Odisha's Journey of Faecal Sludge and Septage Management

Towards sustainable sanitation goals

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Message

Odisha has taken significant strides on the path towards Swachh Odisha, Sustha Odisha. The state has adopted various innovative approaches to address sanitation challenges across urban and rural regions in improving the sanitation landscape. Housing & Urban Development Department has taken sustainable efforts towards comprehensive sanitation across all the urban local bodies to provide clean and healthy living environment.

As a part of such an initiative, the state is now implementing BASUDHA scheme to ensure provision of piped water supply in all the towns, so as to achieve our mission of ensuring water tap to each household before March 2019.

Establishing septage treatment facilities in 11 large towns of the state, which constitute more than two-thirds of the urban population along with adoption of septage management guidelines and regulations by all the urban local bodies to provide regulatory enforcement framework are praiseworthy initiatives of the Housing & Urban Development Department.

I am glad that encouraged by the success achieved in the implementation of septage facilities in pilot towns, the Housing & Urban Development Department is scaling up the initiatives to cover all the urban areas in the state.

I am confident that Odisha will lead by example and will provide long-term inclusive and sustainable models to facilitate replication across the country. Odisha has been a torchbearer in the country and the book showcases our interventions in this field.

Shri Naveen Patnaik
Hon'ble Chief Minister of Odisha

The impact of unsafe sanitation conditions are immense and is adversely affecting the population, particularly the urban poor, women and children. With growing urbanization and population explosion, it's a challenge to provide sanitation facilities to all. Along with construction and usage of toilets, septage management is critical to provide healthy habitations to citizens, to make cities livable and the environment clean. The Government of Odisha has initiated policy-level measures for implementing septage programs. The state government in association with development partners has spearheaded the septage program in Odisha by creating sustainable solutions and models that can be taken up by others. A significant progress has been made through a collaborative multi-stakeholder approach in the state in last four years in this field.

In the first phase, the program was rolled out in 11 cities including the nine Atal Mission for Rejuvenation and Urban Transformation (AMRUT) cities and Angul and Dhenkanal, where urban local bodies (ULBs) have taken up initiatives to come up with contextual solutions and innovative models by following the septage management guidelines. The program has focused on being community-driven, citizen-led and viable through effective intervention tools. In addition, the synergy between various government schemes has proved out to be effective in implementing the faecal sludge and septage management (FSSM) program at the ground level.

The ULBs have taken steps to create an enabling environment in the cities. Technology and policy decisions have been used to make the cesspool emptying services more accessible to people in some of the ULBs. Women self-help groups (SHGs) have been involved in the sanitation programs where they drive the FSSM program in cities. Despite the FSSM program being at a nascent stage, Odisha has been able to create success by leading through examples and proving through solutions. This book outlines the state's experience in implementing the FSSM program in Odisha and I am confident that it will be a valuable resource for all the communities of practice associated with FSSM.

As we move ahead, we recognize that there are no quick fixes or easy answers to tackle the challenges in the sanitation value chain. However, we are determined and committed to expanding the FSSM program throughout Odisha, to achieve our goal of a sanitized, healthy and livable state.

N. Pujari

Shri Niranjan Pujari
Hon'ble Housing & Urban Development Minister of Odisha

Mess

India's rapid urbanization makes it imperative to address the challenges in sanitation to generate positive socio-economic outcomes. The launch of the Swachh Bharat Mission (SBM) has paved the way for attaining the goal of total sanitation. The success of the mission may be attributed to galvanizing of multi-stakeholders' efforts, which opened up new avenues to share knowledge and expertise, facilitate technology transfer, leverage alternative financing mechanisms, mobilize resources and holistically provide basic sanitation facilities for all.

Initiatives such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), has provided opportunities to states for expanding their respective sewerage networks and adopt complementary approaches such as faecal sludge and septage management (FSSM). Central government in consultation with stateslunion territories (UTs) prepared FSSM Policy, 201 7 and promoted institutionalizing FSSM initiatives across India.

Odisha has pioneered along with a few other states to take quick measures to implement FSSM interventions. State mandated policy measures such as the Odisha Urban Sanitation Policy and Odisha Urban Septage Management Guidelines have given a conducive environment to the state for FSSM's implementation.

A two-day National Workshop on FSSM is a step in this direction to propagate large-scale adoption of FSSM measures across the country to promote complete sanitation. I am confident that, through this book, Odisha will showcase its progress and be a light bearer for other states in achieving improved and sustainable sanitation.

I extend my best wishes to the Housing & Urban Development Department, Government of Odisha, to achieve greater strides and set new standards in FSSM implementation and overall improvement in sanitation.

Durga Shanker Mishra
Secretary, Ministry of Housing and Urban Affairs

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With rapid urbanization and increase in public awareness for clean, healthy and liveable cities, the demand for sanitation-related public services and safe drinking water has grown manifold. Over the past three years, Odisha has taken a giant leap along the path of Swachha Odisha, Sustha Odisha (Clean Odisha, Healthy Odisha) by undertaking massive efforts to make the urban centers open defecation free and clean with access to safe drinking water through robust practices of faecal sludge, septage and solid waste management.

Housing & Urban Development Department has been at the forefront in driving the implementation of effective strategies to improve the water and sanitation services in the urban areas. Intensive efforts have been made to attract private sector investments for infrastructure development, technological solutions and capacity building. As an outcome of the efforts, there have been visible differences in terms of coverage and quality of services delivered by the ULBs. I compliment the Department and its partner organizations for their achievements as the state gallops on the path towards the goal of Swachha Odisha, Sustha Odisha.

Furthermore, I appreciate the efforts put in for organization of the national seminar on faecal sludge and septage management (FSSM) and release of book - Odisha's Journey of Faecal Sludge and Septage Management: Towards sustainable sanitation goals. I am sure that this book will serve as a reference document for the cities and states which plan for FSSM interventions.

I wish the publication all success.

Shri A.P. Padhi
Chief Secretary, Odisha

Mess

Sanitation in India is fast progressing from being just about the construction of toilets to being about end-to-end management of the sanitation value chain, with a special emphasis on waste treatment and financing. The sector is also becoming more exciting and diverse, with a range of private- and public-sector partners playing hugely important roles. At such a time, it is inspiring to see Odisha's faecal sludge and septage management (FSSM) journey. The state is a good example of how FSSM can be done at scale with a strong government will. I congratulate the Department of Housing and Urban Development, Government of Odisha and the people of Odisha for this accomplishment. This FSSM journey book for Odisha will inspire programs and strategies to address India's challenges on safe faecal waste disposal. We are happy to be part of this journey and look forward to seeing how Odisha shall expand the FSSM program throughout the state.

Brian Arbogast
Director
Water Sanitation & Hygiene
Bill & Melinda Gates Foundation

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Message

One of the biggest lessons that come from our work in sanitation around the world is the vital role that political will and commitment play in ensuring that safe and sustainable sanitation is universally made available in countries. This truth is displayed in real terms in Odisha. The state government's unerring commitment to ensuring not only that the state is set on a trajectory for ensuring universal access and coverage with safe sanitation, but that it does so in a short period of time is inspiring. The leadership for this comes not only from the state's Chief Minister and his ministerial colleagues, but to every official in the Housing & Urban Development Department led by the Secretary.

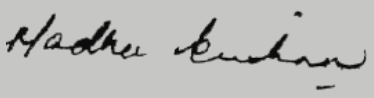
It is this remarkable vision that has kept the state open to new ideas and honest in the short comings of its programs. When the foundation started its partnership with the state government, it brought to light some gaps in the treatment of human waste, or Faecal sludge management (FSM) that were prevalent, not only in Odisha but across India. The Odisha Government was one of the first to acknowledge these gaps to seek technical assistance and support to unearth innovative and cost-effective solutions to address the problem. From proactively seeking out solutions – international or otherwise – to quickly equipping themselves with the technical know-how to implement FSM solutions, the state government leaped into the challenge with great gusto and intent.

The aim of this book is to provide an overview of the sanitation journey the state of Odisha and its technical partners have taken and the steps to focus on FSM, driven by the belief that the state owed both its people and its ecology this investment and attention. Given how relatively new the field of FSM is in India, the Odisha story will be of an immense value to states and other countries that are embarking on this journey and will benefit them with the lessons that were learnt and the paths that the state took to plan for sustainable urban sanitation for all its citizens.

As India completes one phase of its sanitation mission, it is important to remember that the journey has just begun. In urban sanitation today, especially, the issue of effective faecal sludge management requires enthusiasm, tenacity and dedication, so that the right models applicable to our urban context can be developed. Effective solutions and quality service delivery will necessarily need the combined efforts of governments, technical partners, civil society and citizens at large. It is important to remember that lack of sanitation affects the most marginalized more severely and that all infrastructure and service delivery must address the needs of the under-served and women in particular, to ensure safe, equitable and sustainable sanitation for all.

While the solutions are being implemented, there is a need for governments and partners to develop flexibility, an appetite for innovation and a willingness to learn from the mistakes, as urban scenarios evolve. In this new age of inter-connectivity and interdependence, it is necessary to provide practitioners, professionals, policy makers and implementers, as well as students with practical knowledge that they can apply to their work.

This book describes in detail the steps that the state government under the guidance of the political and official leadership took towards their goal of attaining safe sanitation for all over the last few years. We are very pleased at the progress that the state has made, impressed by the work that the government has already done and appreciate their efforts to make their story available widely for others to learn from and adapt. This book is a great step in that direction.



Madhu Krishna
Country Lead
Water Sanitation & Hygiene
India Country Office
Bill & Melinda Gates Foundation

Foreword

Odisha is experiencing a fast pace of urbanization which is accompanied by challenges of providing people of the state with good quality basic amenities such as water and sanitation. As the Government of Odisha has been committed to the cause of ensuring safe, healthy and sanitized towns and cities in the state, it took initiatives four and a half years ago to focus on safe containment, safe transportation, safe disposal and safe treatment of faecal matter. Considering the preponderance of on-site systems in the urban Odisha, the government realized that sewer networks cannot be the only solution for waste water management. Hence, the government has decided to opt for low cost, impactful non-sewer sanitation systems to make cities environmentally clean and safe for the citizens.

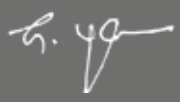
This booklet aptly captures the evolution of FSSM journey of the state by highlighting the genesis of FSM in the state with two small towns – Angul and Dhenkanal in early 2015. A pilot to demonstrate sustainable sanitation solutions was initiated in these two towns with the support of the Bill & Melinda Gates Foundation and Arghyam, implemented by Centre for Policy Research and Practical Action. The initiative was scaled to nine other towns under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) by 2016. Odisha has also notified the Odisha Urban Sanitation Strategy and Policy in 2016. Subsequently, Odisha Government issued the Odisha Septage Guidelines and Municipal Septage regulations, which are for adoption by all the municipal bodies. For undertaking Faecal Sludge and Septage Management in urban local bodies, capacities of all stakeholders involved in the process needs strengthening. Government of Odisha with the support under Project Nirmal brought out a training manual on non-sewered urban sanitation focusing on the entire sanitation value chain emphasizing on the various on-site sanitation systems to the safe practices of emptying, transportation, treating and recycling of faecal sludge and has undertaken an extensive capacity building exercise for the municipal functionaries.

Odisha Government had also brought cesspool vehicles for ULBs using state funds in early 2015 and ensured availability of cesspool vehicles with all the ULBs for safe collection and transport of faecal sludge/septage. An enabling environment has been created to facilitate private players to get engaged in operation and maintenance of cesspool operations. It has also been ensured that cesspool services remain within the limit of INR1,000 to reduce the burden on citizens, especially urban poor. The government has created standard operating procedures, the GPS installed on cesspool vehicles and escrow accounts for vehicle operators opened to ensure streamlining of cesspool operations.

Six septage treatment plants (SeTPs) are going to be commissioned on 26 October 2018 and three others are in the advanced stages of construction. All these SeTPs are based on energy-efficient technologies to ensure minimal operation and maintenance. The state has decided to scale up the implementation of SeTPs in all other towns. Till then, the state is implementing deep row entrenchment (DRE) measures in all other ULBs as a temporary and interim safe disposal practice.

