result in a sustainable impact on sanitation.

Furthermore, collaborative efforts in the sanitation sector have been catalytic toward testing approaches and scaling them up. Collaborative bodies like the National Faecal Sludge and Septage Management Alliance (NFSSM Alliance) have strengthened the foundation of India's sanitation sector by driving multi-stakeholder collaborations across ULBs, governments, private sector players, citizens, and community-based organisations. Such collaborations have helped evenly distribute the collective hyperfocus on toilet infrastructure and access across the entire sanitation value chain.

Sanitation has tremendous implications on the health and education of marginalised populations, the environment, and the burden of care-economy functions performed by women. A WHO finding highlights the significance of sanitation in socio-economic improvement: A dollar spent on sanitation saves $9 spent on health, education, and economic development.

Sanitation forms the bedrock of building resilient cities; it is a cornerstone of the successful development of a city. With a rapid increase in urbanisation, many of us, for years, have been on the fence about directing our energy toward sectors like WSH. Therefore, now is the time to look beyond issues where we might have already made a breakthrough and focus on possible causes of colossal damage in the future.

The writer is the Co-founder and Partner at Dasra.

The thoughts and opinions shared here are of the author.

Inclusive Urban Sanitation Stories

A move towards an inclusive sanitation initiative: collaborative engagement in the Indian State of Uttarakhand

Contributed by **Dr Mahreen Matto and Shantanu Padhi, National Institute of Urban Affairs (NIUA)**

Figure 1 – Source: NIUA

Summary

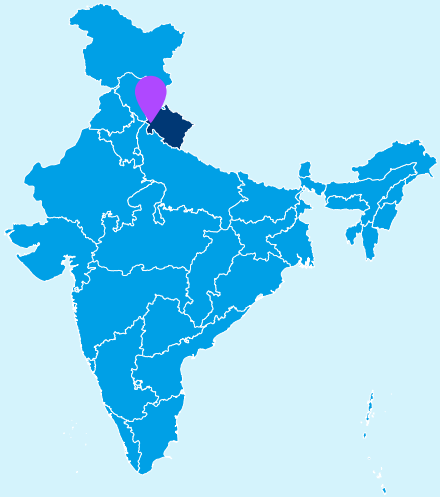
In the Indian State of Uttarakhand, an effort towards CWIS is being initiated with a focus on Integrated Wastewater and Faecal Sludge and Septage Management (FSSM). To improve the sanitation infrastructure, the state government agency, the Urban Uttarakhand State Development Agency collaborated with multiple stakeholders, including a national think tank, the National Institute of Urban Affairs; a donor agency, the Asian Development Bank; and academia, the Indian Institute of Technology Roorkee. A study is being carried out to plan the co-existence of networked sanitation for fast growing city dwellers and non-networked sanitation for left-out households in the city and peri-urban areas. Interim and intermittent measures are taken up to use the current and proposed treatment sites for co-treatment of Faecal Sludge and Septage (FSS) with sewage.

In order to demonstrate the benefits of co-treatment with an inclusivity approach, a technical feasibility study was performed in Dehradun, the State capital. The study supported the implementation of a co-treatment facility of 40 kilo litres per day (KLD) at an upcoming 18 million litres per day (MLD) Sewage Treatment Plant (STP) in Raipur and 130 KLD at the existing Kargi STP, Dehradun. In order to elucidate the advantages of co-treatment of FSS, the proposed framework will benefit more than 78,000 households for a span of 15 years. Consequently, a road map for scaling up CWIS in the state has been developed in order to achieve universal access to sanitation for all including low-income and marginalized households/communities.

Overview

Geographical information

Country: India
City: Dehradun
City population: 800,000



Problem

- No dedicated treatment facility available for treatment of FSS.
- Most of the STPs in the state are found to be running at low utilization.
- Technical scepticism towards co-treatment of FSS with sewage.
- Topography has posed technical challenges for providing sewer connection to every household.

Solution

- The STPs are running at low utilization and thus have spare capacity available to also treat FSS with sewage. Providing sewered sanitation to all the households in the fast growing and hilly cities is difficult task to achieve.
- An integrated approach of FSS and sewage management is to be adopted in the sanitation infrastructure projects.
- The state urgently needs a technical advisory and operational guidelines supported by strong advocacy in order to solve the problem of urban sanitation and river pollution holistically.
- Moreover, prioritizing co-treatment of FSS in STPs can help in accomplishing the national missions on river rejuvenations as well.

Problem

Dehradun, the state capital of Uttarakhand, lies in the Doon valley and is a fast growing and an expanding city. The valley has the Himalayas to its north, the Shivalik range to its south, the river Ganga to its east and the river Yamuna to its west. There are 167,577 households in the city serving a population of just over 800,000. All the households have access to individual household-level toilets, while an additional 31 public/community toilets cater to sanitation requirements of the floating population. As of mid-2020, only 34% of households were connected to the sewer network while the rest are dependent on an On-Site Sanitation System such as a septic tank. It is estimated that the sewage and FSS generation in Dehradun are around 87 MLD and 320 KLD, respectively. The sewer network conveys the sewage to seven different STPs located across the city. The collective treatment potential of these STPs is estimated to be around 115 MLD but they receive only 42 MLD of sewage (see Figure 3).

While the implementation of sewerage projects is ongoing in the city, providing sewer connection to every household has posed technical challenges due to several reasons. Topography is a major reason as many households are situated below the road level. Also, urbanization has caused many households to be densely packed which makes OSS the only possible sanitation infrastructure. With most of the STPs found to have spare treatment capacity, it is envisaged that existing treatment sites will be used for co-treatment of FSS with sewage as an interim solution. To demonstrate the benefits of co-treatment, a technical feasibility study was performed to support the implementation of a co-treatment facility at an upcoming STP in Raipur, Dehradun.

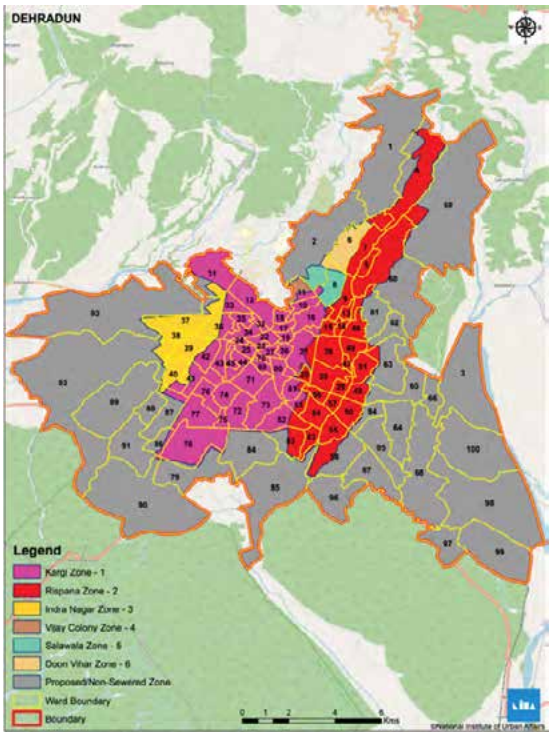


Figure 3 – Sewerage zone map. Source: NIUA

Solution

The topography of the state is hilly, hence providing sewered sanitation to all the households and establishments would be difficult and costly. Co-treatment of FSS with sewage would be a viable solution in the state therefore a study was undertaken by the National Institute of Urban Affairs in collaboration with Indian Institute of Technology, Roorkee in 2019 to evaluate the potential of co-treatment. The study was carried out for nine operational STPs located in five cities of Uttarakhand, including Dehradun.[1] The study included field visits to measure daily

1 Co-treatment of Septage and Faecal Sludge at STPs of Ganga Towns in Uttarakhand. https://niua.org/scbp/sites/default/files/Septage_Co-Treatment_Report_15-09-2020.pdf

and peak wastewater flow, analysing pollution load carried by wastewater and FSS in terms of biological oxygen demand, chemical oxygen demand, total suspended solids, etc. The design and actual loading (both hydraulic and organic) with respect to elapsed time was assessed, and strategies were formulated for safe co-treatment of FSS. Based on this technical study, a desk-based feasibility study and the design of the co-treatment facility was proposed for upcoming STPs at Raipur and Kargi, Dehradun. The capacity of the co-treatment facility will be 40 KLD in Raipur and 130 KLD in Kargi; Wile the STP capacities are 18 MLD and 68 MLD and based on sequential batch reactor technology. The design period of the co-treatment facility is 15 years. As the septage collection will increase in the future, capacity of the co-treatment facility can be increased proportionately.