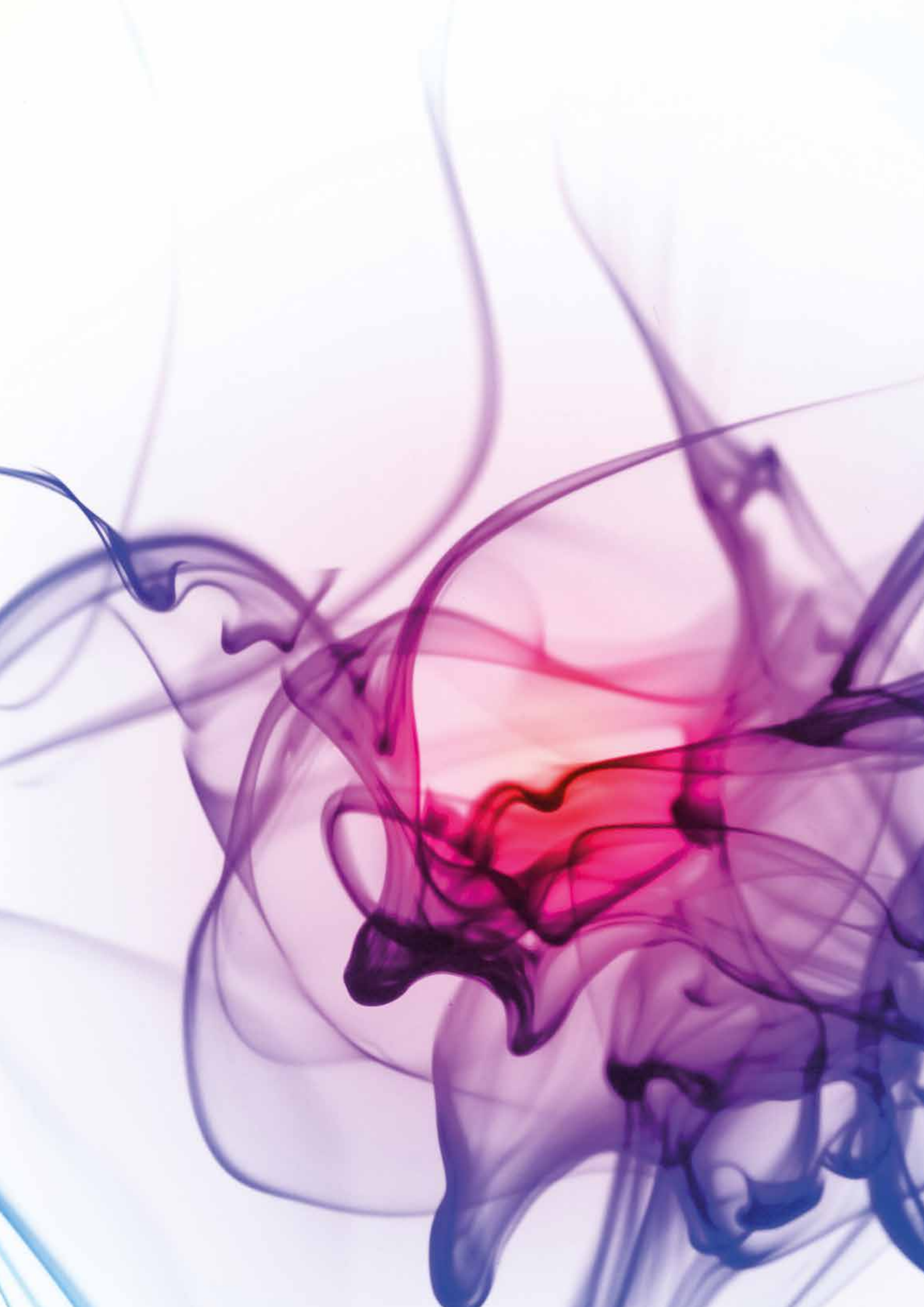
To make these structures, processes and systems sustainable, community participation is a key element. The government is committed to strengthen community especially the marginalized and is ensuring their participation in decision making, planning, and operation and maintenance of systems and infrastructure. We have tried to build and strengthen grassroots structures such as slum sanitation committees, ward level committees and city-level task forces and have attempted to build synergies with other community-based organizations formed under different programs of the government.

This book will be useful for municipal bodies, researchers and policy makers to gain insights from a journey, which has been truly enriching for us.



Shri G. Mathivathanan
Secretary, Housing & Urban Development Department, Governmnent of Odisha

In this report



Background

India's answer to sanitation challenge

1

The Government of India has made noteworthy achievements on increasing access to sanitation primarily facilitated through Swachh Bharat Mission (SBM), a flagship sanitation improvement program. The success of the program can be attributed to multi-stakeholder coordination, awareness generation, capacity building and convergence of financial resources.

Marked by such initiatives, India is on the pathway towards attaining Open Defecation Free (ODF) status by 2019. The next challenge is to sustain the ODF status and move beyond to attain ODF+ and ODF++ status with efficient and scientific liquid waste management across the sanitation value chain.

Did you know?

68%
urban households do not have access to a sewerage network to safely transport human waste.

85%
of liquid waste generated goes untreated and is disposed-off indiscriminately into the environment

The waste management challenge

The increase in access to sanitation also brought about an evident need to address the emerging liquid waste management challenges.

Untreated faecal sludge and septage from towns and cities is one of the major causes of surface and ground water pollution in India; posing threat to health, hygiene and environmental outcomes. In India, a majority of the households depend on onsite sanitation facilities wherein, safe management of human waste, which includes its safe containment, transport, treatment and disposal, is of utmost importance to make our cities healthy and livable. Furthermore, rising urban population and increasing access to sanitation exert pressure on the existing sewerage management systems.

The intervention

Recognizing the evident need to address the challenges, government mandated initiatives such as the AMRUT which was introduced with funds earmarked specifically to finance various programmatic interventions pertaining to liquid waste management[1], among other interventions. Besides the conventional sewer systems, initiatives like AMRUT took a step further to address the liquid waste management challenges by adopting complementary approaches such as FSSM for septage management in areas lacking sewerage system. For instance, FSSM was promoted as an alternative solution for efficient liquid waste management in small and medium towns where setting up sewer networks seemed unviable due to several reasons such as high cost, longer and complex construction phase and less density of population.

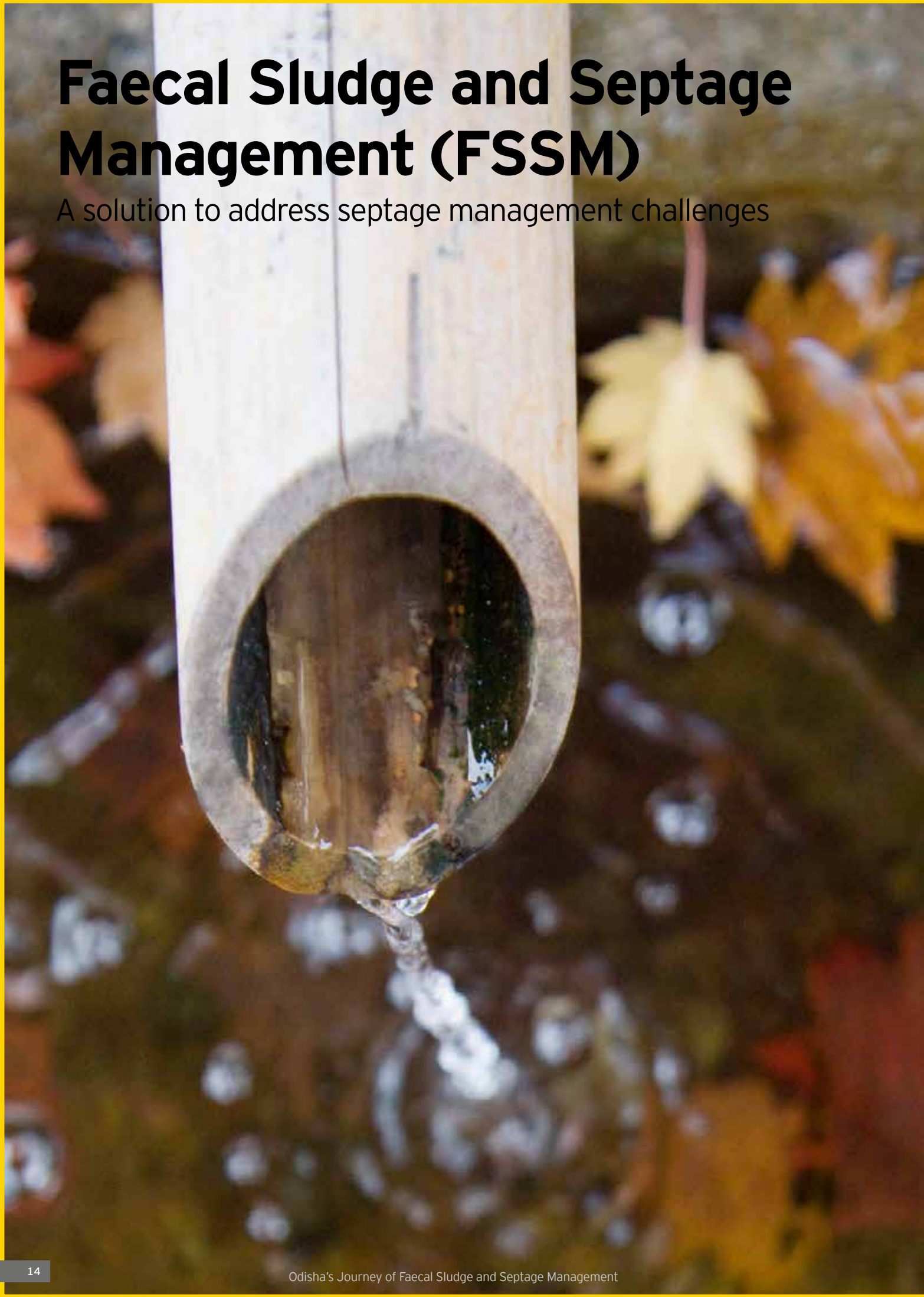
Food for thought!

What happens to the waste collected in septic tanks and pit latrines once everyone in India has an access to toilets but only a limited population has latrines connected to a sewerage system?

[1]http://amrut.gov.in/

Faecal Sludge and Septage Management (FSSM)

A solution to address septage management challenges

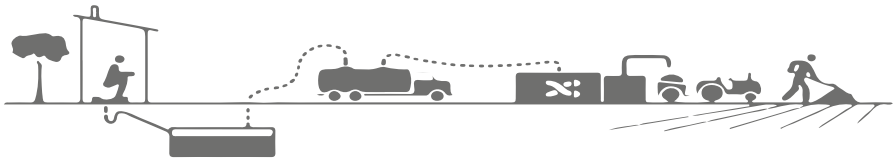


2

Fecal Sludge and Septage Management (FSSM) is an approach for end-to-end management of fecal waste collected in the pit latrines and/or septic tanks. FSSM can be applied to arrest harmful impact of poor sanitation in cases where provision of sewer network is unfeasible or takes longer duration.

FSSM Value Chain

Containment → Emptying → Transport → Treatment → Reuse/dispose



FSSM Advantage

Low cost (capital and operating expenditure)

Less time for implementation

No accessibility issues

Capture and Containment

Capture and containment focuses on ensuring toilets are connected to safe containment facilities such as septic tanks (if sewer is not available), which are constructed scientifically.

Emptying and transport

Emptying and transportation focuses on ensuring mechanized emptying and safe transportation of the collected faecal sludge and septage from the containment facilities.

Treatment and disposal

The focus is to create the required infrastructure to manage the waste generated to meet short and long-term waste management needs. The solutions range from adopting safe temporary disposal mechanisms, to investing in long- term solutions such as faecal sludge treatment plants.

FSSM in India

How it started in India?

Over the years, India has been implementing a succession of sanitation improvement programs. However, it was not until the inception of the National Urban Sanitation Policy (NUSP) in 2008, that septage management was accorded attention. NUSP initiated a framework for cities to prepare City Sanitation Plans (CSPs) under the state sanitation strategy. In addition, urban sanitation awards and ratings were also introduced based on the benchmark of sanitation services thereby incentivizing the local government agencies to act on improving the state of affairs of sanitation. FSSM in particular, gained further recognition in 2013 with an advisory note issued by the, erstwhile, Ministry of Urban Development (MoUD)[2]. This along with national workshops on sanitation policies and alternative options in smaller cities, helped build the understanding of alternative approaches including FSSM in urban sanitation[3]. This was followed by the nationwide Swachh Bharat Mission (SBM), which aimed to address liquid waste management as a component of the program by making proper containment unit an integral part of toilet construction. Following this, MoUD issued a primer on FSSM in 2016 to supplement the 2013 advisory note. The primer emphasized on the need to develop state-wide operative guidelines, city-level toolkits, operational manuals, operating plans and allocate finances for state-level FSSM implementation. As FSSM gained importance, the government also collaborated with various national and international partners to initiate both policy and operational measures at the national and state level. The formation of the National Faecal Sludge and Septage Management Alliance (NFSSM) was one such convention formed to build consensus around faecal sludge and septage management. This multi-stakeholder alliance works in close collaboration with the Ministry of Housing and Urban Affairs (MoHUA) and has assisted the government on the declaration of the National Policy on FSSM in 2017. The inclusion of FSSM parameters as part of National Cleanliness Survey viz. Swachh Survekshan was one of the recent national reforms on FSSM.

Given this, as India progresses to meet its sanitation goals, it is imperative that solutions such as FSSM are adopted in all large cities across India as a mechanism to provide non-network/non-sewered and cost-effective solutions complementary to centralized sewer network. In smaller cities with relatively less population density, FSSM can be an effective standalone solution.

[2]https://amrut.gov.in/writereaddata/FSSM_Policy_Report_23Feb.pdf
[3]http://www.cprindia.org/research/reports/report-and-proceedings-towards-universal-urban-sanitation-smaller-cities-priority

3

FSSM trajectory in India

1981
- Integrated low cost sanitation Scheme to convert dry latrines to pour flush latrines

1993
- Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993

2005
- Jawaharlal Nehru National Urban Renewal Mission
- Upgradation of sanitation facilities in selected slums under Basic Services to Urban Poor (BUSP) and Integrated Housing and Slum Development Program (IHSDP)

2008
- National Urban Sanitation Policy
- Service level benchmarks for water and sanitation

2010
- National sanitation rating of cities

2013
- Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013
- Advisory note on septage management

2014
- Swachh Bharat Mission (urban and rural)

2015
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT)
- Sustainable Development Goals (SDGs)

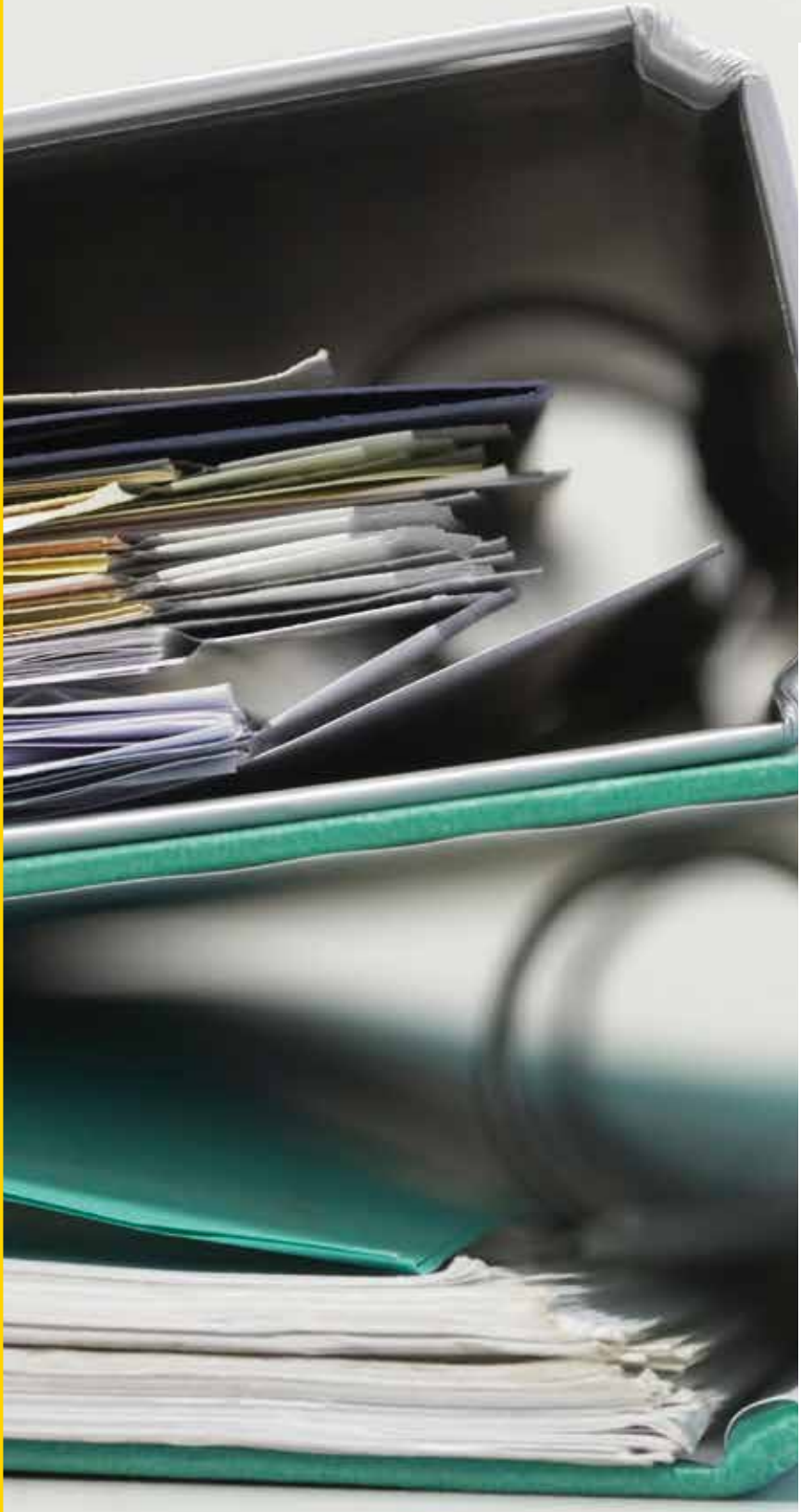
2016
- Primer on FSSM supplementing the Advisory note with state-wide operative guidelines
- National Faecal Sludge and Septage Management Alliance

2017
- National Policy on Faecal Sludge and Septage Management

2018
- FSSM implementation in India scaled up in the States of Andhra Pradesh, Maharashtra, Tamil Nadu, Telangana and Odisha

FSSM in Odisha

Odisha's way to address faecal sludge and septage management challenges



Following the national momentum, the Government of Odisha (GoO) is one of the frontrunners to have recognized the significance of adopting a comprehensive approach to FSSM in the urban areas. A serious cognizance of the adverse impact of untreated faecal sludge and septage on major rivers flowing across main towns of Odisha from where drinking water is drawn for treatment and supply triggered the need for safe management of septage. Early 2015, a river pollution abatement plan was developed which later became an integral part of Odisha Urban Sanitation Strategy (OUSS). An exposure to advanced faecal sludge and septage management practices in Malaysia for the senior bureaucrats of the state including commissioner-cum-secretary, H&UDD, Deputy Secretary, H&UDD and Member Secretary of OWSSB spurred the state to consider decentralized and/or non-sewered waste management as a method of treating the human waste safely. This also marked the beginning for the state to adopt a comprehensive FSSM program in the towns of Odisha. In 2016, soon after Malaysia visit, commissioner-cum-secretary, H&UDD made a presentation to Chief Secretary for initiating FSSM in all towns of Odisha in a phased manner. It was mentioned that INR213.75 crore will be required to cover all ULBs under FSSM till year 2020.

4

The journey

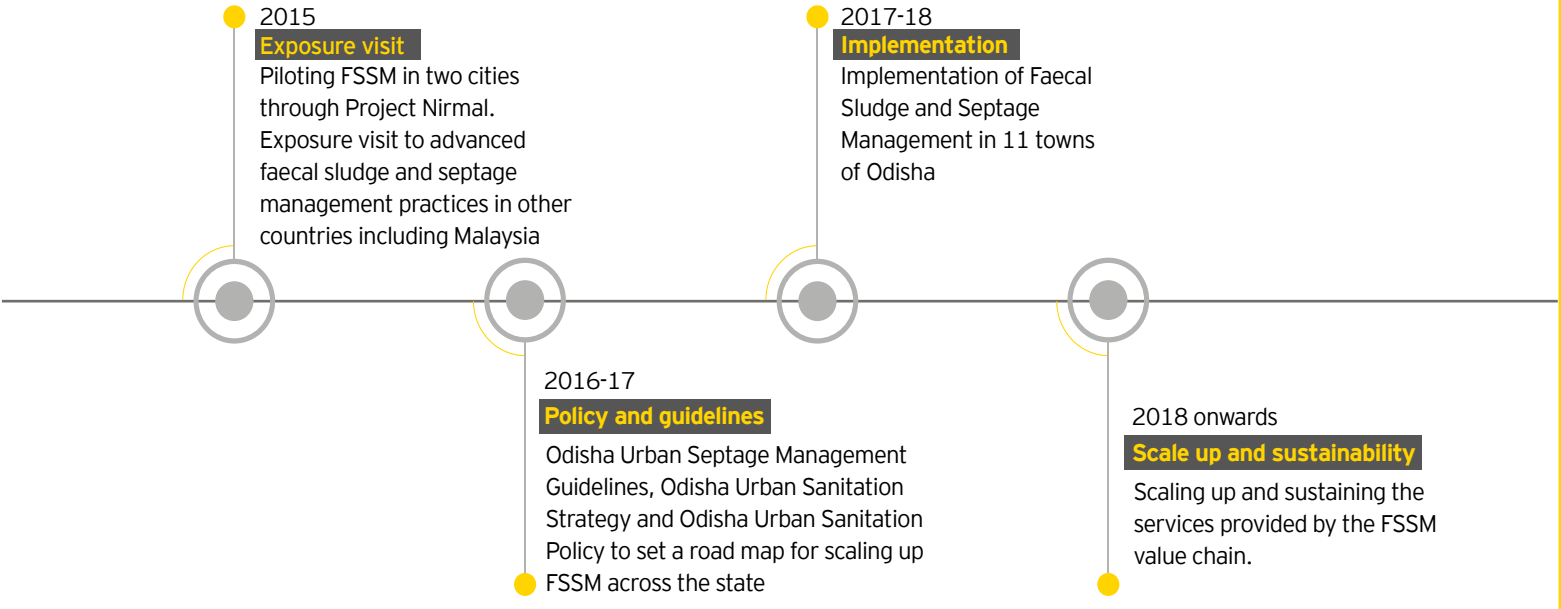
Odisha's FSSM journey was planned in a systematic manner, starting with formulation of Odisha State Sanitation Strategy 2011. The strategy focuses on strengthening the ULBs to provide sanitation infrastructure including those related to FSSM. The release of Odisha Urban Septage Management Guidelines, which followed in 2016, is a set of operative guidelines for ULBs to implement FSSM interventions across the value chains. It was soon followed by other government mandates such as the **Odisha Urban Sanitation Policy (OUSP)** and the revised **Odisha Urban Sanitation Strategy (OUSS)**. The OUSP and OUSS envisioned the state's cities and towns to be clean, sanitized and healthy, with septage management recognized as a key intervention. The government also ensured that the policy initiatives align Odisha to India's commitment to meet the goals set by the United Nations through the Sustainable Development Goals (SDGs), Swachh Bharat Mission, 2014. Odisha has been very progressive on FSSM and included it as part of the OUSP and OUSS, which predate the National FSSM Policy, 2017.

In 2014, under Scaling City Institutions for India (SCI-FI) done by CPR: a GIS analysis of Balasore was undertaken. Using the case study of Balasore, as a town directly affecting a river system, the information in the GIS report was used by the state government to make a case to the Additional Chief Secretary (ACS), GoO for a River Basin Pollution Abatement Strategy. As a direct outcome of this, the state government identified 30 towns affecting nine river basins in Odisha where drainage and septage management could be strengthened such that the discharge from these cities would not flow untreated into the river systems. In the same period, Practical Action conducted a study on Sanitation landscaping in nine cities (which are now AMRUT cities) emphasizing on the need for ULBs to focus on FSM in Odisha. It highlighted capacity building of ULB staff, awareness generation of citizens and piloting FSSM.

In March 2014, during the Reinvent the Toilet Fair, GoO made a strong case for cost effective, impactful and decentralized waste water management systems considering high dependence of Odisha towns on the onsite sanitation systems.

This led to initiation of Project Nirmal in 2015, implemented by Practical Action and CPR in the towns of Angul and Dhenkanal. The overall vision of the success of the project is demonstration of sustainable sanitation service delivery for small towns leading to an increased coverage of households and institutions by enabling institutional and financial arrangements and increased private sector participation.

FSSM Trajectory in Odisha



Key components facilitating FSSM implementation in the state

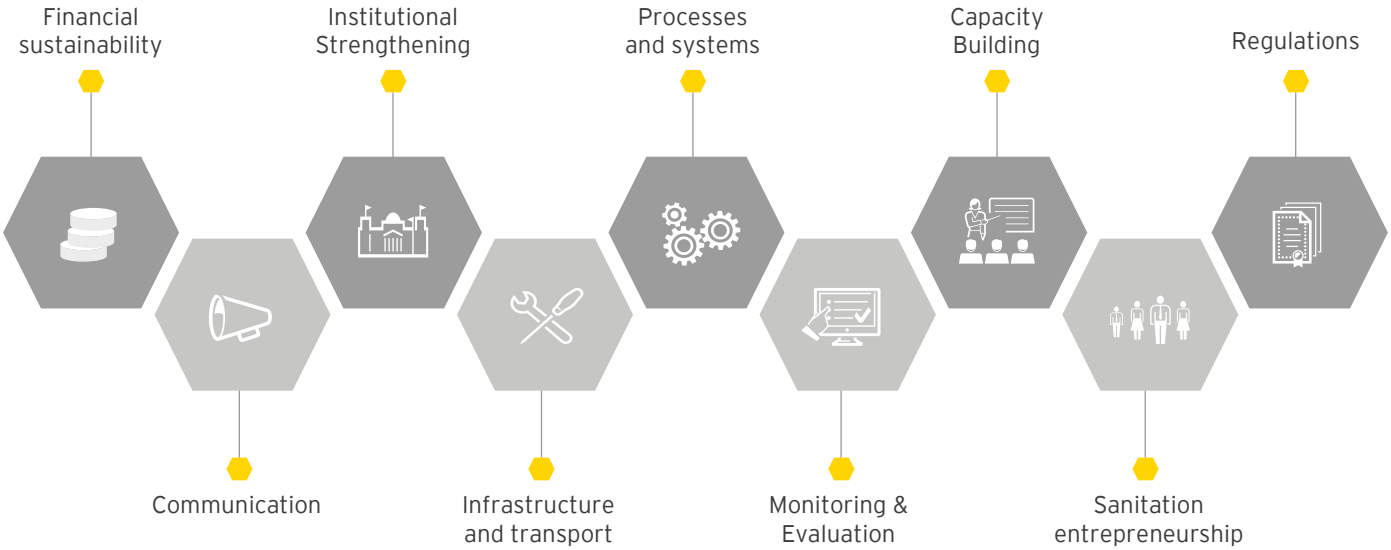
FSSM interventions in Odisha

5

In Odisha, FSSM interventions are augmented by policy and strategy interventions through a host of integrated solutions. These solutions span over infrastructure strengthening, which extends across the FSSM value chain that focus on emptying, transportation and treatment. For a successful FSSM implementation across the value chain, government initiatives are also focused on strengthening other key components depicted below. A few initiatives include:

- Creating demand for FSSM through a mix of informational educational communication (IEC) and interpersonal communication mediums
- Conducting capacity-building programs for government, private sector stakeholders and community-based organizations
- Addressing regulatory gaps at ULB level by formulating FSSM regulations
- Developing robust monitoring and evaluation systems, which integrate both SBM and FSSM program outcomes
- Recognizing the need to build a supply chain ecosystem to support FSSM infrastructure, which is currently facilitated through various entrepreneurship programs that also include leveraging the strengths of SHGs in the state
- Improving processes to strengthen delivery of FSSM services through standard operating procedures (SOPs)
- Taking measures to ensure financial sustainability for seamless FSSM service delivery.

FSSM in urban Odisha



Odisha's answer to the sanitation challenge

FSSM implementation

6

Infrastructure

Constructing Septage Treatment Plants (SeTPs) and Faecal Sludge and Septage Treatment Plants (FSTPs) for safe treatment of waste.

Cesspool vehicles

Procurement

Procuring cesspool vehicles of varying sizes especially to negotiate narrow lanes/streets and SeTPs to ensure safe emptying and transportation of the contained faecal waste.