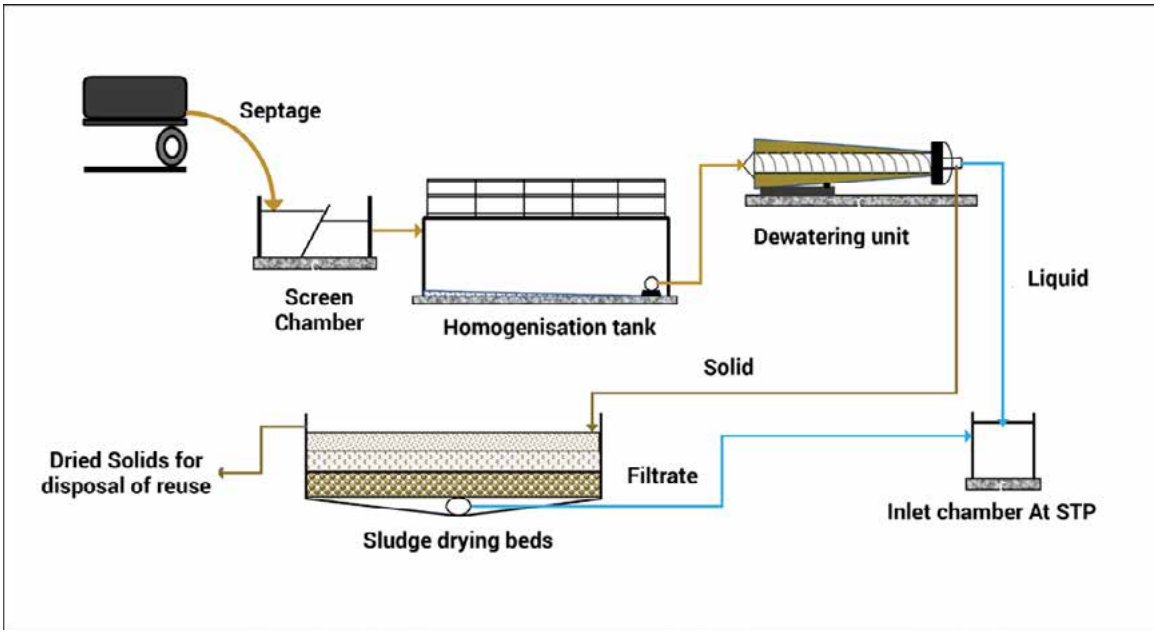


Figure 4 – Process flow diagram of co-treatment units. Source: NIUA

A pre-treatment facility is proposed for FSS treatment before adding it to the sewage stream. Thus, it will ensure scientific treatment of FSS as direct discharge leads to operational difficulties and treatment process may be compromised at the STP. The pre-treatment facility includes a septage receiving station, screen chambers, homogenization tanks, centrifuge unit for solid / liquid separation and sludge drying (see Figure 4).[2] Following further discussion, the co-treatment infrastructure proposal was accepted and included in the detailed project report for sewerage systems for Raipur; the project has recently been put out to tendered for procurement of the works. A simple low-cost co-treatment infrastructure will ensure proper treatment of FSS from non-sewered and low-income group areas in the city, but also those from the peri-urban areas and the nearby villages which will benefit 24,000 households. In parallel, a 130 KLD co-treatment facility is planned and designed for the existing 68 MLD capacity STP in Kargi zone, in Dehradun city which is estimated to cater for around 54,000 households, including

2 Design Modules for Co-treatment of Faecal Sludge at STPs Part -A, B, C: https://www.niua.org/scbp/?q=training-modules

households which are planned to be connected with sewers in a phase-wise manner.[3] The Kargi zone STP was receiving septage through direct discharge into the wet well unit from 2020. It was observed that due to lack of pre-treatment facility, the STP encountered a few operational issues. Therefore, a pre-treatment facility of 130 KLD capacity for co-treatment is proposed for this STP. The advocacy for co-treatment through various research and technical reports paved the way for scaling-up co-treatment across the state to address FSS treatment from households dependent on on-site sanitation. Henceforth, a policy-cum-advisory report has been released cordially endorsed by respective departments to adopt scientific method of co-treatment of FSS with sewage.

Adopting the co-treatment approach can help in achieving CWIS as it is in line with four of the CWIS principles: a) everyone benefits from safe services and public investment equitably, b) human waste is safely managed along the sanitation chain, c) authorities operate with a clear, inclusive mandate and d) authorities deploy a range of hardware, funding and business models which enables adoption of simple, local and financially sustainable technologies that increase the scope of FSS treatment while benefiting all the stakeholders, especially the citizens relying on on-site sanitation systems.

Decentralized and non-sewered sanitation systems are a paradigm shift in urban planning and infrastructure creation in most developing countries. The case study identifies the critical path and activities ranging from capacity development of state officials, policy engagement and advocacy at national level, research, engagement with implementing agencies for their buy in, funding for FSSM, technical assistance for preparing designs and technology options, and on ground hand-holding support for implementing solutions. These activities are not possible without a collaborative engagement of key stakeholders and pressing the right levers at all levels.

Lessons learned

The study has brought the technical domain for co-treatment of septage with sewage in the State of Uttarakhand to the forefront. The state is utilizing this for scaling FSS treatment by manoeuvring co-treatment techniques at their existing STPs that have additional capacity and for the forthcoming sewerage plans. The state is also integrating FSSM at a city-wide scale through co-treatment, which is quite perceptible through the various notifications and advisories on co-treatment and FSSM being circulated/disseminated by the authorities. Treatment of FSS at STPs is cost effective as it utilizes the spare capacity at existing STPs. Minimal cost would be required for preliminary treatment of FSS during co-treatment as compared to capital and land cost which would be incurred for a dedicated Faecal Sludge Treatment Plant.

Recently, Ministry of Jal Shakti (water resources) in May 2022 has approved funds for co-treatment units for four existing STPs under its flagship programme, the National Mission for

3 Design Recommendations for Co-treatment of Faecal sludge and Septage with Sewage, at Kargi Sewage Treatment Plant, Dehradun: https://www.niua.org/scbp/?q=content/design-recommendations-co-treatment-septage-sewage-kargi-stp-dehradun

Clean Ganga (NMCG) in Uttarakhand, thus indicating the replicability within the State. The capacities of individual units are:

- Haridwar 150 KLD (100 KLD Jagjeetpur + 50KLD Sarai)
- Rishikesh 50 KLD
- Srinagar 30 KLD
- Devprayag 5 KLD

The project component includes development of septage co-treatment plant at the existing STPs and O&M for 5 years. This has been proposed to address the issue of septage collected from septic tanks being disposed illegally into drains/manholes, which affects the functioning of the existing STPs.

Useful links

Uttarakhand State Advisory note – Co-treatment Faecal Sludge and Septage with sewage in sewage treatment Plant: https://scbp.niua.org/sites/default/files/Co-treatment%20AdvisoryNote_UK.pdf

Further reading and references

- NIUA 2020 Design Recommendations for Co-treatment of Faecal sludge and Septage with Sewage, at Kargi Sewage Treatment Plant, Dehradun. National Institute of Urban Affairs, New Delhi.
- NIUA 2019 Co-Treatment of Septage at STPs of Ganga Towns in Uttarakhand. National Institute of Urban Affairs, New Delhi.
- NIUA 2020 Co-Treatment Feasibility (Septage with Sewage), Dehradun, Uttarakhand; Asian Development Bank supported Banjarawala, Mothrawala and Raipur Sewerage projects. National Institute of Urban Affairs, New Delhi.
- NIUA 2020 Urban Faecal Sludge & Septage Management in Uttarakhand – A City Level Sanitation Study: https://niua.org/scbp/sites/default/files/Septage_Co-Treatment_Report_15-09-2020.pdf

About the authors

Dr Mahreen Matto is the Team Lead for the Sanitation Capacity Building Platform (SCBP) at the NIUA. Mahreen is an environmental researcher and capacity building trainer with 12 years of experience in mainstreaming urban water and sanitation management across human settlements in India, South Asia and African Countries. The work includes research, capacity building, advocacy and project implementation on decentralized wastewater management, citywide inclusive sanitation, water and sanitation safety planning, preparation of city sanitation plans, and faecal sludge and septage management. She has authored reports/guides/research articles, including Water Sensitive Urban Design and Planning: A practitioner's guide. Her major clients have been the World Health Organization, Asian Development Bank, Bill and Melinda Gates Foundation, Swedish International Development Cooperation Agency, Ministry of Housing and Urban Affairs, India; Water Aid (India, Bangladesh and Rwanda), Water Research Commission, South Africa and Rwanda Water and Forestry Authority.

Mr Shantanu Kumar Padhi, an environmental engineer, works as a Senior Programme Officer (Technical) - SCBP at NIUA. Shantanu has closely worked with the governments at city, state and national level in India and African countries to jointly find solutions for achieving sanitation for all. He has authored reports/guides, including Integrated Wastewater and Faecal Sludge for Ghana, Guidebook on Co-treatment for Dehradun and contributed to development of web-based tools like Shit Flow Diagrams. Prior to joining NIUA he was working with Centre for Science & Environment where he was co-ordinating technical support units in two small towns of Uttar Pradesh for mainstreaming faecal sludge and septage management to achieve citywide sanitation.

About the institution / organisation

The **National Institute of Urban Affairs (NIUA)** is India's leading national think tank on urban planning and development. As a hub for the generation and dissemination of cutting-edge research in the urban sector, it seeks to provide innovative solutions to address the challenges of a fast-urbanizing India and pave the way for more inclusive and sustainable cities of the future.

National Institute of Urban Affairs

niua.in

About the IWA Inclusive Urban Sanitation Initiative

IWA's Inclusive Urban Sanitation initiative responds to a huge and growing public need - safe sanitation in combination with access to safe drinking water and hygiene underpins good health. The aim of this initiative is reshaping the global urban sanitation agenda by focusing on inclusive sanitation service goals--and the service systems required to achieve them - rather than the traditional singular focus on expanding sewer networks and treatment works. This forms part of IWA's larger agenda to promote inclusive, resilient, water-wise, and sanitation-secure cities.

About the Inclusive Urban Sanitation Stories

The Inclusive Urban Sanitation stories are documenting some of the policies, practices, and approaches that demonstrate how stakeholders especially those in urban areas (e.g., public sector, operators, academics, regulators, and other key actors) are taking part or contributing to Sustainable Development Goal 6 which require water and sanitation concepts and norms to look beyond technology and the usual focus on building infrastructure. Increased focus is on safety, inclusion, environment, public health, and multiple technology solutions tailored to different geographies and socio-economic contexts for building climate-resilient cities. The stories aim to inspire urban stakeholders to discuss ways for advancing inclusive urban sanitation, especially in low- and middle-income countries.

inspiring change

iwa-network.org
iwa-connect.org

IWA
the international water association

Explained: How GARIMA Scheme Is Empowering Sanitation Workers In Odisha

Sanitation work is one of the most hazardous professions that involves exposure to occupational safety risks such as exposure to poisonous gases and faecal sludge. Its informal nature further compounds their vulnerable position leaving workers with no formal social, financial, occupational redressal mechanisms and benefits.

Meghna Malhotra & Manvita Baradi

Updated: Dec 17, 2022, 16:37 IST

6 min read

File Photo

Sanitation work is one of the most hazardous professions that involves exposure to occupational safety risks such as exposure to poisonous gases and faecal sludge. Its informal nature further compounds their vulnerable position leaving workers with no formal social, financial, occupational redressal mechanisms and benefits.

Sanitation workers form the closest link between providing the most essential sanitation services to communities, yet they remain stigmatized and discriminated against for the nature of their work. Subject to a vicious cycle of poor working conditions, increased fatalities, and financial instability, it becomes crucial to establish safe work environments for sanitation workers, ensure access to benefits, and secure a dignified livelihood for them.

Sanitation work is one of the most hazardous professions that involves exposure to occupational safety risks such as exposure to poisonous gases and faecal sludge. Its safely managed waste.

However, to ensure the investment in infrastructure is operated and maintained with adequate efficiency, a skilled and safe sanitation workforce is required to ensure sustained service delivery. It is thus crucial to secure the occupational, social and financial upliftment of sanitation workers and elevate their role as sanitation professionals.

TOI

In a benchmark move to empower sanitation workers across the sanitation value chain, the Housing and Urban Development Department, Odisha, launched the GARIMA Scheme in 2020. It is a one-of-its-kind statewide scheme to ensure the dignity and welfare of 20,000 core sanitation workers who are exposed to hazardous working conditions including coming in close contact with faecal sludge in toilets, septic tanks and sewer treatment facilities. Through the GARIMA scheme, Odisha has become one of the first states to identify 5 categories of core sanitation workers as skilled and highly skilled workers.

BCCL

The scheme highlights that the first step to empower sanitation workers is to recognize them as professionals entitled to safety, benefits and rights with specific skill-sets and capabilities. In order to identify and visiblize the number of sanitation workers, the state has rolled out a robust methodology to create a database of sanitation workers through the generation of unique IDs.

The state has been able to create a dynamic database of 15,000+ informal sanitation workers who can now avail the entitled benefits. Implemented across **115 Urban Local Bodies (ULBs)** in Odisha the scheme has emerged as a landmark step to make sanitation workers visible through recognition and identification, increasing access to health benefits, enabling financial and social security.

Ensuring Occupational Safety of Sanitation Workers:

Sanitation worker communities tend to live in the fringes of society and are stigmatized amongst their communities – the Scheme recognized the need to ensure occupational safety of workers through provision of appropriate PPEs and safety devices as well as creation of Garima Grihas where workers can rest, wash their PPEs, bathe, change from their work uniform before heading back home.

BCCL

The need to skill and train sanitation workers has been recognized and implemented through mandated skill development and periodic capacity building of core sanitation workers. The Housing & Urban Development Department (H&UDD) along with the Odisha Water Academy and Urban Management Centre has created a training ecosystem with appropriate pedagogy. More than **200 sanitation** workers have been trained and certified as sewage entry professionals in Odisha. Further to ensure enforcement of safety measures and reduction of risk, ULBs have set up **Emergency Response Units (ERSU)** to monitor and implement procedures for entering sewers and ensure the well-being of sanitation workers from being exposed to any hazardous work conditions.

Securing Financial Benefits for Economic Upliftment of Sanitation Workers:

In an effort to uplift sanitation workers financially, the H&UDD collaborated with the Department of Labour to recognize sanitation workers as highly skilled and skilled, thereby increasing their wages by33-50% including an additional risk and hardship allowance of 15%. The scheme further extends health insurance and life insurance to core sanitation workers, mandates providing benefits of the Employees Provident Fund Act, 1952, details out premature retirement benefit in case of illness or disability and highlights post service monthly perks and benefits.

Socially Empowering Sanitation Workers and their Families towards a Dignified Livelihood:

Social security of core sanitation workers and their families plays a key role in their empowerment and creates opportunities to mitigate for intergenerational caste-based work. Recognizing the right to quality education for children of sanitation workers, the scheme extended support of educational grants to cover the costs of tuition and hostel fees up to post-graduation, in the absence of such support from any other department.

Babuli Nayak, a sanitation worker who entered the profession to supplement family income at a young age, shares his experience in becoming a trained sewage entry professional, *"After the GARIMA scheme, we have been identified as sanitation professionals, trained to use machinery and technical equipment. I am now a certified Sewer Entry Professional, and I hold the certificate as my pride. Now we also have rest houses at work where we can rest and store our personal things safely. I was very happy when, for the first time after years of service, I was rewarded for my work."*

The impact and success of the GARIMA scheme has emerged as a learning model for other states to adapt and enable sanitation worker safety and dignity. Tamil Nadu is one state that has closely been following the example set by Odisha. Collaborative action of diverse stakeholders across government officials, activists, civil society organizations and the leadership of sanitation champions like Shri G Mathi Vathanan (Principal Secretary, H&UDD, Government of Odisha) has played an instrumental role in its effective implementation in the state. Such schemes and their outcomes further encourage stakeholders to replicate the approach at a national level to drive the momentum towards ensuring the safety of sanitation workers. In an effort towards it, the Ministry of Social Justice and Empowerment (MoSJE) along with the Ministry of Housing and Urban Affairs (MoHUA) with the launch of NAMASTE scheme.

The scheme is another prime example of scaling schemes for socio-economic and occupational empowerment of sanitation workers. Schemes such as these have the potential to be replicated and scaled across states and cities in the country and is a reflection of the country's collective commitment towards SafaiMitra Suraksha. With 75 years of independence, it is an appropriate and opportune moment for stakeholders to continue to work collaboratively towards building a safe, dignified, and inclusive space for sanitation workers.

About the author: Meghna Malhotra is the Deputy Director of Urban Management Centre. All views/opinions expressed in the article are of the author.

Sanitation | Utilities

- A paradigm shift towards a public service approach may help in confronting the sanitation challenges faced by cities and towns
- An integrated sanitation plan should be a formalized governance structure to ensure marginalised communities are well represented
- CWIS promotes business as unusual, intending to provide everyone with equitable access to safely managed and affordable sanitation services.

To meet SDG 6, the Government of India has recognized Non-Sewered Sanitation (NSS), i.e. Faecal Sludge and Septage Management (FSSM), including Wastewater Management, as a viable and pragmatic solution towards citywide sanitation (especially in small towns and cities).. The recent national missions - Swachh Bharat Mission Urban 2.0, Jal Jeevan Mission (Urban) and the 15th Finance commission - demonstrate a response to "Toilet ke baad kya?" (What happens after we flush the toilet) by emphasizing NSS. Thus, acknowledging the linkage between universal water, sanitation and health.

The National Institute of Urban Affairs - NIUA's Sanitation Capacity Building Platform (SCBP) team is working in the state of Uttarakhand on mainstreaming citywide sanitation and made a recent visit to four towns in the Udham Singh Nagar district (Rudrapur, Bazpur, Kashipur and Kichha, average population of 115,000 people).. The team conducted a sample survey of households to get an idea about the nature of the sanitation practices prevalent in these areas. The responses received were similar across all the urban centres:

- In all towns, the predominant type of sanitation system in households is septic tanks connected to open drains.
- The majority of the contaminants in the towns were located beneath the building, where access for desludging is challenging.
- Most of the tanks (in all the towns) had hardly been emptied/desludged. The average period of emptying is over 10 years, the reason being, these toilets are either blocked or overflow to manholes.

The overflow of effluent into open drains is of particular concern as all four towns lie along stretches of smaller rivers, namely Kalyani, Bhela, Pilakhar and Ghola, which have been identified as critically polluted by the Central Pollution Control Board. Thus, the contribution of ad-hoc septage/effluent disposal is undeniable.

Moving towards Citywide inclusive sanitation

Given the above challenges, it is evident that a paradigm shift in urban sanitation management is needed that is both holistic and inclusive. In this regard, Citywide inclusive sanitation (CWIS) could be an applicable solution. It promotes business as unusual, to provide everyone with equitable access to safely managed and affordable sanitation services (Figure 1).

CWIS will require multifaceted interventions at multiple levels, involving various stakeholders to address specific concerns. All or a combination of the following CWIS measures can be taken:

A mix of sanitation systems: To ensure an inclusive sanitation approach, cities cannot adopt a one-size-fits-all solution. Cities need to promote a range of solutions, either or both onsite and sewered, centralized or decentralized with consideration on resource recovery and re-use, tailored to the cities. The following factors need to be considered:

- Existing sanitation services, gaps and priorities to address
- Better household services and the tariffs they are willing to pay
- Establish suitable policies, institutions and regulations
- A range of different yet complementary investments - partners/private sectors involved/contributing to the city

With this in mind, the Integrated Wastewater and Septage Management (IWSM) can be considered as it addresses both FSSM and Wastewater Management. The IWSM incorporates a mix of technologies appropriate for the city as well as the operation and maintenance for safe transport, treatment, safe disposal, and/or reuse of septage and wastewater. IWSM gives particular importance to low income and densely populated areas to help achieve CWIS.

Thus depending on the urban fabric, human settlements and sanitation systems prevalent in a city, possible options could be possible:

· Offsite: Centralized systems, where sewerage systems can be laid depending on the economy of scale

· Onsite: City majorly dependent on septic tanks and sewerage systems are not possible/affordable:

i) If the Urban Local Body (ULB) has the institutional and financial stability it can go for an individual Faecal Sludge Treatment Plants (FSTP) or else a cluster-based FSTP catering to 2-3 towns. For example in Uttrakhand, Rudrapur is a big town where an FSTP has been planned catering to Rudrapur and nearby small towns of Kichha, Gadarpur, Dineshpur and Gularbhoj

iii) Co-treatment of septage with sewage in an STP. NIUA has recommended operationalising this at the 68 MLD STP at Kargi Chowk, Dehradun

iv) Decentralized wastewater treatment plants can be installed at the institutional and community level

Gender neutrality and Inclusivity: Ensuring women's participation and equal opportunities for leadership at all levels of decision-making is a fundamental target to achieve SDG number 5 and 6. Interventions must be based on a good understanding of gender-specific needs including the constraints faced by women and girls in accessing safe sanitation. Furthermore, gender neutrality and inclusivity can be mainstreamed by involving Self Help Groups (SHGs) and sanitation workers in various aspects across the sanitation service chain. Odisha and cities like Trichy, Warangal, Narsapur, Wai are the frontrunners in this. For example in Trichy, women's SHGs promote awareness on WASH and hygiene, run community toilets etc. It is equally important to ensure that marginalized and vulnerable people have a "voice" and that their needs are well understood by the formal governance structures and integrated as a part of the overall sanitation planning.