Operation and Maintenance

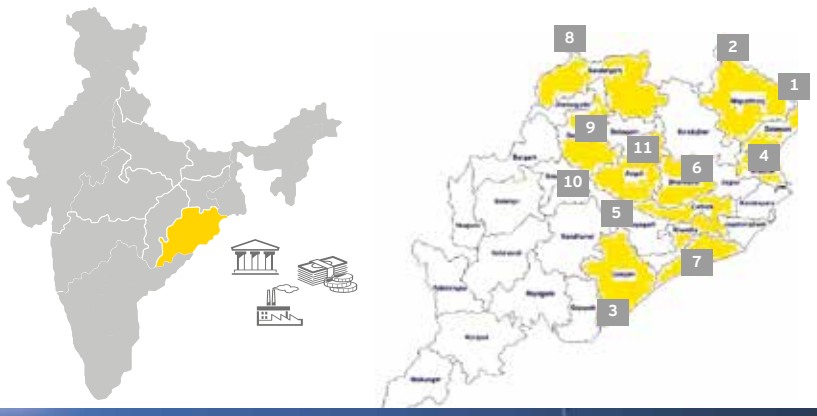
Promoting private sector engagement for operating and maintaining cesspool emptier vehicles.

Infrastructure

Currently, the Government of Odisha is investing to construct SeTPs and FSTPs to treat the faecal waste. The nine AMRUT towns which have approvals to construct SeTPs are Balasore, Baripada, Berhampur, Bhadrak, Bhubaneswar, Cuttack, Puri, Rourkela and Sambalpur through AMRUT funds. While the SeTPs in Bhubaneswar and Puri are fully functional, the SeTPs and FSTPs in six towns of Berhampur, Bhubaneswar, Dhenkanal, Puri, Rourkela and Sambalpur are being commissioned. Additionally, construction of six other FSTPs are also under progress in the towns of Angul, Balasore, Bhadrak, Baripada, Choudwar and Cuttack. Some of these plants have also adopted co-treatment and co-location options, which optimize the capacity and land requirements. The plants employ a decentralized wastewater system (DEWATS). DEWATS is chosen as a preferred technology, given the comparative advantage of technology, in terms of its minimum electricity requirement and ease of operations through semi-skilled personnel. All plants also have landscaping as an integral part of the design to make them as a public space to increase community's acceptance of waste treatment plants.

The picture below depicts the existing/ongoing treatment plants in Odisha.

SeTPs in Odisha



Town

1 Balasore
2 Baripada
3 Berhampur
4 Bhadrak
5 Bhubaneswar
6 Cuttack
7 Puri
8 Rourkela
9 Sambalpur
10 Angul
11 Dhenkanal

SeTP specifications

S. No.	City/town	Population catered by SeTP	Capacity	Technology[4]
1	Angul	81,105	18 KLD	Sludge stabilization/sterilization, DEWATS, aeration, sand and carbon filtration, ultraviolet (UV) treatment
2	Balasore	1,20,000	60 KLD	Liquid solid separation with DEWATS
3	Baripada	1,00,000	50 KLD	Liquid solid separation with DEWATS
4	Berhampur	80,000	40 KLD	Liquid solid separation with DEWATS
5	Bhadrak	80,000	40 KLD	Liquid solid separation with DEWATS
6	Bhubaneswar	1,40,000	75 KLD	DEWATS
7	Cuttack	1,20,000	60 KLD	Liquid solid separation (co-treatment with sewerage treatment plant)
8	Dhenkanal	1,10,015	27 KLD	Sludge stabilization/sterilization, DEWATS, aeration, sand and carbon filtration, UV treatment
9	Puri	1,00,000	50 KLD	Liquid solid separation with DEWATS (co-treatment with sewerage treatment plant)
10	Rourkela	80,000	40 KLD	Liquid solid separation with DEWATS
11	Sambalpur	40,000	20 KLD	Liquid solid separation with DEWATS

SeTPs in focus

City: Bhubaneswar

The 75 KLD SeTP in Bhubaneswar is one-of-its kind in the entire country, which treats both solid and liquid parts of the septage in an integrated manner. The SeTP is designed to treat the liquid part of the septage using DEWATS technology. This is a gravity flow-based system, where septage collected through cesspool emptier trucks is discharged to the receiving chamber from where it flows to different units by gravity. The technology requires least mechanical and electrical interventions to run the process and is cost effective as compared to other technologies[5]. Additionally, the solar photovoltaic (PV) panels installed to generate grid connected solar power to make the plant energy surplus.

The SeTP in Bhubaneswar covers an area of 2.47 acres and has been built at a cost of INR3.54 crore (approx. US$480,000).

[4]Housing & Urban Development Department (H&UUD), Odisha
[5]H&UDD, Odisha

Landscaping and plantation have enhanced the aesthetics of the SeTP in Bhubaneswar. The grid connected rooftop solar panels on the campus building has helped the plant become energy surplus.

City: Puri

Puri is first among the AMRUT towns to have a SeTP completed in October 2017. The plant in Puri employs co-treatment for septage management. The solids present in the septage are separated in a settling-cum-thickener tank, which is then taken to the sludge drying bed for drying and disposal. The liquid part of the septage is treated in the STP located adjacent to the SeTP[6].

The co-treatment plant at Puri was the first to be commissioned in the state.

The SeTP has land area of nearly 1000 sq. m and is located within the battery limit of the existing STP.

FSTP in focus

City: Dhenkanal

The FSTP in Dhenkanal Municipality constructed under Project Nirmal is designed for handling faecal sludge up to 27 m^3 per day. The treatment technology has been developed in order to achieve maximum treatment efficiency and minimum operation and maintenance (O&M) requirements. The technology is a gravity-based system, which is based on natural and biological treatment. The treatment components include – screening and grit chamber, stabilization reactor, sludge drying beds, anaerobic baffled reactor, planted gravel filter and sludge pasteurization. Plans to use the treated wastewater for landscaping the 2,500 m^2 area of FSTP plant is also considered as an option.

The FSTP other than the tertiary treatment is designed to operate based on gravity model avoiding wear and tear of equipment leading to low operation costs.

[6]H&UDD, Odisha

Cesspool emptier vehicles

Cesspool emptier vehicle procurement

The GoO has made investments to procure cesspool emptier vehicles to ensure safe emptying and transportation of the contained faecal waste. So far, 57 ULBs of the state possess cesspool emptier vehicles have been procured by the state government. These vehicles are equipped with technological options such as global positioning system (GPS) trackers to enable tracking and improvement in service delivery. They also come with personal protective equipment (PPE) to comply with safety norms related to cesspool emptying and transport and to facilitate mechanized emptying as against manual emptying.

A total of 86 cesspool emptier vehicles were procured by the state for towns with a growing needs for Faecal sludge and septage management.

The GoO has taken measures to facilitate private sector engagement in FSSM. This is currently achieved by providing cesspool emptying licenses to private sector entities. Once the vehicles are procured and sent to the ULBs, the private operators are given the responsibility of operating and maintaining the cesspool emptier vehicles. As a result, currently, desludging activity is carried out in the state by both ULB-operated and ULB-contracted cesspool emptier vehicles (operated by private players).

Operators trained on safe desludging practices

Licensing of cesspool emptier vehicle operators to private players has also resulted in a substantial reduction in the tariff payable by the customer. As a result, outsourcing has helped in increasing the uptake for mechanized emptying services.

As a way forward to further improve service delivery, the government is taking efforts to encourage ULBs to use technology as an enabler and take measures to ensure the financial sustainability of operations by improving payment gateways such as opening of escrow accounts to improve the efficiency of cesspool emptying operations. Besides the larger vehicles, the state government has approved procurement of two small-sized cesspool emptier vehicles in Puri and Berhampur on a trial basis. This is expected to resolve the challenges of lack of access due to narrow roads.

Cesspool emptying operations

In Odisha, cesspool emptying operations are currently undertaken by both ULBs and private operators. The government recognizes that achieving efficiency in cesspool emptying operations is important to ensure the sustainability of the FSSM interventions. To achieve this, efforts aimed at enhancing the local government's capacity in conjunction with adoption of technology to improve the governance has resulted in an increase in mechanized cleaning of septic tanks and pits in a shorter time. The outcomes are evident from the increased operational performance of the cesspool emptier vehicles.

The table below presents a comparative study on the methodology of cesspool emptying operations undertaken in India, outside Odisha.

1 Cesspool operations: Lessons from India

State/City	Salient features	Learning
Andhra Pradesh	Cesspool operations in AP is a free market model and the operations are undertaken by the private sector	The prices of cesspool operations are market driven and service delivery is core to the operating model
Telangana	▶ Cesspool operating vendors/service providers are empanelled ▶ Use of Personal Protective Equipment (PPEs) are enforced ▶ Regular compliance checks are done to ensure vehicle fitness ▶ Cesspool operators are also done by women	Such models works effectively in areas with more than one players in the cesspool operating business. Women operated cesspool operations have helped moved towards achieving gender equity in the sanitation business.
Maharashtra	▶ Scheduled desludging implemented ▶ Sanitation tax linked to the collection of cesspool emptying charges	Given the higher percentage of urban population, cesspool operations is a viable business opportunity for cesspool operators to operate and recover costs.
Tamil Nadu	Cesspool operations undertaken by the private sector	

The table below presents a comparative study on the methodology of cesspool emptying operations undertaken outside India in Asia and West Africa.

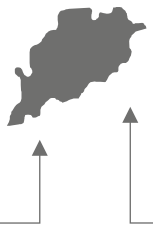
2 Cesspool emptier operations: Lessons outside India

State/City	Salient features	Learning
Malaysia	▶ IT-enabled system ▶ Operated by government utility - Indah Water ▶ Scheduled desludging has been stopped as a result of access issues resulting from narrow lanes and customers' reluctance to empty.	IT-enabled system have helped in containing indiscriminate dumping
Philippines	Has three different models: ▶ ULB-owned and outsourced to private players ▶ Government utility player operated ▶ Private player owned and operated	Different operating models adopted to manage FSSM services, depending on local context and strengths of the government
Senegal	▶ Private operators-led service ▶ Average frequency between two emptying events is six to twelve months ▶ Centralized IT-enabled call center which receives emptying request and allocates the czesspool requisition to lowest bidding private operator	Technology-based integration of unorganized private players has helped both operators and customers

What Odisha can learn from other best practices?

AP, Telangana
Rapid deployment of treatment infrastructure with optimized investment from government, while allowing a balance between innovation and service quality

Malaysia
Experience of scheduled desludging and successes of Information Communication Technology (ICT) integration offers opportunities for urban Odisha



TN, Maharashtra
Adoption of regulatory reforms in building approval process and financial reforms are important take-aways

Senegal
The centralized IT-enabled call center offers good lessons for twin cities of Bhubaneshwar and Cuttack which has a considerable urban population and private players in cesspool services.

Streamlining cesspool emptier vehicle operations

In the FSSM value chain, emptying and transportation of faecal sludge/septage is a crucial component. In order to provide efficient services to citizens and with an aim to ensure no indiscriminate disposal of the waste and streamline services take place, the government has taken various measures such as:

- Issuing guidelines for GPS monitoring of cesspool emptier vehicle fleets
- Wearing personal protective equipment (PPE) during service delivery
- Opening of an escrow account for maintaining transparency on financial transaction between ULB and outsourced operator

At the ULB level, steps to strengthen cesspool emptier vehicle operations: rationalize prices; setting up cesspool emptying ULB-level service requisition cells; appointment of nodal officer for FSSM, training cesspool emptier operators and disposal at designated place have been taken. The advantage of rationalizing price is that, it helps in maintaining a fair and uniform price for cesspool emptying services for both the ULB-operated vehicle and ULB-owned private operated vehicles. Training of cesspool emptier operators and ULB staff also helps in understanding the critical issues related to mechanical emptying and associated safety measures. It also helps in improving process of service delivery, safe disposal and providing solutions for the same.

State-level interventions

- GPS monitoring of cesspool emptier vehicle fleets
- Use of PPE during service delivery
- Escrow account opening to maintain transparency on the financial transactions between the ULB and the private cesspool emptying operator

ULB-level interventions

- Price rationalization
- Establishment of cesspool service requisition cells and appointment of a nodal officer for FSSM
- Trainings to cesspool emptying operators
- Designated place for disposal through DRE where there are no treatment facilities, currently

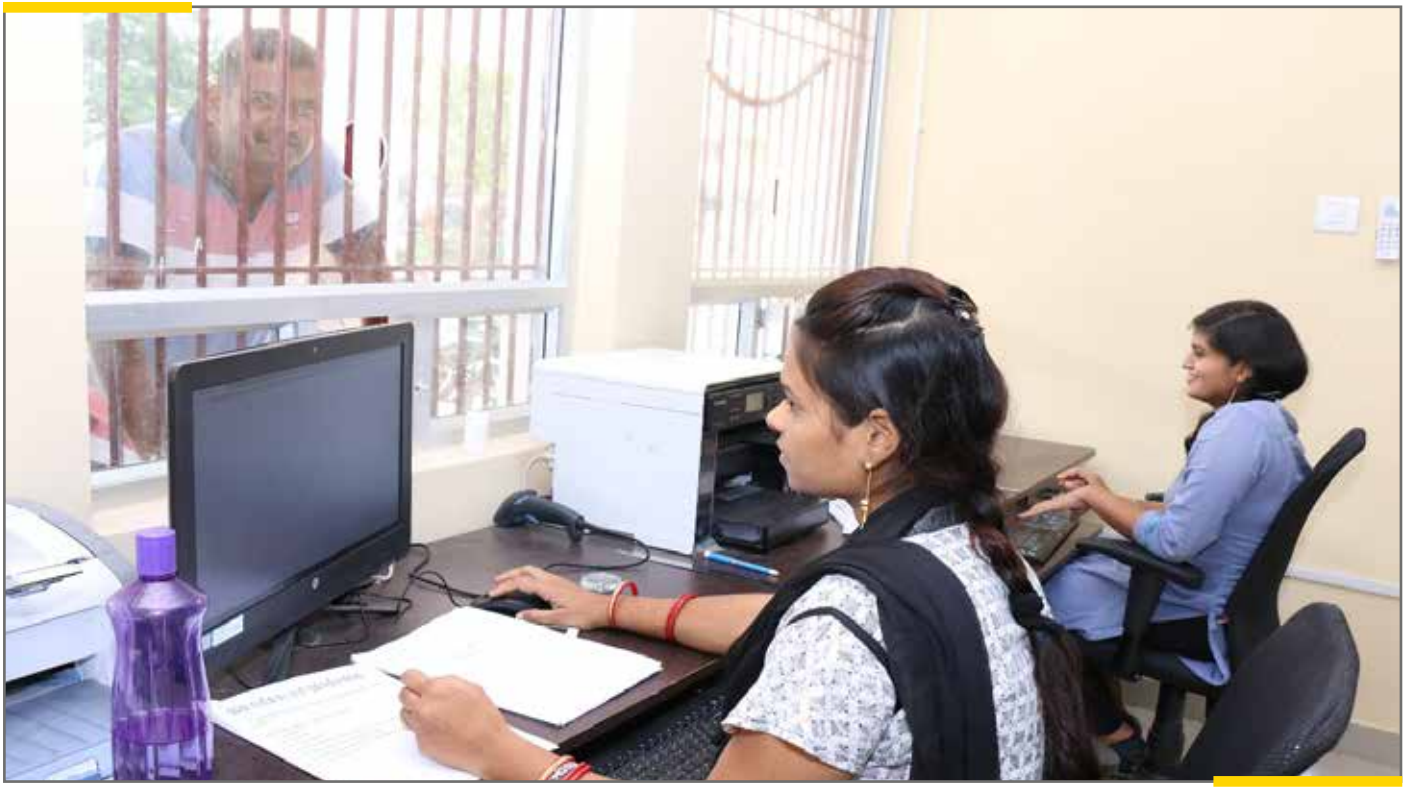
Furthermore, ULB authorities are advised to construct deep row entrenchment (DRE) for temporary and designated disposal of septage and to ensure that the cesspool emptier vehicle operators dispose the septage safely.