Commitment from local government: City-level resolutions are important to ensure success while implementing city-wide sanitation solutions. In Uttarakhand, the state Septage Management Protocol mandates that every ULB form a Septage Management Cell (SMC) to oversee the FSSM interventions at the ULB level. Furthermore, SMC members comprise not only ULB representatives but also from relevant departments such as Peyjal Nigam, Jal Sansthan, Pollution Control Board etc. This ensures that decisions are taken in an integrated manner across departments.

Awareness creation: Efficient communication towards the effect of poor sanitation on public health and the environment has a positive impact on public acceptance. The provision of information to all the stakeholders is crucial for management and long-term viability. NGOs, public or private utilities and governments can be involved at different levels for awareness-raising through visits, workshops and information campaigns. This is the reason why the communication campaign on FSSM 'Malasur' was initiated by BBC media action with support from the Ministry of Housing and Urban Affairs, with the objectives to increase awareness, heighten risk perception and build a sense of urgency.

Building capacity of practitioners

To empower sanitation workers and help them achieve job security, the municipalities of Cuttack and Bhadrak identified and trained sanitation workers to use cesspool vehicles. Continuous handholding support and capacity building have resulted in their improved performance and proactiveness, increased economic security and formal employment aiming towards better social standing. Thus indicating that the practice of building capacities among relevant stakeholders should be amplified in cities.

Conclusion

Keeping in view the current sanitation challenges confronting towns and cities, a paradigm shift towards a public service approach seems promising. An inclusive urban sanitation approach necessitates a public service strategy that targets the vulnerable communities. Putting CWIS into practice necessitates major changes in how all sector professionals think, plan and act towards mainstreaming sanitation solutions.

DownToEarth

Water

COVID-19: Hits & misses of Centre's advisory on water supply, sanitation

A review of;MoHUA April, 2020 advisory on safe management of water supply and sanitation;

Sumita Singhal, Mahreen Matto, Jyoti Parsad

Published on: 18 May 2020, 10:21 am

It has been over two months since the Indian government imposed its first phase of lockdown to curb the novel coronavirus disease (COVID-19) spread. The lack of uniformity in the measures adopted and their implementation, however, may not have served the objective of containing the virus (SARS-CoV-2).

COVID-19 requires an emergency response from Urban Local Bodies (ULBs) and states on several fronts. Hygiene and cleanliness are the strongest weapons in any public health crisis — several cities initiated massive drives for sanitisation of public spaces, particularly in COVID-19 hotspots — and deployed a huge number of sanitation workers.

Door-to-door waste collection, emptying septic tanks, addressing safe disposal of bio-medical waste and household waste generated remains a top priority for all cities, especially those falling under contained/red zone areas.

Key government advisories have been issued by the central and state governments to address the emerging challenges of urban water and sanitation. Some private and public organisations working on the ground also issued practical and operational guidelines and created posters, reports and publications.

One such advisory was issued by the Ministry of Housing and Urban Affairs (MoHUA) titled *Safe Management of Water Supply and Sanitation Services during COVID-19 crisis, April 2020*.

COVID19 responses on water and sanitation management

Title	Issuing authority	Salient features
Guidelines for Hygiene and Sanitation in Densely Populated areas	Office of the Principal Scientific Adviser to the Government of India (GoI)	Preventive measures at home and public areas. Face cover, washing hands, proper sanitisation
Advisory on Safe Management of Water Supply and Sanitation Services	Ministry of Housing and Urban Affairs (MoHUA), GoI	Persistence of the SARS-CoV-2 in drinking water, keeping water supplies safe, safely managing wastewater and faecal waste, safely disposing of greywater or water by washing PPE
Instructions for safe disposal of waste from quarantined households (English)	MoHUA, GoI	Safe disposal of waste from quarantined households, sanitary workers' attendance
MHA Order on Consolidated Revised Guidelines (COVID-19)	Ministry of Jalshakti - Department of drinking Water and Sanitation	
Guidelines for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients	CPCB	Management of solid waste from isolation facilities, labs and hospitals and role of following stakeholders: a -Responsibilities of persons operating Quarantine camps/homes or homecare facilities -Duties of common biomedical waste treatment facility -Duties of SPCBs/PCCs -Duties of urban local bodies
Novel Coronavirus Disease 2019 (COVID-19): Guidelines on rational use of Personal Protective Equipment	(Ministry of Health and Family Welfare) MoHFW, GoI	Personal Protective Equipment required for sanitary workers, rational for use of PPE in sanitation
Ensuring Health and Safety of Sanitation Workers and Wastepickers in the wake of spread of COVID-19	NSKFDC, MoSJE, GoI	Guided the ULBs to prepare the Standard Operating Procedures (SOP) covering: - Mandatory orientation, Social Distancing norms and key precautionary measures - List of Dos and Don'ts during work - Providing PPE
Advisory for ensuring Health and Safety of Sanitation workers during COVID19	Ministry of Social Justice and Empowerment (MoSJE), GoI	SOP, specific measures to be taken by sanitation workers, and PPE/safety gears for sanitation workers and choice of disinfectant.
Role of Frontline workers in prevention and management of Corona virus	MoHFW, GoI	Role as a frontline worker What is COVID-19? How does COVID-19 spread? People who are at a high risk; key messages for prevention; personal hygiene and safety; myths versus reality
COVID-19: Guidelines on disinfection of common public places including offices	MoHFW, GOI	Aims to provide interim guidance about the environmental cleaning /decontamination of common public places including offices in areas reporting COVID-19. Talks about the PPEs and care to be taken while spraying disinfectants.
Assistance from State Disaster response Fund	Press Information Bureau (PIB), GOI	For PPE for healthcare, municipal, police and fire authorities

Adapted from NIUA and NFSSMA, 2020

Here is a review:

The hits

The advisory was intended not only for ULBs, but water supply and sewage practitioners and services providers who want to know more about the risk and practices associated with water supply and sewage in states/UTs.

It identified sanitation workers as a vulnerable frontline workers highlighting the potential for service providers to step up their performance and customer orientation.

It also mphasised on provision of safe water supply and sanitation services to protect human health during all infectious disease outbreaks, including COVID-19.

The advisory stressed that provision of consistent water and sewage management practices at ULBs will help prevent indirect human-to-human transmission of SARS-CoV-2 virus.

It prescribed conventional, centralised water treatment methods that use filtration and disinfection (chlorine, ultraviolet (UV) light and other oxidants) should deactivate SARS-CoV-2, but doesn't confirm it.

It recommended that the acceptable limit of free residual chlorine in drinking water in India is 0.2 milligram/litre under normal conditions and should be at least 0.5 mg/L to protect against viral infection, according to the BIS Indian Standard for Drinking Water (IS 10500:2012). The WHO guidelines recommended that a residual concentration of free chlorine of ≥0.5 mg/L after at least 30 minutes of contact time at pH<8 shall be applied for the centralised disinfection during the outbreak. This has to be taken care of by all water supply utilities across India.

The misses

The nationwide lockdown was enforced on March 25 and the advisory was issued on April 20, which points to a delayed in response from the MoHUA.

The advisory was an adaptation of other international guidelines and misses the local context and specific issues such as non-conventional wastewater treatment.

It was intended for ULBs, water supply and sewerage boards and service providers, but did not not talk about sanitary workers employed in COVID-19 hotspots, quarantine facilities, hospitals and precautions that were needed.

The exposure and hazards associated with various steps of water and sanitation chain differ depending on the work and duties of workers. A comprehensive approach was expected from the advisory, especially at a time when the Union government has been running several programmes and schemes related to water and sanitation.

Ownership, enforcement and monitoring of guidelines in terms of 0.5 per cent residual chlorine was missing.

The advisory stated the virus was not detected in drinking-water supplies, and that based on current evidence, the risk to water supplies was low. At the same time, it talked about laboratory studies indicating that the virus could remain infectious in water-contaminated with faecal matter for days to weeks. Most Indian cities, due to intermittent water supply, have a higher chance of having sewage influx in water supply pipelines. But the advisory doesn't say much on the issue.

The advisory talked about wastewater treatment approaches — centralised as well as decentralised and reuse of treated wastewater. However, it only touched upon the decentralised approach and lacked detailed instructions for decentralised wastewater treatment.

It said all wastewater treatment plants should have disinfection level of treatment. However, according to current scenario, most decentralised technologies offered secondary-level treatment to be used for non-potable purpose. The advisory did not elaborate whether they have to be retrofit/modified. If they have to be retrofit, then what about cost-economics? And how will it be possible in this crucial situation?

In general, it talked about usage of Personal Protective Equipment (PPEs) for wastewater workers but did not specify regular specific medicines/vaccinations to be administered to sanitation workers.

For users of community and public toilets, it recommended that facilities be properly maintained and cleaned, and all sanitary workers protected. But it failed to specify the types of protection required.

It talked about reuse of treated sewage for industries and agriculture to improve water availability and financial sustainability. It did not mention the precautions needed for safe reuse of treated water.

The advisory failed to talk about other aspects as well, such as ensuring PPEs, financial support, food and boarding support, training on PPEs and its usage, ban on sewer/septic tank entry to reduce exposure, regular health check-ups and timely medical attention and safety and protection.

Worldwide studies showed no evidence of COVID-19 faecal-oral transmission risk. But the same needs to be verified for Indian conditions and safety of operators of STPs, cleaners and operators of public and community toilets, septic tanks desludging operators and drivers should be prioritised. This needs to be done in a planned manner with detailed analysis of the situation, followed by subsequent guidelines on exposure in water supply and sanitation system.

The advisory was silent about funding of interventions suggested as well as capacity building of officials required for expected results. Most local bodies are doing things in their own capacity, with no proper standard or protocol to follow in place.

Key learnings

A whole gamut of advisories has been issued by various ministries such as the MoHUA, Central Pollution Control Board, Ministry of Health and Family Welfare etc. It would have been great if there were a nodal department or ministry coordinating with everyone bringing out such advisories and guidelines. Dissemination of information to stakeholders working on the ground is a big challenge and creates confusion.

India needs to be more prepared to deal with such emergencies and a dedicated policy is required. Proper allocation of budget in health and hygiene sector is also required.

Our approach has been more reactionary in nature and we can be better prepared for such situations. States such as Odisha and Kerala that regularly experience natural disasters like cyclone were better prepared. Some lessons can be taken from them.

DownToEarth

Rural Water and Sanitation

Swachh Bharat Mission: An outstanding achievement, but challenges remain

Including people who still lack toilets, overcoming partial toilet use and retrofitting sustainably unsafe toilets are some of the massive tasks ahead

Robert Chambers

Published on: 30 Sep 2019, 9:31 am

The Swachh Bharat Mission-Gramin (SBM-G) was a remarkable programme. Nowhere, to my knowledge, has there been a rural sanitation programme that has combined political priority with resources on such a big scale. The administrative drive from the Centre was exceptional.

The Mission faced the pressure of reporting both toilet coverage and behavioural change. But in some outstanding districts, the actual physical achievements have been beyond what might have seemed possible. Reported toilet coverage has increased dramatically at a historically unprecedented rate.

However, on-ground studies show that many of the achievements claimed were inflated, the quality of toilets constructed left much to be desired, and local level malpractice — much of it now hidden safely in toilet substructures — were extensive.

Several challenges still need to be faced to achieve a *swachh* Bharat. The massive task is to include people who still lack toilets, overcome partial toilet use, and retrofit toilets which are not yet sustainably safe.

There is a time bomb of rural and small town faecal sludge management as tanks and single pits fill up and are difficult to empty. But solid and liquid waste management is now receiving the much deserved attention. Children's faeces and hand washing are in the frontier.

Often unrecognised, there has been an unprecedented creative multiplicity of initiatives in SBM-G, many at the district level. These have generated an unstoppable momentum of social and behavioural change. Innovations have proliferated.

Methodologies evolved like the national Swachhathon to crowd source innovations; Rapid Action Learning Workshops for lateral sharing of experiences, immersive research for ground truthing; and now CLNOB (Community Leave No One Behind) to facilitate communities to reach and support those behind — people with disabilities, the old and infirm, the very poor and weak, migrants, marginalised, and others.

Let's hope that future historians see SBM-G as a watershed, an irreversible tipping point towards a cleaner and healthier rural environment in which children can grow to their full potential.

Robert Chambers is a professor at the Institute of Development Studies, University of Sussex

Views expressed are the authors' own and don't necessarily reflect that of Down To Earth

DownToEarth

Water

India's water crisis: The clock is ticking

We need to promote a decentralised approach, with a key focus on water conservation, source sustainability, storage and reuse wherever possible

Photo: Getty Images

Mahreen Matto

Published on: 21 Jun 2019, 1:26 pm

India is facing one of its major and most serious water crisis.

After two consecutive years of weak monsoons, 330 million people — a quarter of the country's population — are affected by a severe drought. With nearly 50 per cent of India grappling with drought-like conditions, the situation has been particularly grim this year in western and southern states that received below average rainfall.

According to the Composite Water Management Index (CWMI) report released by the Niti Aayog in 2018, 21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach zero groundwater levels by 2020, affecting access for 100 million people.

However, 12 per cent of India's population is already living the 'Day Zero' scenario, thanks to excessive groundwater pumping, an inefficient and wasteful water management system and years of deficient rains. The CWMI report also states that by 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual six per cent loss in the country's GDP.

The Union government recently formed a new *Jal Shakti* (water) ministry, which aims at tackling water issues with a holistic and integrated perspective on the subject. The ministry has announced an ambitious plan to provide piped water connections to every household in India by 2024.

The ministry has set a tough target at a time when hundreds of millions don't have access to clean water. Aiming at laying huge pipeline networks for water supply means that yet again, we are giving more preference to infrastructure. Also, the moot questions are: what will happen if there is no water to supply? What will happen to all the wastewater that gets generated?

This indicates that there is a clear disconnect between water, society and economy. Currently, we are interested in laying large networks, constructing huge storage dams, fetching water from 150 kilometres and above, which involves a huge carbon footprint.

We are valuing land more than water, neglecting our local water bodies, which have either gone dry or encroached. Also, in many Indian cities, water is not properly distributed. Some areas of mega cities like Delhi and Mumbai are privileged to get more that than the standard municipal water norm of 150 litres per capita per day (lpcd) while other areas get 40-50 lpcd.

Aggravating the problem is that the water being supplied currently is of drinking water standards.

The World Health Organization (WHO) states that an individual requires around 25 litres of water daily for meeting his/her basic hygiene and food needs. The rest is used for non-potable purposes like mopping and cleaning. This indicates that for most of the non-potable uses, a quality lower than drinking water is required. Thus, for economic efficiency and environmental sustainability, water must be treated and supplied according to usage.

To top this, are issues of leakage losses, water pricing and metering of water. Lack of proper maintenance of existing infrastructure causes further losses of almost 40 per cent of piped water in urban areas.

The road ahead

Looking at the current situation, there is a need for a paradigm shift. We urgently require a transition from this 'supply-and-supply-more water' provision to measures which lead towards improving water use efficiency, reducing leakages, recharging/restoring local waterbodies as well as applying for higher tariffs and ownership by various stakeholders.

A recovery-based closed loop system is the need of the hour.

It is time to go back and start using our traditional practice of rainwater harvesting — catching water where it falls. Presently, India captures only eight per cent of its annual rainfall, among the lowest in the world.

Another aspect is the treatment and reuse of wastewater. About 80 per cent of the water that reaches households, leaves as waste and pollutes our waterbodies and environment. There is a huge potential in reusing and recycling this treated wastewater at least for non-potable purposes, which is cost effective.

All this leads to the fact that we need to promote a decentralised approach, with a key focus on water conservation, source sustainability, storage and reuse wherever possible.

It is important to understand that managing the water situation is not the job of only engineers but all stakeholders including hydrogeologists, economists, planners and most importantly, communities themselves.

Emphasis on behavioural change is not getting enough attention because it is nuanced and complex. But locals/citizens/ communities have a huge part to play. By keeping in check our own usage and actions, we can contribute.

As for our decision-makers, they need to re-think: Are we being sold dreams or realities?

Mahreen Matto is Programme Manager, Water Management at the Centre for Science and Environment, Delhi

DownToEarth

Waste

Why building sewage treatment plants in cities on the Ganga is a challenge

Flood-prone low-lying locations;add to the difficulty

Sewage pumping station near Numayadahi STP submerged in water.

Shantanu Kumar Padhi, Rahul Mankotia

Published on: 06 Oct 2019, 8:22 am

> *UP: Low-lying areas near Triveni Sangam flooded due to rise in Ganga, Yamuna River water level*
>
> *In Uttar Pradesh, Ganga Water Level Close To Danger Mark, Buildings Partially Submerged*
>
> *Bihar battles floods yet again, as rivers swell up due to heavy rain*

Those are some of headlines which have become usual every monsoon. Recent history has taught us just how fast water can overflow river banks. Ever put a thought what happens to the water utilities during such adverse circumstances?

It has become a major concern with the last floods – particularly flash floods. Drinking water and wastewater treatment plants are typically the most vulnerable to flooding. They should be top priority when major storms come knocking.

Flooding happens to be one of the most common hazards in the Ganga basin. The impact on a community is huge.

Waste water treatment plants (WWTP) usually floods from tropical storms, swollen rivers, dam failure, and more. Residents and businesses are affected. Loss of power, asset damage, and dangerous conditions for personnel have large impacts on wastewater and drinking water facilities. Excessive flooding affects treatment plants in many ways.

A wastewater treatment plant is most at risk of flooding when it is in a low-lying area near waterbodies for which it discharges its final effluent and enables gravity-fed collection systems. Pump stations, where head differential is insufficient for flow, is included in some systems and increases the likelihood of flooding.

Although, sophisticated geographic information system mapping for site selection is prior done to identify the best possible site to construct the wastewater treatment plant but still more weightage is given to flood plain or low lying areas.

Technically, these areas are economical because it is easier to receive wastewater from city through gravity. Perhaps, in many cities, these low-lying areas are often free from any conflict or encroachment. Hence it is convenient for local bodies or 'Jal Nigams' to establish a plant in such areas.

A wastewater treatment plant is a highly capital-intensive infrastructure. Although, measures and calculations are done to mitigate flooding in the WWTP, but still the plants remain shut down during monsoon.

The raw wastewater is discharged into river with a belief that Streeter-Phelps equation (a self-purification process of rivers) will save the plant during those days, hence, the raw sewage is indiscriminately discharged into ganga river.

A team from New Delhi-based non-profit Centre for Science and Environment visited Prayagraj in August and September 2019 to study its sanitation scenario. Considering a sewage network has been laid on a mission mode in the city, the main focus was to study the peri-urban areas, which often lie outside the mandate of concerned authorities.

What was found

Except the 14 million litres per day (MLD) sewage treatment plant (STP) at Salori and the one at Naini, all STPs were shut down. There was no major rainfall in the preceding weeks there.

The shutdowns were attributed to a rise in Ganga's water level that causes a backflow.

Clearly, locating an STP in low-lying areas close to the point of discharge has its advantages, but also downfalls.

Our team visiting Chunar to identify a site for an FSTP, we found that the proposed area was flood-prone.

Further complications: STPs in the Ganga Basin are not only designed to treat sewage transported through a sewerage network, but also to treat water from open nullahs, which contains faecal matter from non-sewered areas.

These projects require interception and diversion of existing nullahs to an STP. It would make sense for the STP to be located as close to the final disposal point.