Payment is made to the outsourced operator on a monthly basis through the escrow account after verification from the cesspool emptier service request form and register. The nodal officer of the ULB periodically reviews the cesspool emptying services and takes appropriate measures to provide efficient services to the citizens.

Cesspool emptier requisition cell

The government has established cesspool emptier requisition cells at the ULBs, whose functions are to take requests from the customers, collect service fees and maintain detailed records of the provided services.

The cell is also responsible to periodically monitor the use of PPEs during desludging. Additionally, the cell monitors the movement of cesspool emptier vehicles through GPS devices and appraises the ULB authorities in case the waste gets dumped in undesignated sites.



Cesspool emptier requisition cells established at the ULBs have helped in strengthening the cesspool services at the city. The cell in Berhampur Municipal Corporation

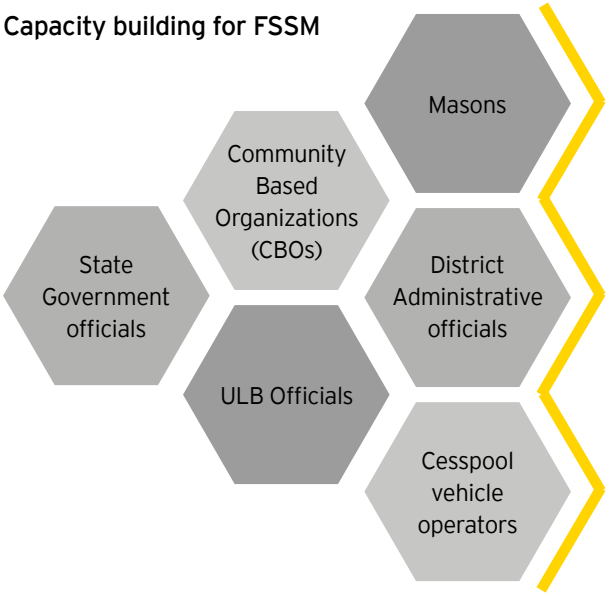
Capacity building

Capacitating key stakeholders to plan, implement and monitor FSSM activities is critical to the success of the program. A detailed capacity building need assessment of small towns (Angul and Dhenkanal) in 2016 was the first assessment of capacities across all levels of the government. This encompasses preparing training manuals, materials and guidelines on sanitation.

A training module on Non Sewered Urban Sanitation was developed under Project Nirmal for deeper understanding of FSSM amongst stakeholders involved in FSSM. A training of master trainers was conducted for 11 towns as well as for various project management units (PMUs). This was followed by, capacity building workshops, orientations of the ULB officials, district administration, community-based organizations (CBOs) and cesspool emptier vehicle operators across key towns and cities of the state. The capacity building programs are oriented to cover various aspects of FSSM services and infrastructure such as technology, financing, community engagement, O&M, etc. One such example is the triggering workshops conducted in several towns on FSSM. Such workshops provided a platform for the city-level FSSM implementers the opportunity to express concerns, discuss solutions and resolve operational issues for successful FSSM implementation.

Capacity-building initiatives involved exposure of state government to various international best practices on FSSM. Faridpur (Bangladesh) team of Practical Action came to Odisha to share the knowledge of Faridpur FSTP with the state officials. Inter-country learning exchange helped the state government to learn and implement FSSM in the state.

Capacity building for FSSM



Exposure visits

- To expose ULB officials, Community Based Organisations (CBOs) & community leaders to successful community engagement models in urban sanitation in other cities
- To help understand importance of community engagement in sanitation programme
- To help participants understand demand generation for desirable sanitation services
- To help participants understand ways of successful problem solving relating to sanitation services

Exposure visit of state and city officials to Malaysia to witness technological interventions of FSSM instead of Cesspool emptier requisition cells established at the ULBs have helped in strengthening the cesspool services at the city. The cell in Berhampur Municipal Corporation

ULB officials from several towns in the state during exposure visit to the FSTP in Devanahalli, Karnataka.

Awareness generation

In Odisha, the implementation of FSSM is relatively in the nascent stages. In order to improve citizens' awareness on FSSM at the state and town-levels, communication strategies focused on identifying the need for informational education communication (IEC) and behavior change communication (BCC) are being implemented. Based on the findings, a variety of communication outputs were developed covering interpersonal communication (IPC), mid media and mass media. A wide range of communication activities, adopting a 360-degree approach, have been undertaken at the city level to communicate the key messages on FSSM. The outcomes of such communication campaigns are evident from the increased awareness on FSSM in Odisha, which in turn has led to an increase in the demand for FSSM services.

Mass Media:
paintings, hoardings, banners and posters

Interpersonal communication:
CBOs and citizen groups

Mid media:
Jingles, Mike Announcements

Wall painting in Cuttack disseminating key messages for citizens on mechanized cleaning.

IEC collaterals used for dissemination of key messages in FSSM

FSSM regulations

Considering the necessity of regulatory mechanism for FSSM, the Odisha Government formulated model sets of regulations on FSSM appropriate for service providers. The **2018 FSSM Regulations** lay emphasis on construction of septic tanks/pits, cleaning of septic tanks/pits, septage transport vehicles or cesspool emptier vehicles, designated disposal sites, septage treatment plants, general administration and violations as well as penalties. It provides a regulatory framework and an enforcement mechanism for proper onsite sanitation activities inside the municipal boundaries.

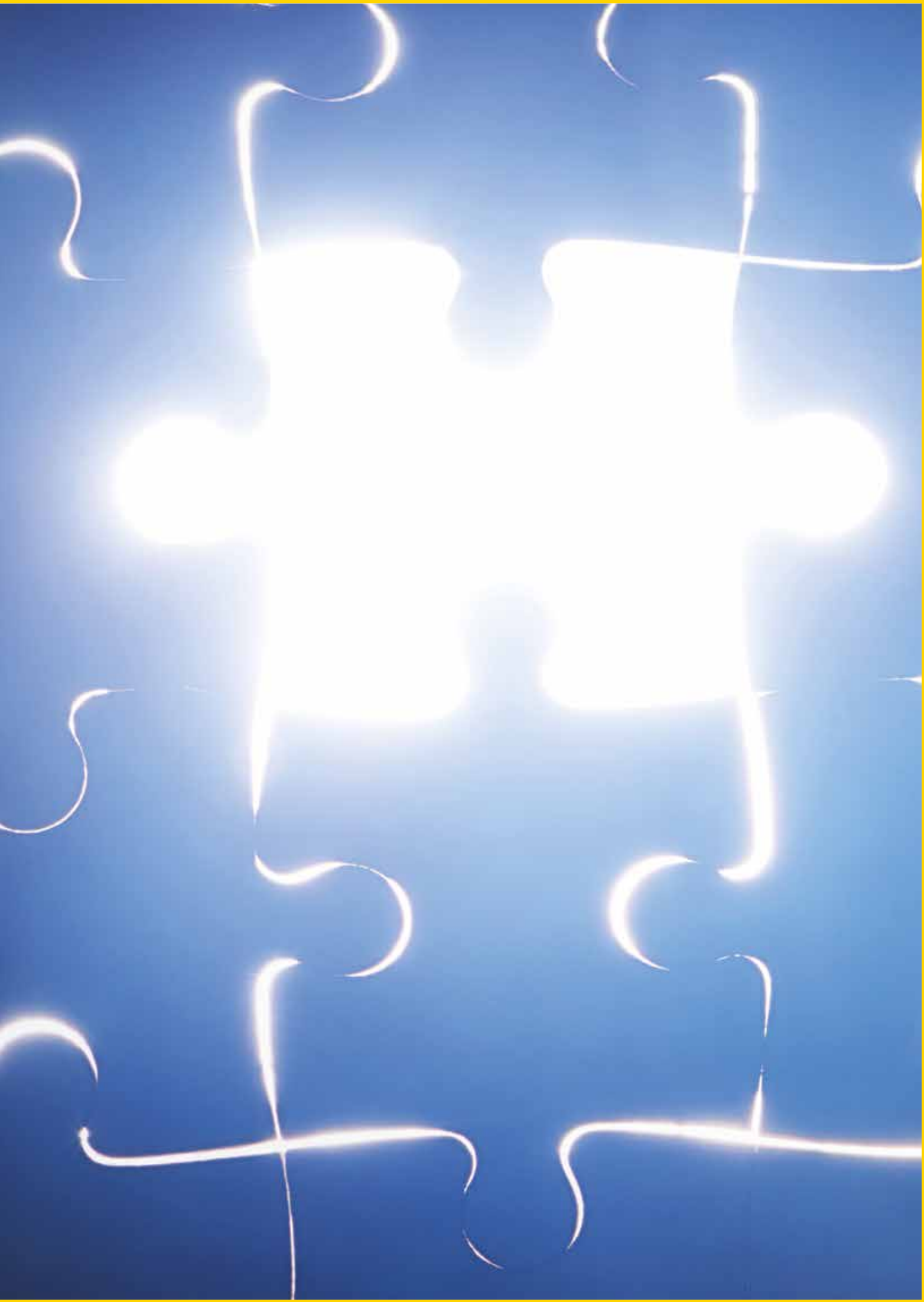
State-level interventions

- Connecting toilets to sewerage systems, onsite containment units or decentralized treatment units
- Mechanized emptying of containment units through sanitary workers and through registered operators and registered cesspool emptier vehicles
- Scheduled desludging of containment units
- Registration of operators and cesspool emptier vehicles
- Disposal only at treatment plant or designated site
- Treatment as per standards and norms
- Providing Urban Local Bodies the authority to inspect and ensure compliance
- Penalties for offence such as contravention

The 2018 FSSM Regulations enforces every latrine to be connected to either a pit, a septic tank or a sewage treatment plant through a sewer connection. It also enforces that every pit or septic tank constructed is in accordance with the standards and guidelines, as prescribed from time to time. The owner or occupier of the premises has to ensure the upkeep of the facility. As per the regulations, the responsibility of construction and maintenance of a sanitary toilet is that of the owner who has to ensure that there is no direct discharge of toilet waste to the open and that the pit/tank is cleaned periodically, as decided by the ULB, through septage transport vehicles only. Attempts to register all cesspool emptier vehicles with the concerned ULB mandatory to formalize the sector, making sure that all faecal sludge and septage from the tanks/pits are safely disposed and the citizens receive appropriate services are also underway. Importantly, the regulations prohibit the deployment of manual methods for emptying the pits or tanks and are also trying to ensure that the septage treatment plant operator is responsible towards the optimal treatment as per the standards and guidelines. Administratively, the 2018 FSSM Regulations will give powers of inspection to the ULB and empower officials to ensure that the latrines, septage transport vehicles and treatment plants are working appropriately. In cases of contravention of the regulations, ULBs will be given the power to impose fines.

The FSSM Regulations 2018 are now being passed by all 114 ULBs of the state through a council and corporation resolutions.

Regulatory frameworks can work only if there is a robust system to implement the regulations. Are adoption of an ICT-based approach and convergence with traffic police and transport offices the effective routes to implement these regulations?



Leading practices

A few best practices from FSSM implementation in Odisha

7

Temporary waste disposal: Deep row entrenchment

CBOs as demand creators and service providers

IEC campaign for cesspool demand generation

ICT-enabled cesspool emptier vehicle monitoring

Private sector engagement

Temporary waste disposal: Deep row entrenchment

If a solution like deep row entrenchment can provide safer solutions in disposing the faecal waste, should India, follow the footsteps of Malaysia, to consider interventions like "Right to Contravene"?

In Odisha, deep row entrenchment (DRE) is being promoted as a temporary solution for safe disposal of faecal sludge. For towns with available land and a need for temporary disposal of faecal sludge, DRE is proven to be a viable solution. Currently, 29 towns have functioning DRE sites in Odisha with several other towns in the process of adopting the intervention as an interim measure before moving to FSTP or SeTP. Prior to the implementation of DRE in Odisha, no interim solutions were used for safe disposal of faecal waste in India. Most harmfully, indiscriminate disposal of faecal waste is done in agricultural fields, where the disposal could lead to health impacts through contamination of food crops.

Several solutions for temporary safe disposal of faecal waste were evaluated where the criteria for evaluation were:

- Cost of implementation
- Operation and maintenance
- Ease of execution
- Minimal area requirement
- Robust and proven system
- Usability across state

Implementation

To successfully implement DRE as a solution in the state, as a first step, the total faecal waste generated by all towns and cities were estimated and the cost of implementation and upkeep were calculated, guidelines were developed for site selection and model designs for DREs were shared with the state and ULB officials.

Some towns with DRE sites also have taken measures to install monitoring mechanisms to ensure that all the collected faecal waste is disposed at designated sites. Despite the advantages, a few limitations that exist are that DREs are not optimized for places with a high aquifer or nearby water body. DRE sites should also have a low probability of inundation. Most importantly, it is an approach which can be marked redundant during monsoons.

Operators were trained on safe desludging practices

Community-based organizations as demand creators and service providers

The government recognizes that a collaborative approach to citizen engagement is key to facilitate a successful behavioral change to motivate households to adopt good FSSM practices. The government is integrating its efforts with a vast network of grass root-level CBOs established under National Urban Livelihood Mission (NULM) and National Urban Health Mission (NUHM). The objective is to empower and enable local leadership to move the FSSM agenda forward at the household/ community level and also create a sense of community ownership.

Members of CBOs like the MAS have started conversations on FSSM - an important step towards better health outcomes.

Engaging CBOs to spread awareness on FSSM

In this regard, Bhadrak municipality has taken a proactive step to leverage CBOs like the Mahila Arogya Samitis (MAS) – women groups formed under NUHM, to promote improved sanitation and FSSM practices at the ward level, especially among the urban poor communities. MAS groups in Bhadrak were formed in 2014 as mandated by the NUHM, a separate mission of the Government of India which works through the Department of Health and Family Welfare, with an intent to promote community participation to improve public health, nutrition and sanitation. Currently, Bhadrak Municipality engages with MAS in all the wards through regular orientation programs on sanitation, which covers open defecation, benefits of toilet construction and usage, and septage management. While all the members are made aware about the significance of practicing improved sanitation behaviors and demanding mechanized emptying services, the leaders are specifically motivated to further spread awareness among other urban poor households in the communities.

Members of CBOs like the MAS have started conversations on FSSM - an important step towards better health outcomes.

Enhancing livelihood options for vulnerable population

Mainstreaming vulnerable populations through livelihood opportunities within the sanitation sector is crucial for their empowerment and progress. Sanitary workers and other urban poor communities often bear the brunt of poor sanitation due to the growing urbanization. Engaging them in appropriate livelihood activities not only gives them an opportunity to augment their income but also enhances their dignity and social prospects. Among the successful social entrepreneurial activities undertaken under the Odisha NULM are engagement of women SHGs in the O&M of community toilets (CTs). In this regard, Berhampur has taken a lead by engaging 10 SHGs engaged in the O&M of 10 CTs. Following the lead, other towns such as Balasore, Bhadrak, Bhubaneswar and Cuttack have adopted similar interventions. In Cuttack, for example, a male SHG of sanitary workers from a vulnerable community is engaged for O&M of cesspool emptier vehicles in the municipal corporation. The involvement of such vulnerable groups has helped the government to improve on-ground sanitation services through a linkage between livelihood and efficient FSSM services. In addition, it boosts confidence and dignity of the group members, who are looked upon as role models in their community.

Members of a SHG group in Berhampur, Odisha

Enabling platforms for implementing FSSM programs

Involvement of key stakeholders is imperative for effective delivery of sanitation services in the city. In this regard, the two Project Nirmal municipalities of Angul and Dhenkanal aim to successfully demonstrate decentralized sanitation system. The two municipalities strongly incorporate FSSM in addition to creating several platforms for stakeholders to ensure active participation and contribution. Strengthening of various grassroots-level institutions such as Slum Sanitation Committee, Ward Sanitation Committee, City Sanitation Task Force (CSTF), etc., prove in changing the ownership in sanitation service delivery systems in the ULBs. Such platforms are also currently contributing towards the development of participatory city sanitation plans, land allotments for infrastructure creation, formulation of regulatory standards and guidelines as well as day-to-day operation and maintenance of the infrastructure.

Can infrastructure sustain itself where community lacks its ownership

IEC campaign for cesspool demand generation

Where Puri, Odisha

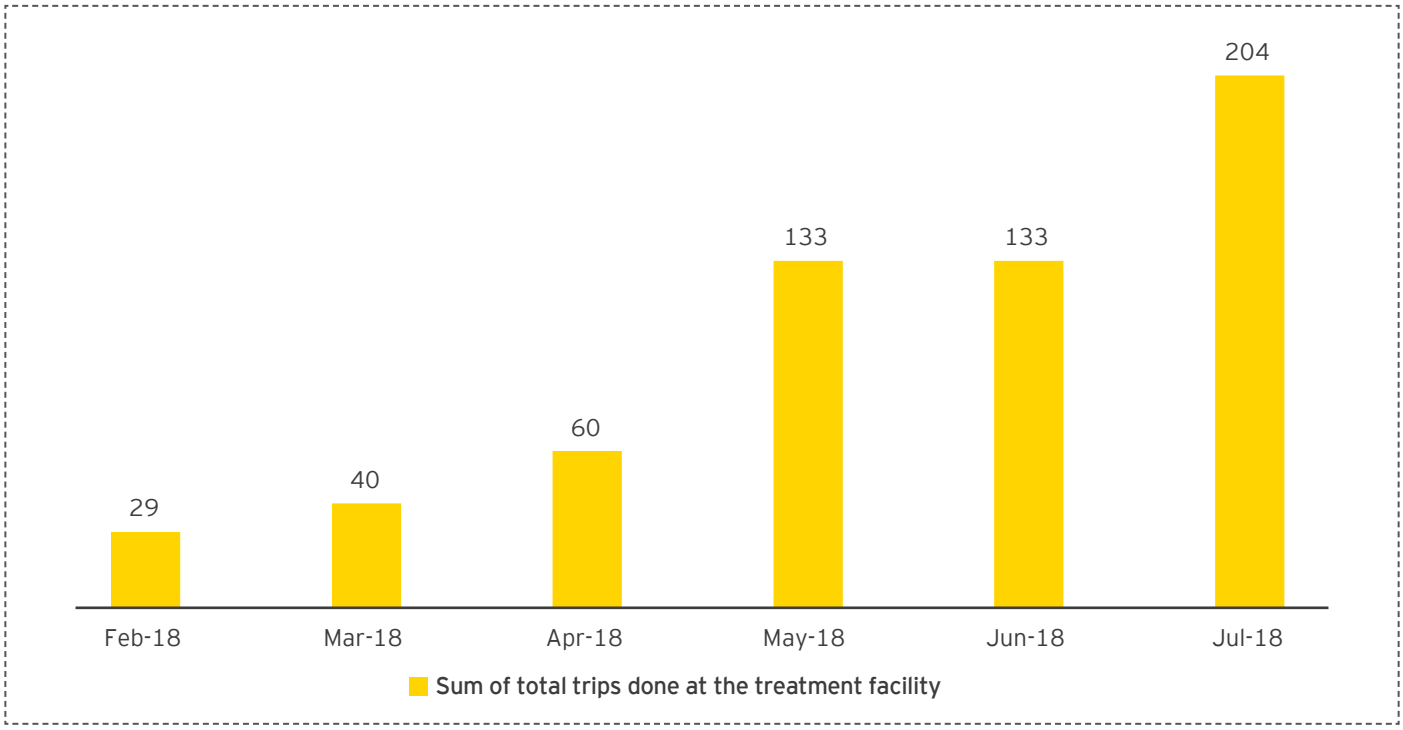
How Media communication

Outcome Increased demand for FSSM services

The significance of communication campaigns in generating demand for sanitation services, cannot be undermined. Puri Municipality undertook an extensive communication campaign to increase the awareness on risks of poor FSSM and manual scavenging, to increase demand for mechanized desludging and to motivate households to desludge their septic tanks/pits every three years using mechanized emptying services. The IEC campaign was undertaken in four priority wards of Puri, for a period of three months, using a mix of communication channels, such as street plays, wall paintings, wall stenciling, and display of hoarding and dissemination of leaflets. The impact of the campaign was witnessed in the high message recall, through the increase in the number of requests for the ULB's cesspool emptier vehicle services and also in the number of trips.

The campaign in Puri communicated key messages related to FSSM through a mix of communication channels.

Post the campaign, there was a substantial increase in the demand for mechanized cleaning through cesspool emptier vehicles.



ICT-enabled cesspool emptier vehicle monitoring

ULBs in Odisha are recognizing the importance of using technology as an enabler to integrate and improve FSSM service delivery. Presented below are a few cases from Berhampur and Bhubaneswar, where the municipalities are embracing technology to improve governance and service delivery.

ICT in Berhampur

Berhampur Municipal Corporation (BeMC) has incorporated digital techniques to improve FSSM service delivery and increase operational transparency. Installation of GPS systems in the cesspool emptier vehicles for live updates on movement of cesspool emptier vehicles by tracking the distance travelled, turnaround time of the service request and waste disposal practices is one example. Currently, the vehicle tracking system monitors every trip and municipal corporation has the technology to effectively govern (monitor and track) trips both online and offline. In case of violation, a penalty is imposed.

BeMC has also installed CCTVs at the disposal site to ensure that the cesspool emptier vehicles are dumping at the designated site. The municipality has also developed and launched a single window grievance redressal platform called e-Subidha. This platform integrates services for cesspool emptying with services of nine key departments of the municipality through a single window platform. BeMC has also implemented an interactive voice response (IVR) system in the corporation by providing a toll-free number for citizens to call and avail cesspool services.

Cesspool emptier vehicle tracking system at Berhampur Municipal Corporation.

The intervention is aimed at indirectly increasing the demand for cesspool emptying operations by improving the cesspool requisition booking experience. As a way forward, BeMC is planning to improve service delivery by incorporating online payment gateways for service booking, adopting differential pricing to achieve inclusiveness in service delivery and pave ways to integrate internet of things (IoT).

ICT in Bhubaneswar

As a part of the Smart City Mission, Bhubaneswar Municipal Corporation (BMC) is implementing the smart FSSM system, which enables the components of FSSM, to be remotely monitored using wireless sensors installed inside the tank of cesspool emptier vehicles. The waste collection shall then be managed via a web portal from Intelligent City Operations Management Centre (ICOMC). Radio-frequency identification (RFID)-based system allows real-time tracking of faecal sludge dumping by the corporation. BMC's Web Based Monitoring System addresses the monitoring of different types of waste disposal separately. Rourkela, Odisha's second smart city is looking to replicate these interventions.

Integrated command control center in Bhubaneswar

Private sector engagement

Management of cesspool emptier vehicles is often brimming with challenges and requires innovative models. The Housing & Urban Development Department (H&UDD), Government of Odisha, procured cesspool emptier vehicles to ensure safe emptying and transportation of human waste.

The procured vehicles were provided with protective gear – a helmet, a full body all weather jacket, safety shoes and gloves. The government promoted private sector engagement by involving private sector for operations and maintenance of the cesspool emptier vehicles. Annual maintenance contracts were signed with the vehicle provider to ensure that the vehicles are well-maintained and there is no delay in service delivery due to the lack of maintenance.

Additionally, in order to bring in service delivery standards in operations, formal terms and conditions were also laid out for both the private operator and the ULB. Establishment of a designated cesspool emptier vehicle requisition cell and a nodal officer, installing vehicle monitoring and tracking mechanism, designated disposal of sludge/septage and ensuring the use of PPE are a few examples of standardizing service delivery. The government also emphasized the turnaround time for the services offered to be three days or lesser from the day of the requisition of the service.

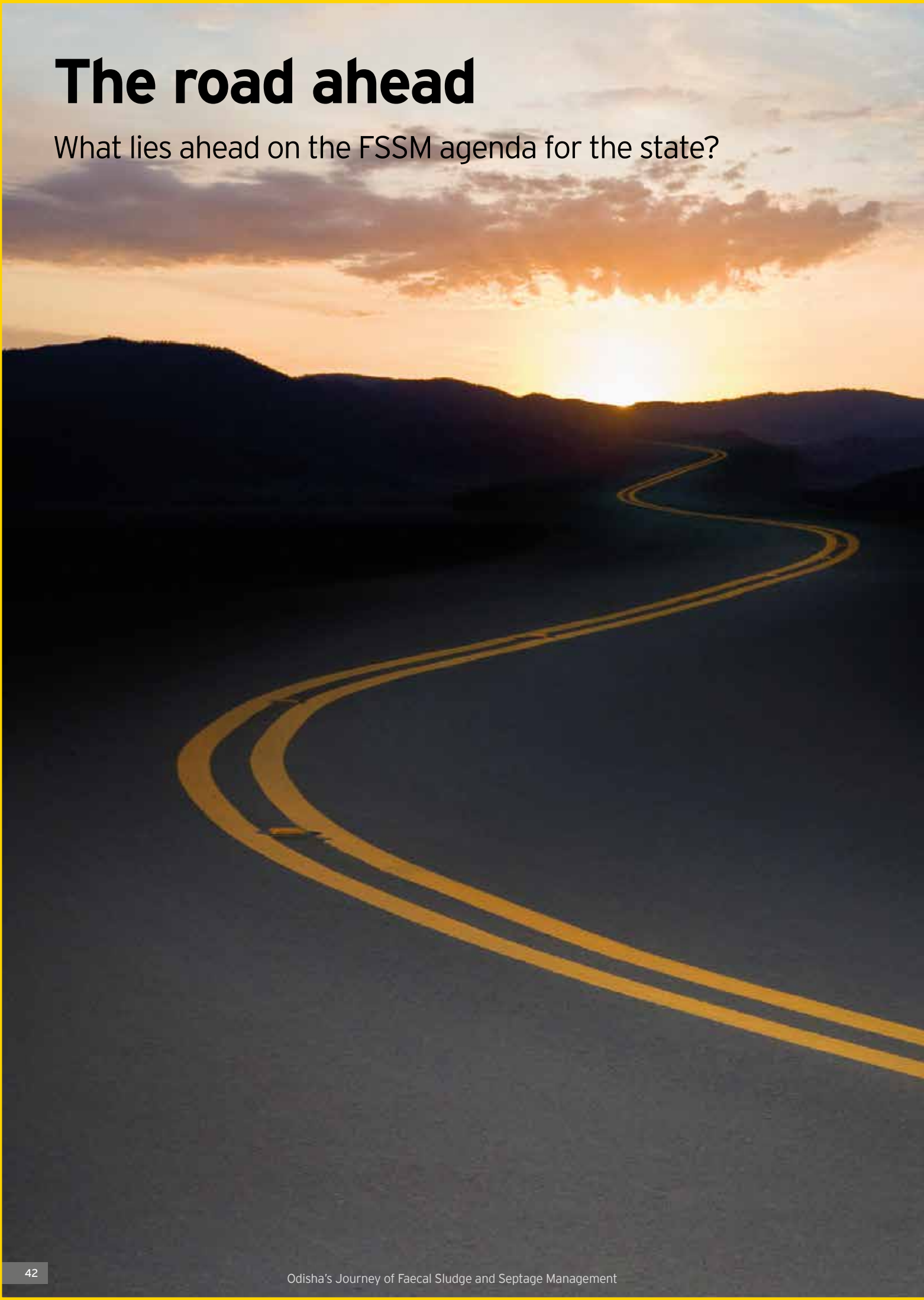
Cesspool services pricing

To provide incentives to private players for operating sustainably, the government has ensured the presence of a market-driven pricing mechanism, wherein the new cesspool emptier vehicles currently operate under the new pricing scheme. The new market-based pricing mechanism in all the cities is also being seen to be lower than the cost previously charged by privately owned and privately operated vehicles. It has drastically reduced to an average value of INR800 or ~US$10.