Many STPs connected to these interception and diversion projects run above the design capacity as open drains also contain storm water. The problem is exasperated during the periods of heavy rainfall when there is a spike in the water received by the STPs. Authorities normally bypass the excess water directly into the Ganga.

Engineers working towards building STPs in the Ganga have toiled hard in finding solutions to this problem. An example is the 60 MLD STP at Rajapur, Allahabad, on the Ganga floodplains.

Nearly 10-metre-high embankments have been constructed around it to prevent flooding. It was also shut down in September due to flooding.

The situation of STPs in the Ganga Basin is a concern. Many function poorly. The National Mission for Clean Ganga has come up the 'One City One Operator' model – a single private sector agency tasked with to rehabilitating existing sewerage infrastructure and building a new one.

Adani Waters was roped in for Prayagraj and Va Tech Wabag for Agra and Ghaziabad. These projects have been tendered out under a hybrid annuity model wherein the private sector agency partly funds the project and recovers it over the contract duration.

These contracts potentially build incentives for designing and implementing efficient systems and streamlines the responsibility and monitoring of a complex sewerage system. How the engineers overcome flood-related challenges remains to be seen.

DownToEarth

Waste

Is Swachh Bharat Mission ensuring waste segregation systems?

Segregation is still not being followed in its true spirit across India due to the lack of adequate end-to-end infrastructure for waste segregation

Waste segregation in Tirunelveli, Tamil Nadu. Credit: Srikant Chaudhary/CSE

Swati Singh Sambyal, Richa Agarwal

Published on: 15 Oct 2018, 6:34 am

In its fifth year, Swachh Bharat Mission (SBM) has led to a paradigm shift when it comes to solid waste management. Stakeholders in cities across the country were sensitised on the importance of solid waste management – through programmes, cleanliness drives, workshops, competitions, rallies etc. It was only in its third year that an all India segregation campaign, *Har din do bin* was launched on June 5, 2017. Under SBM, cities have to ensure 100 per cent source segregation within one year, which is a challenge and yet has been a game changer wherever implemented properly.

Is segregation sustainable under SBM?

As per SBM August 2018 data, 43 per cent of the total wards in the country are segregating their waste at source. In 2017, door-to-door collection coverage increased from 53 per cent to 80 per cent .

But what do the figures mean?

The cities have limited the practice of segregation to the distribution of blue and green dustbins but has not made sure there is an end-to-end segregation infrastructure in place. In many cities, collection of segregated waste has started; however, often mixed waste ends up in the dumpsite. For instance, in Tirunelveli, a city in Tamil Nadu awarded by the government for implementing 100 per cent source segregation, households segregate only recyclable plastic and give it to the collector on a designated day. Mixed waste is collected on a daily basis when SWM Rules, 2016 mandate that waste be segregated into wet, dry and domestic hazardous distinctively.

Cities such as Panchgani, Ambikapur, Vengurla, Panaji, Indore, Mysuru, Muzaffarpur created systems to support segregation. In these cities, the segregated waste is taken to the processing centre where compost is made from the wet waste, and only inert waste goes to the landfill.

But most of the country is not segregating in its true spirit.

How much collected, how much treated?

Of the 1.45 lakh tonne of waste generated per day (TPD) in India, 49,401 TPD (34.07 per cent) is being processed. Just within the past 10 months, the processing capacity has increased from 24 per cent to 34 per cent. However, this also includes the non-operational and under construction plants. Also, majority of the processing centres in the country take mixed waste and are based on cost intensive centralised systems. The total waste that is processed takes into account the incoming waste that comes to the plant every day; however not all of this is processed. This further compromises on the quality of compost, RDF and recyclables.

Adopting a decentralised model helps cities manage waste better. Muzaffarpur, Bihar adopted a zero landfill model, and now has two processing centres which take segregated waste from 34 wards of the total 49. This has led to savings in transportation cost and the local municipality is earning revenue by selling compost. Also, collector gets incentivised for the dry waste. 42 urban local bodies of Bihar were recently asked to adopt a similar model. Many cities in Chhattisgarh are likely to follow the example of Ambikapur.

Waste to Compost

As per SBM by August 2018, 616 wastes to compost centralised plants are operational in the country. In April 2018, SBM claimed that there were 145 functional compost plants in the country while 150 plants were under construction. However, there is no list or account of these plants available for public. A recent document by the Union Ministry of Urban and Housing Affairs on co-processing *Guidelines on Usage of Refuse Derived Fuel in Various Industries* says that there are 52 centralised composting plants operational in the country and another 147 are under construction.

Although compost under SBM has caught the nation's attention but India still lacks an appropriate market and implementation mechanism for the Policy on Promotion of City Compost. It was estimated that the new federal incentives for the production of city compost would boost the use of city compost amongst farmers. However, neither manufacturers/fertiliser companies nor the farmers seem interested in city compost due to high cost and questionable quality. Apart from a few fertiliser companies, who have received 50 per cent of the 'on account payment', the majority of the manufacturers/companies have not got the subsidy. This has created a major hindrance in promoting city compost as envisioned.

Waste to Energy

As per SBM, seven plants of 88.4 MW are operational Waste to Energy (WTE), but only five WTE's are actually operational in India. Plants with power generation capacity of 415 MW are under consideration. One needs to relook on the viability of WTE in the country, considering there is only a limited fraction of waste that is fit for incineration- approximately 15-20 per cent of the total city's waste as waste-to-energy plant can only treat non-biodegradable, non-recyclable high calorific value. These proposed plants collectively have more capacity to treat the waste than they viably can.

Of the Rs 7,365 crores allocated for SBM for SWM, only 2126.24 crores (28 per cent) only have been dispersed so far. Rajasthan state has utilised maximum funds for solid waste management till date (94 per cent) but there is no significant waste management system on the ground in the state.

Since cleanliness has become a movement like never before, this is the right time to address the bigger challenges- infrastructure, municipal capacity, corruption and social engineering in waste management. Although substantial work has been undertaken for capacity building and public awareness, the impact on the ground may be overstated. Priorities should be straight- segregate, collect and treat!

DownToEarth

Waste

From garbage to electricity: Goa reaches new waste management milestone

State-of-the-art facility at Cacora adopts an integrated approach to tackle South Goa's waste challenges

The Cacora Integrated Solid Waste Management Plant represents a significant step forward in sustainable waste management for South Goa. Kaifee Jawed

Kaifee Jawed

Published on: 06 Sep 2024, 3:52 pm

The Goa Waste Management Corporation (GWMC) has reached a significant milestone with the establishment of a 100 tonnes per day (TPD) Integrated Solid Waste Management Plant in Cacora, South Goa. The facility is designed to manage municipal solid waste from both municipalities and panchayats in the region.

The plant is located on a site that was previously an open dumping ground, which has since been remediated and transformed into a modern waste management facility. The state-of-the-art facility was inaugurated by Prime Minister Narendra Modi February 6, 2024.

The Cacora plant is a brownfield project, meaning it was developed on a previously used site. The legacy waste at this location was remediated to recover the land for the new facility. The project is estimated to cost Rs 173.98 crore.

It is based on a public-private partnership model, with the state providing 75 per cent of the funding, supported by a National Bank for Agriculture and Rural Development loan under the Rural Infrastructure Development Fund and the concessionaire providing the remaining through equity. The GWMC has also provided essential infrastructure, including land, access roads, electricity and water connections.

The plant is the second of its kind established by the corporation in Goa, after a solid waste management facility in Saligao, said Ankit Yadav, managing director of GWMC. "The Cacora facility incorporates similar technology and builds on the operational experience of the Saligao plant. The facility adheres to the Solid Waste Management Rules, 2016 and employs a comprehensive approach, including recycling and sorting lines, segregation, biomethanation and composting," he added.

The operations of the facility are overseen by an expert committee led by Padmashree Sharad Kale, a former Bhabha Atomic Research Centre scientist, with contributions from the National Environmental Engineering Research Institute, Indian Institute of Technology Bombay, Birla Institute of Technology And Science, Pilani and other waste management experts from Goa.

The Cacora facility serves both rural and urban populations in Quepem, Sanguem, Dharbandora and Canacona talukas, covering around 30 village panchayats and four municipal councils. The facility can process 60 TPD of wet waste and 40 TPD of dry waste, resulting in production of recyclables, electricity, compost and liquid fertiliser. This initiative supports India's Swachh Bharat Mission and Goa's vision for a *Nitol Goem* (clean Goa).

The plant's efficiency is boosted by regular monitoring from an independent committee, resulting in a high biogas yield of 130-140 cubic metres per tonne of segregated municipal solid waste, with methane content at 60 per cent, said Shashank Dessai, plant in-charge at GWMC.

Only 4-5 per cent of processed inert waste ends up in landfills — significantly below the national standard of 10 per cent — and the recovery rate for recyclables is 22 per cent. All wastewater generated from the process is recycled. These achievements are an evidence of the plant's consistent performance, Dessai added.

Waste collection is initially handled by panchayats and municipalities, which store the waste at secondary points. GWMC then transports the segregated waste using specially designed vehicles.

Specially designed vehicles for segregated wet waste collection Kaifee Jawed

Upon arrival at the plant, dry waste is directed to a feeding bunker for the segregation of recyclables such as plastic, paper, cloth, metal and cardboard. These materials are then sent to recycling units in Karnataka and Mumbai, while non-recyclable waste is transported to cement industries in Karnataka for co-processing at a cost of approximately Rs 1,500 per tonne.

The plant processes around 60 tonnes of wet, segregated waste daily through a biomethanation process to generate electricity. The thermophilic digester produces 130-140 cubic metres of biogas per tonne of segregated wet organic waste. The facility generates approximately 8,000 cubic metres of biogas daily, which is used to produce electricity through an 800 kilowatt generator.

Currently, the plant produces 17,000 units of electricity daily, with 40 per cent used in-house and the remaining 60 per cent supplied to the grid at a rate of Rs 5 per unit. Additionally, the plant generates 1,600 units per day from solar power and produces 4-6 tonnes of compost daily.