In addition, the ULBs that adopted a new model and subsequently achieved the price parity between the old and new vehicles operating at the new market-driven price. The outcomes of such mechanisms resulted in an overall improvement in governing the cesspool emptier vehicle operations thereby witnessing an increase in the number of customer requests and trips.

The road ahead

What lies ahead on the FSSM agenda for the state?



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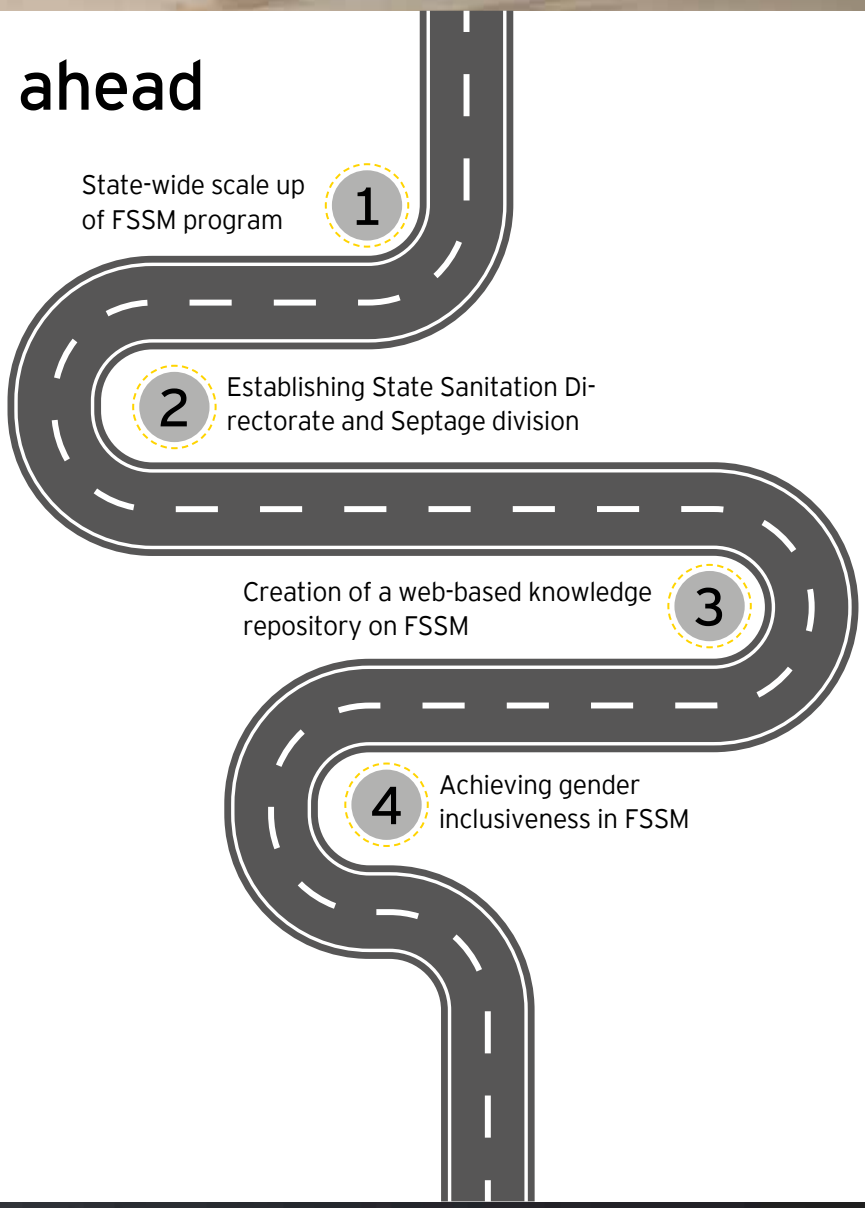
The road ahead



1 State-wide scale up of FSSM program

The Odisha Government has provided an access to safe sanitation through its own funds and integrated it with missions like AMRUT, Swachh Bharat Mission, NULM and NUHM as well as aids like Japan International Cooperation Agency, German funding agency and Bill & Melinda Gates Foundation. Government investments were also made to improve an access to mechanized emptying. However, to further increase the outreach to all geographies of Odisha and provide facilities to its entire urban population, the government is committed to make additional investments as required. The areas of focus for the investment would be to facilitate ULBs to increase the access to mechanized emptying of on-site sanitation systems, treatment facilities and creation of enabling environment to implement the FSSM program in all ULBs of the state. The expansion plan will adopt a cluster approach through a shared infrastructure between ULBs and peri-urban areas.

2 Establishment of State Sanitation Directorate and Septage division

Forging ahead on its commitment to meet the sanitation goals, the state government through the H&UDD is keen to establish a State Sanitation Directorate (SSD) to support the implementation of the OUSP. The SSD will give an equal importance to liquid and solid waste management. The key objectives of the directorate will be to provide a strategic direction to agencies at the state and towns on sanitation. The directorate will set out guidelines for ULBs to operationalize different components of OUSP, create a uniform structure across the state for planning, designing, project preparation, appraisal, sanction and implementation of sanctioned projects. It is also expected to bring in successful experiences/leading practices from other states/towns, develop collaborations and suitable models for technical options and social mobilization and guiding ULBs in the preparation of the city sanitation plans (CSPs), channeling financial resources from state, central and externally aided sources, etc.

A septage division is proposed to address the knowledge and skill gap on FSSM and is anticipated to operate as a center of excellence (CoE) to provide the technical know-how and guidance to ULBs for new infrastructure and O&M of the existing ones. A capacity building cell shall be developed along with the septage division. It shall create knowledge products and disseminate through various academic institutes, government training institutes, etc.

3 Creation of web-based knowledge repository on FSSM

In the view of the crucial role of knowledge management, especially in emerging areas like FSSM in the sanitation sphere, an exclusive web-based repository is being set up by the H&UDD, Odisha. This website is intended to act as a knowledge platform that benefits stakeholders seeking water supply, sewerage management and septage management-related information. The repository will include: policies, regulations and guidelines, infrastructure and O&M, informational education communication (IEC)/behavior change communication (BCC) and community engagement, capacity building, vendor information and innovation in the state and other resources.

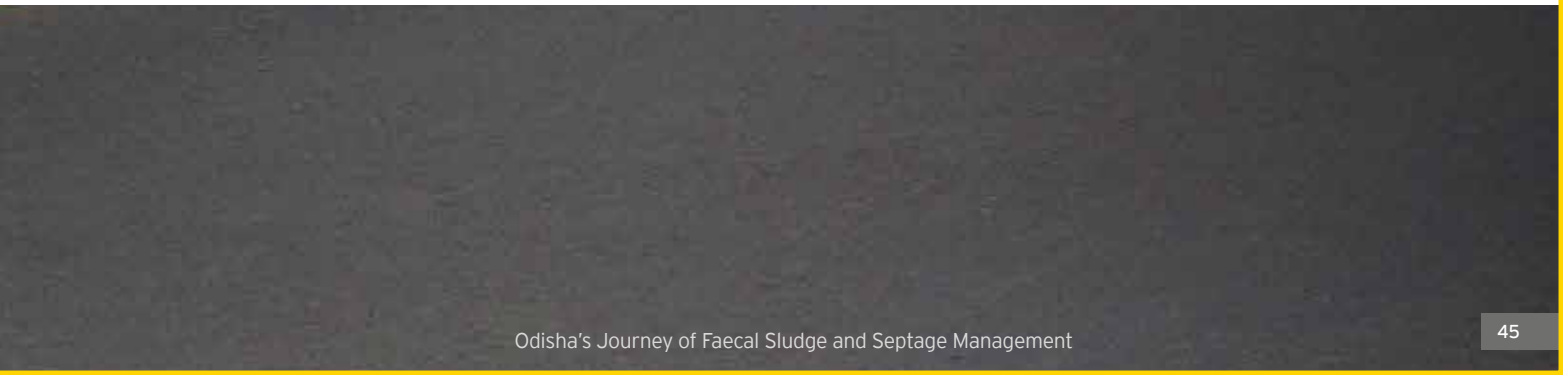
4 Achieving gender inclusiveness in FSSM

Women and girls bear the heaviest burden of poor sanitation and hygiene. Lack of safe and private spaces for women and girls to wash or attend to their personal hygiene needs not only leads to health problems but also severely restricts their ability to fully participate in daily activities including attending school.

Vulnerable sections of the community such as women, elderly, children, differently-abled and the third gender have a limited participation in the creation of sanitation-related infrastructure such as public and community toilets, leading to a poor and restricted access. Their role in decision-making with regards to sanitation-related assets and services, both at the community and household level, is also often seen to be poor. In the urban context, growing migrant population, slums, low female work participation rate and high incidences of violence against women create additional challenges in making towns gender-friendly, empower girls, women, sexual minorities and to create a supportive and enabling environment for women, elderly, children, differently-abled and the third gender. One of the institutional mechanisms to take proactive steps while addressing the areas of concern is the creation of a gender resource center and provision of services in collaboration with the state-level government departments and ULBs. The gender resource center for sanitation would address the sanitation needs of the men, women and sexual minority groups holistically while involving them as a strong stakeholder in sanitation value chain, which would help them socially and economically. Engaging women and transgenders in sanitation programs, promoting entrepreneurs, managing menstrual hygiene and providing gender-friendly sanitation infrastructure are some of the interventions that could be taken up.

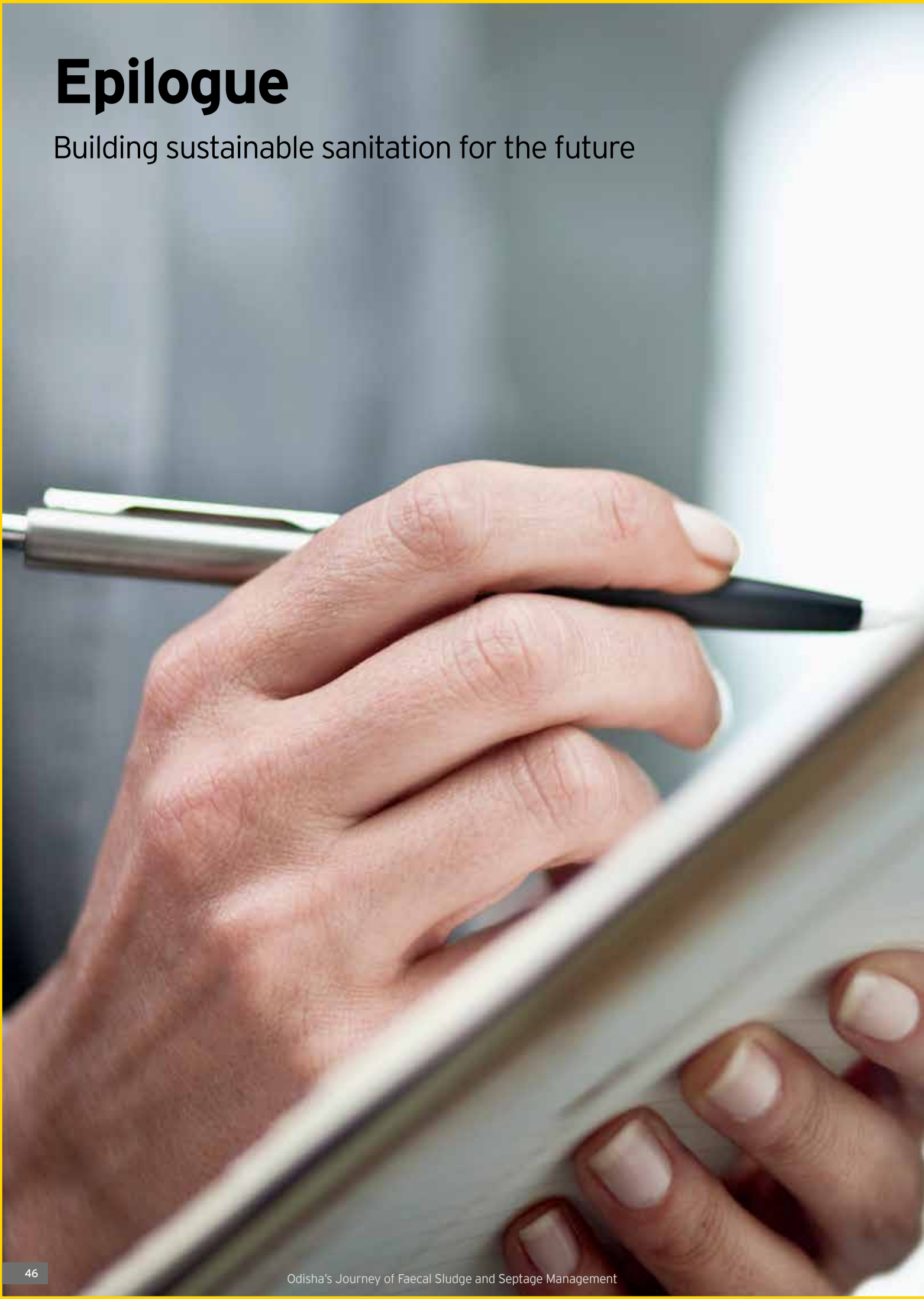
Workshops on gender inclusion in sanitation for ULBs, elected representatives and the state government officials, adequate gender budgeting are some key areas that would need focus in the coming years.