Water is a critical resource for operating the biogas plant, with 1,000 litres required per tonne of segregated wet organic waste. To manage potential water shortages, the plant has a 450 kilolitres per day effluent treatment plant to treat wastewater from the digester, washing units and other sources. The recycled water is reused in the process and for gardening.

Recycling water through an effluent treatment plant Kaifee Jawed

The concessionaire is paid approximately Rs 3,000 per tonne of processed waste on a monthly basis, based on performance evaluations according to agreed indicators. User fees are collected by panchayats and municipalities, with no processing costs charged by GWMC. These expenditures are justified by the significant environmental benefits and electricity generation.

A notable feature of the facility is its in-house training and capacity-building programme, aimed at upskilling workers and improving the plant's operational efficiency. The training centre also educates school and college students. So far, the programme has trained 1,400 school students, raising awareness of waste management challenges and solutions. The cleanliness and hygiene maintained at the facility further distinguish it from other waste management centres.

However, the plant has faced challenges, particularly in maintaining a steady supply of segregated waste needed for the biogas facility. This has been addressed through regular awareness campaigns and enforcement measures, supported by political will and administrative backing.

The Cacora Integrated Solid Waste Management Plant represents a significant step forward in sustainable waste management for South Goa. It addresses the region's waste disposal needs while contributing to broader environmental goals, providing a model for other areas to follow.

DownToEarth

Energy

Turning trash to treasure: This woman-led waste management model in Goa is a success story

Goa has successfully transformed a towering landfill into an integrated solid waste management facility

Photo: GWMC

Rahul Jain

Published on: 04 Aug 2023, 9:19 am

In a remarkable effort to address waste management challenges and protect its pristine beaches, Goa has successfully transformed a towering landfill into an integrated solid waste management facility. This facility in north Goa's Saligao spans approximately 12 hectares and caters to waste generated at popular beaches like Bagha, Calangute and Anjuna as well as village Panchayats.

The plant, which is operated on a public-private partnership model between the Goa Waste Management Corporation (GWMC) and Hindustan Waste Treatment Pvt Ltd, has been a game-changer in sustainable waste management.

The facility's inception in May 2016 marked a turning point for waste management in Goa, with an initial capacity to handle 120 tonnes per day (TPD) of waste. Over time, it has significantly expanded, doubling its capacity to 250 TPD by December 2021.

The impressive thing about the plant is that it is run under the leadership of Gargi Raote, who is among the few women to head a waste management plant in India. The integrated solid waste management facility employs an advanced approach to treat municipal solid waste.

Rohan Ghadi, engineer at GWMC, told *Down To Earth:*

> The plant receives segregated organic (wet) and inorganic (dry) fractions, which amount to 150 TPD and 100 TPD, respectively. The inorganic waste is separated into 16 different fractions, out of which some materials are recycled and others are used to generate refuse derived fuel (RDF). The produced RDF is supplied to cement factories in Maharashtra and Karnataka at zero cost.

The wet organic waste is used to produce biogas which is then converted to electricity. There are a total of three anaerobic-type thermophilic continuous stirred-tank reactors.

This plant generates 17,000 cubic metres of biogas per day (m3/day). Of this, 13,000 m3/day is utilised for power generation after removing moisture and hydrogen sulphide. Three gas engines (170 kilowatts, 600 KW, 600 KW) produce 1.37 megawatts (MW) of electricity daily from the biogas, delivering a monthly total of approximately 32 MW.

"The surplus electricity, approximately 20-22 MW, is supplied to the grid at a rate of Rs 5 per unit, and the rest is utilised to run the facility," said Raote.

Additionally, 25-30 tonnes of sludge is produced per day, which is turned into solid compost (6-8 tonnes per day) in a covered aerated drying hall that covers an area of 4,000 square metres. The generated compost is sold at Rs 4 per kilogram and some part is distributed free of cost for social welfare, she added.

"The initial setup capital cost of the facility was Rs 146 crore, with an additional investment of Rs 103 crore during the expansion to a capacity of 250 TPD. GWMC pays Rs 2209.6 + 18 per cent goods and services tax to Hindustan Waste Treatment Pvt Ltd, for treating one tonne of waste," Levinson J Martins, managing director of GWMC, told *DTE.*

There is no tipping fee levied on village Panchayats for depositing wet waste at the facility. These expenditures are justified by the considerable environmental benefits and electricity generation from the biogas plant, which operates continuously without failures, Martins added.

The success of the plant can be attributed to several crucial factors. First and foremost, through the Department of Science, Technology and Waste Management, the Government of Goa demonstrated unwavering political will in forming GWMC. The entity, which is distinct from municipalities, is headed by the chief minister of Goa.

Second, due to a consistent information, education and communication strategy employed by GWMC, the level of waste segregation has shown significant improvement — rising from 60 per cent in 2016 to an impressive 90 per cent presently. This has been a result of better awareness and education initiatives that encourage proper waste segregation.

Additionally, a plant monitoring committee comprising bureaucrats from technical backgrounds ensures regular monitoring and suggests solutions to operational challenges. Moreover, incentives tied to the plant's performance have been offered to motivate GWMC staff, encouraging dedication and efficiency.

Goa's integrated solid waste processing plant stands as a testament to sustainable waste management practices. Its transformation from a landfill into a state-of-the-art facility demonstrates the positive impact that dedicated efforts and political will can achieve.

By effectively treating and generating electricity from waste while promoting waste segregation and community engagement, this plant serves as an inspiring model for other regions seeking to combat waste management challenges and embrace a greener future.

ET Realty.com

Goa: GWMC secures patent for laterite-based concrete block

The laterite-based concrete block will result in a cleaner environment and less contamination of soil and groundwater, a senior GWMC officer said.

Murari Shetye · TNN

Published On Apr 9, 2024 at 07:00 PM IST

Representative Image

PANAJI: In a first for Goa govt, the Goa Waste Management Corporation (GWMC) has secured a patent for Laterite-based Concrete Block for a term of 20 years.

The laterite-based concrete block will result in a cleaner environment and less contamination of soil and groundwater, a senior GWMC officer said.

The 20-year term allows revenue generation through private manufacturing with royalty payments. 'This patent opens new opportunities for sustainable waste management,' said the GWMC.

The main objective of the invention is to effectively use the construction and demolition (C&D) waste, generated from demolition of buildings and structures, and to minimise unnecessary use of cement which not only contributes to an increase in cost of a structure but also results in reduced strength.

A senior officer said that the invention provides a solution to the problems created by construction debris and waste materials and provides a composition which utilises industrial waste, amongst other ingredients, for producing bricks.

'Invention will help mop up revenue'

The present invention involves a synergistic composition by mixing C&D waste and other ingredients in a fixed proportion. It produces a laterite-based concrete block consisting of fines in laterite-based recycled aggregates," the senior officer said.

"The invention directly contributes to preventing illegal dumping of C&D waste. It will lead to a significantly cleaner local environment, as C&D waste is a major waste stream in Goa. The groundwater resources in Goa will also have a higher protection against unwanted leaching, as the C&D waste will be recycled and turned into new concrete blocks," the senior officer said.

"The laterite-based concrete block can be produced with 100% recycled aggregates without compromising mechanical strength. In addition, it is significantly more climate-friendly, due to significantly reduced green-house gas emissions," the officer said.

Now private players interested in manufacturing the blocks can approach the corporation and secure permission to manufacture the blocks. "This invention will help the corporation dispose of the waste in a scientific manager and generate revenue through royalty," the officer said.

The GWMC along with assistance from SINTEF and Institute for Building and Infrastructure had submitted the proposal for patent.

The GWMC had applied for this patent in 2021. The corporation's technical partner was SINTEF research organisation from Norway and SINTEF scientist Christain Engelsen was associated with the GWMC for the invention. Advocate Shalini Sitaraman represented GWMC before the patent office, govt of India.

Community engagement a must for implementing & sustaining good urban practices

By Elets News Network 20-August-2021

Share:

For a long time now, practitioners in the urban development sector have been advocating that for any programme or project to be sustainable and robust, it is imperative to ensure buy-in from its stakeholders. This involves engagement with stakeholders to diagnose a challenge and jointly find solutions, writes **Paramita Datta Dey**, Program Lead - Sustainable Cities Integrated Approach Pilot, **NIUA**.

India's commitment to SDG 11.3 promotes that "by 2030, the country will enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management in all countries". The landmark 74th Constitutional Amendment Act, enacted on June 1, 1993, empowers Urban Local Bodies (ULBs) to implement local development works and solve other issues through a participatory approach. This policy lever gives power to citizens to participate in decision making at the ward level through ward committees and 'area sabhas'. However, in many cases, the devolution of responsibilities was not accompanied by the devolution of funds. Hence change on the ground has not been as envisaged. Some of the common challenges include limited autonomy of ward committees, inadequate representation of representatives from the civil society and inadequate platforms for engagement of citizens. In some states like Kerala and West Bengal, the legislative provisions have been appreciated.

Awareness campaign on waste segregation

The Annual Survey of India's CitySystems (ASICS) 2017 has evaluated the quality of governance in cities. It assesses 23 Indian cities spread over 20 states, based on 89 parameters. One of the important takeaways from the report is the absence of platforms where citizens can participate in civic matters in their neighbourhoods. It articulates that this can be remedied by enacting 'public disclosure' and 'community participation laws'. These laws were rolled out as part of reforms mandated for ULBs that received funding from the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) but met with limited success in many states due to lack of devolvement of funds. The concept of 'area sabhas' or consortiums linked to 'ward committees', ensured local engagements at the ward level and was mandated as a part of the Community Participation law. Despite the constitutional provisions regarding the devolution of power, implementation on the ground has not happened as envisaged. According to a recent report on urban democracy by the Praja Foundation, nine cities out of the 29 cities surveyed by them, have functional ward committees. As per the Annual Survey of Cities Report (ASICS 2017) published by Janaagraha, only Hyderabad and Guwahati have constituted 'area sabhas' in all wards. Due to this, participatory planning at the local level is constrained.

Participatory engagement in programmes has shown success on-ground when implemented in a mission mode. A case in point is the Swachh Bharat Mission (SBM). The mission is a living example of how community engagement has led to its success and has been credited to have driven behaviour change at scale. Let us examine the reasons behind SBM's success.

Leadership on top:

The call to action from the country's Prime Minister was crucial to mobilising support and participation from stakeholders across various sections of society. Thus, the campaign turned into a "Jan Andolan" or people's movement.

Capacity building programme for state & ULB officials

Allocation of sufficient resources:

The programme was backed with adequate resources and a budget of over US $20 billion.

Concept of speed and scalability factored into the design of the programme:
The program was designed keeping scalability in mind with an objective to reach everyone, everywhere. SBM encouraged the creation of several sustainable and demonstrative models emphasising quality service delivery.

Persistent engagement with executors on ground:
Systematic and periodic convening and regular interactions were organised by the top leadership at the centre (Mission Director) with those at the state level (State Mission Directors), city managers (commissioners). This was instrumental to drive the sanitation agenda in cities. A lot of the success is attributed to the joint and collaborative efforts of the elected leaders (mayors, chairpersons, councillors) and administrative heads (municipal commissioners) who worked in tandem in cities and ensured continuous involvement of citizens.

Consistent capacity building:

Various cross-learning platforms, workshops, training programmes and site visits have played a vital role in ensuring interactive peer-to-peer learning and demonstration of on-ground action. This has created a cascading effect on scaling up success stories and fuelled innovation.

Awareness on SBM through wall messages

Leaving none behind:

SBM was designed with the citizen at the core. It promoted the use of culturally ingrained popular mass media drivers like street theatres, folk art, music and movies. It used the high penetration of mobile phones in India and thus developed tools like mobile apps to ease access to safe and better sanitation and also disseminate the messages of cleanliness or swachhta. The main thinking behind this was more the triggers and recall, faster would be the change in behaviour. It also fostered women and children as change agents for speed and scale.

Celebrating success:

The annual Swachh Survekshan and awards at various levels created a sense of accomplishment for achievers. Not only did these achievers inspire aspirant states and cities to strive more, but they also encouraged them to work on innovations by tweaking existing practices. Since the competition was annual, it gave cities and states to learn from their and others mistake, improve and leapfrog. The Swachh Survekshan also evolved with its participant cities from measuring outputs and outcomes to emphasising sustainability, institutionalisation and integrated and circular approaches.

Street play performance to spread awareness on Swachh Bharat Mission

The Way Forward

In a country like India, with its scale and diversity, success can be sustained when it is accompanied by institutional changes. An urban service, like sanitation, is a state subject in India and states have competing priorities and levels of development, even if the urban services improvement projects are funded by the Centre. Therefore, unless the 74th Constitutional Amendment Act is fully implemented with functions, funds and functionaries, sustaining the success of any mission will remain to be a challenge, which may lead us to lag behind in achieving the goals set by the SDGs.

NIUA's recent efforts in capacity building in waste management

By **Elets News Network** - June 5, 2023

The National Institute of Urban Affairs (NIUA) has been valued as a key partner organisation for various capacity building initiatives that are part of the flagship urban development programmes of the Ministry of Housing and Urban Affairs (MoHUA), Government of India like the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Mission (SCM) and the Swachh Bharat Mission (Urban). Through this article, **Hitesh Vaidya, Director, NIUA and Paramita Datta Dey, Head, Resources and Waste, NIUA**, share their experiences and insights from one such vibrant programme, the Swachh Bharat Mission (Urban).

Launched on October 2, 2014, the Swachh Bharat Mission (Urban) or SBM (U) is one of the most ambitious initiatives undertaken by the Government of India. The mission had the twin objectives of making urban India open defecation-free along with 100 percent scientific management of solid waste. To achieve this, it was important to build the capacity and knowledge of the municipal officials, who had the challenging task of implementing and ensuring the guidelines stated in the Solid Waste Management Rules, 2016.

On behalf of MoHUA, NIUA was entrusted with the task of organising training and exposure workshops for the Urban Local Bodies (ULBs) from 2016 up to 2020. In these five years, the institute conducted 154 workshops spread across 58 locations in India that witnessed the participation of 6160 officials and elected representatives from 3221 Urban Local Bodies.

This programme was designed keeping in view the needs of the participants. Hence a variety of features were incorporated which eventually led to its popularity. These include providing on-ground exposure, enabling cross-learning efforts, workshops designed for smaller cities and towns, incorporation and use of sustainable and green products, and a focus on convergence. This consistent plan helped build an effective and easily replicable model. To begin with, the institute conducted Training of Trainer Workshops and partnered with experts and organisations that had a rich knowledge of the subject as well as local conditions. This enabled the effective dissemination of knowledge.

Each three-day workshop began with the orientation of the participants regarding policies, practices and technologies for effective management of solid waste management, wastewater and Fecal Sludge and Septage Management (FSSM) on the first day. The second day was exclusively reserved for field visits for the demonstration of centralised and decentralised waste management technologies. These sites were carefully chosen to highlight innovative and good practices being implemented across the nation for uptake by other ULBs of the cluster. These sites were chosen from 58 cities across India and included visits to the landfill sites, Waste to Energy Plants, Construction and Demolition Waste Recycling Plants, decentralised wet waste composting sites, Material Recovery Facilities (MRF), bio- methanation plants, Fecal Sludge Treatment Plants (FSTP) and Solid and Liquid Resource Management (SLRM) Centre. Visits were also organised to Integrated Waste Management Facilities to show how a combination of technologies can work when bundled together.

The last day began with a summary of what was communicated during the previous two days. This recapitulation was done through group activities and a quiz to test how much knowledge the participants were able to assimilate during the course of training and the field visits. One of the most pivotal sessions of the closing day focused on developing a financially viable and sustainable waste management plan for the cities. It concluded with a presentation by the participants on the business models they came up with. It was followed up by feedback and impact assessment. These assessments done at the individual and group level helped in comparing the knowledge pre and post-workshop and if the participants' perspectives had widened and myths dispelled. The pre and post-workshop assessments were mapped through a survey in the last lap. The feedback indicates an improvement of nearly 12 per cent in the understanding and knowledge of the participants. To practice what was preached, care was taken to ensure that these were green events that included the workshop kits comprising metal or glass water bottles, notepads made of recycled paper, and token prizes and mementoes made up of upcycled materials.

As an outcome of this journey and with an overall purpose to disseminate the takeaways and experiences with a wider audience keen on working towards sustainable waste management, NIUA has produced a series of knowledge products and compendiums. These documents are a compilation of the various waste management practices and innovative approaches undertaken and initiated across the nation. It provides information on cities that have shown commendable efforts in solid waste management practices. Additionally, keeping in view the appetite and ease of learning, the team developed a portal collating the information and data gathered across various cities over the past five years. The portal is an interactive GIS platform that provides the user with an opportunity to traverse through the journey of several sustainable and innovative practices adopted across Indian cities. Through the click of a button, one can browse through the entire value chain of waste management beginning from the collection, transportation, processing, treatment and disposal, across cities classified into different population sizes and characteristics (like tourist cities, capital and administrative cities, industrial and commercial cities and trailblazers). The impact of the project has been far- reaching across the country and the same is showcased through the 'impact stories' and 'feedback' from participants.

The achievements of these workshops have been due to the comprehensive and inclusive format of the workshop. The workshops provided a holistic opportunity for cross-learning. We present some of the key takeaways:

The twinning of cities: Going forward, the various annual "Swachh Survekshans" or National Cleanliness Surveys have been collating information and awarding well-performing cities. Those that have achieved considerable success at scale can be the mentors and thus help a recipient city (mentee) or a small cluster of cities to imbibe lessons and hand-hold to implement good practices.

Cross learning among cities: Cities can be clubbed and dedicated workshops can be designed for cities with similar challenges and opportunities (e.g. those located in hilly areas, coastal areas or famous as religious or pilgrim towns).

Upscale the workshops for elected representatives: Based on the good response received from the workshops conducted for elected representatives, it is worthwhile to scale it up for all elected representatives in the country.

Workshops for targeted groups of stakeholders: Our experience has shown that there is a need to conduct workshops for some target groups like ground functionaries (Swachh Mitras and Safai Mitras) and Bulk Waste Generators (e.g. RWAs, Educational institutes, office complexes, hotels, etc.). Workshops for Safai Mitras have already been initiated for those ULBs that have participated in the 'Safai Mitra Suraksha Challenge' (the challenge for 'Machine Hole to Man Hole').

Link waste management with the creation of green jobs and a circular economy: The concept of circularity in waste management holds a lot of promise when promoted through the use of biodegradable, upcycled and recycled products. This will also facilitate the skill development of marginalised groups in the preparation of such products and add to a reduction in GHG emissions, thereby aiding in the achievement of Sustainable Development Goal 11.6.

Periodic 'Swachh Melas' or Fairs can act as marketplaces for the exhibition of innovative, affordable and home- grown technologies and products in waste management along with the display and sale of biodegradable, up-cycled and recycled products.

The conduct of an SBM Fellowship Programme can give students and youth the much-needed exposure to understand ground realities by working with institutions and stakeholders in this sector (e.g. working with ULBs).

Thesis competitions on waste management and circularity will be a good channel to enrich the sector with fresh and innovative ideas from young minds.

Creation of a National Waste Management Alliance: The empanelment of training institutes, agencies and experts will make collaborations faster to achieve outcomes. This has been incorporated in the guidelines of SBM 2.0 and efforts on creating dedicated 'Centres of Excellence' has been initiated.

Establishing Learning Platforms: Development of curriculum, e-modules, learning and gamification apps, online and face-to-face training and site visits, customized courses linked to citywide projects, certified courses endorsed by MoHUA and NIUA linked to 'Swachh Survekshan' or the annual cleanliness surveys and related protocols, are imperative. Much of this is being taken up as part of the National Urban Learning Platform of MoHUA and NIUA.

Ministry of Housing and Urban Affairs
Government of India