A large proportion of women are a part of the formal and informal sanitation workforce and their safety at workplace remains a pressing concern. In 2013, the Sexual Harassment of Women at Workplace Prevention, Prohibition and Redressal Act, 2013 came into force. The act provides that the local complaints committee at the district or the ULBs can be accessed by the aggrieved for complaints against sexual harassment. In line with this, cities would be supported to create these committees and the workers as well as city and district officials would be informed about the process of lodging a complaint through these committees.



Epilogue

Building sustainable sanitation for the future



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Odisha has embarked on an ambitious journey towards the goal of achieving sustainable sanitation for all, in which FSSM plays a crucial role. The government-led FSSM program supported by development partners has not only invested in creating infrastructure but it has also laid importance on creating an enabling environment through a judicious mix of policy and regulatory support, capacity building and awareness generation initiatives. The ULB-centric processes and community-driven interventions have supported these measures. The state has made successful attempts to tap funds for FSSM through integration of several national urban programs (SBM, AMRUT, Smart City, NUHM and NULM) and state finances. Going forward, it should also be able to garner funds from the private sector and other sources such as District Mineral Funds and Corporate Social Responsibility Funds. This will hasten the drive towards attaining the sanitation goals. The scale-up of FSSM beyond the 11 towns would bring about newer challenges which the state should be prepared to meet. Investment in service delivery efficiency, cost-effective technology, demand creation and O&M of facilities and strengthening regulations are imperative to sustainable FSSM in the state. Odisha's commitment towards meeting the desired sanitation goals is sure to result in improvement of its water resources and consequently bring positive changes in health, livelihood and environment outcomes.

Special contributions

What the experts have to say?

Odisha: Towards quality of life through improved sanitation

Greetings from Malaysia!

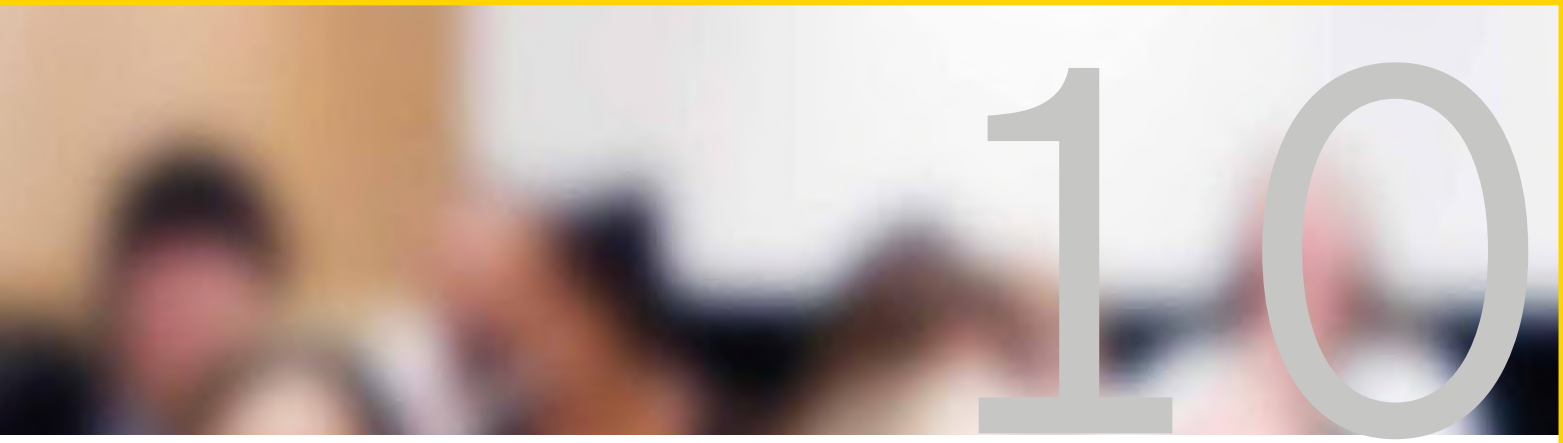
I first came to know about Odisha's developmental aspirations, particularly those relating to sanitation, in early 2016, when a delegation of high-level officials from Odisha Government, including the Secretary of the Housing & Urban Development Department of Odisha, Mr. Mathi Vathanan visited Malaysia. I could see the keen passion of the Secretary and the team in improving sanitation and sewerage in Odisha. Subsequent to this, I was involved in the various initiatives in Odisha as advisory consultant, including for the two FSTPs in Dhenkanal and Angul. I visited Odisha in October 2017, along with the Dhenkanal FSTP, which was under construction then.

Odisha has embarked on a FSM program in urban areas that started with a focus on policy and regulations as the first step. The state formulated its Sanitation Policy and Septage Operating Guidelines, followed by a ULB's regulation. With a strong driver in the government, and support from local-level champions, as well as the partners in the technical support unit, substantial change is happening.

Treatment plants are coming up in multiple towns, which would cover a large portion of the urban population. The state has adopted a mix of sewerage, FSM and co-treatment approach to address the challenge of Faecal sludge treatment.

The issues of water contamination and pollution in Odisha are likely to be greatly mitigated as these initiatives take effect, improving the potential beneficial use of water resources, and enhancing the health of the people and the state's economy.

The realistic strategy, which has been adopted, based on a hybrid mix of on-site/sewerage interventions, with co-treatment options utilized wherever possible, is to be lauded. The policy and strategy ensure streamlined interventions, with line-of sight to overall objectives. The state-level technical support unit (TSU) is a great institutional enhancement.



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The state has been a pioneer in initiating construction of septage treatment plant (SeTP) under the national AMRUT program. The state did not stop at this, but went further, augmenting this with investment on mechanized emptying and transport.

Going forward, as sanitation issues are gradually mitigated, the water resources, economic activities and the living environment for the people will surely be enhanced.

At this juncture, I would like to highlight a few matters, and also sound some cautions.

- While we focus of fecal sludge and septage, we should not forget the liquid stream. Where is the liquid of the Faecal matter going, from the containments? Is it causing any contamination/pollution? What interventions are required at the containment level?
- Determine a minimum defined sanitation level and ensure new facilities comply with this. Existing facilities can be gradually retrofitted/upgraded based on priority, considering the impact of these facilities on the health of the people and pollution of the immediate environment
- Consider local context and need while determining the technology and standards of effluent/end products and selecting appropriate systems. Start with low-cost and low-energy robust systems and progress in suitable increments, building up capacity and knowledge as you do so
- Avoid looking at the sector from a commercialized angle. It is doubtful if this sector could self-sustain itself commercially, in the near future. But parts of the whole chain can be sustained by the private sector and with greater efficiency. If the government is able to address the viability gap then go for a model where you recover a part of the cost from the user and part of it comes from the government. This is a good approach because the people are paying for the direct benefit and the indirect benefit is being covered by the government and paid indirectly through taxes. You can call it government contribution. Gradually, you can narrow down the ratio as you go along. But the overall affordability (both of the customer and the government) should be a consideration in selecting the system. If there is an issue, reduce the cost and go for simpler low cost systems
- Competition and efficiency can be encouraged through multiple operators, either in direct competition (for emptying, for example) or operating by region/city. We can then benchmark them and have an indirect competition between the two operators
- While the initiatives involving co-treatment of Faecal sludge in sewage treatment plants is to be encouraged, this should be done with caution for the liquid portion after solid/liquid separation, and care must be taken to avoid any overloading of the STP

I wish Odisha all the best. You have a great future; go for it!

Dorai Narayana
FSSM expert from Malaysia

Odisha is a rapidly growing state in the area of sanitation services. There is an increased burden on our cities to provide safe sanitation solutions due to rising population. While our major towns have been provisioned for conventional sewerage systems, there is an urgent need to rapidly scale-up safe sanitation solutions to all other towns/ULBs. It has already been realized that conventional approach through centralized sewerage systems is capital intensive and requires a longer gestation period. Therefore, an alternative approach is required to be evolved and firmly established to curb increased pollution of water bodies due to indiscriminate discharge of untreated liquid waste. Government of Odisha took a conscious decision to implement low-cost decentralized collection and treatment of sewage/faecal sludge (as per OUSP and OUSS 2017) to reduce the cost of collection and treatment. As an initiative to achieve that, it was decided by the state that small and medium un-sewered ULBs can be provided with septage treatment facilities. This was later converted to a policy called Odisha Sanitation Policy-2017. It was for the first time that the OWSSB was required to develop and construct such facilities.

A relentless effort was made by the team with support from the administrative department (H&UDD) of the state. A vast variety of items were analyzed before converging the concept into a workable proposal with support from one of the premier institutions of the country, viz. IIT, Kharagpur.

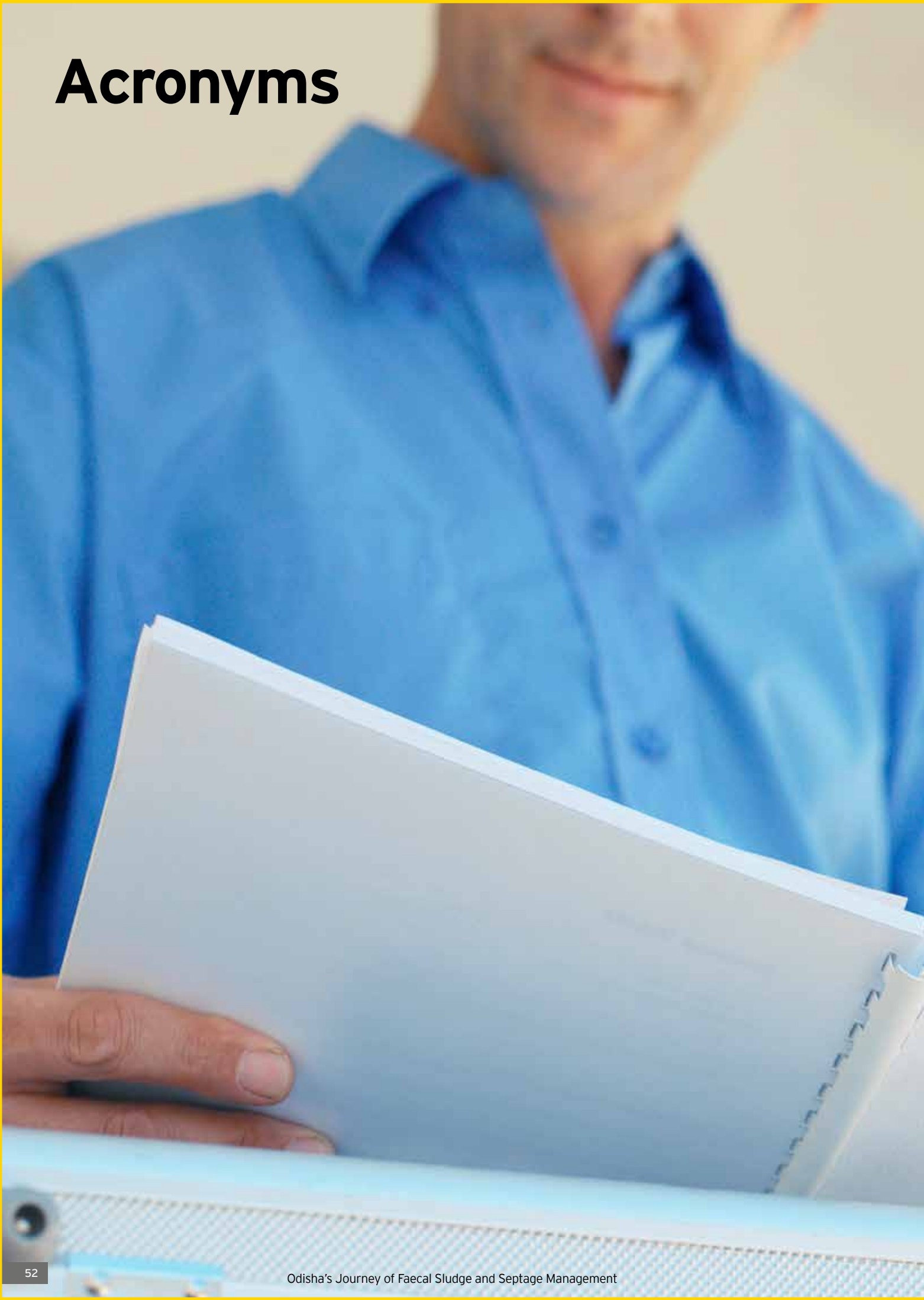
The most difficult, risky and challenging part of the journey was to finalize and freeze the technology option for the septage facilities to be developed for the nine AMRUT towns. Our preference was for a facility that demands the least in terms of cost and attention towards O&M issues. Another area of consideration was to utilize the effluent within the premises of the facility so that it is utilized in the landscape specially developed for the purpose. All the plants have landscaping as an integral part of the design to increase community acceptance for such treatment plants.

The SeTPs in Bhubaneswar and Puri are fully functional at present and SeTPs and FSTPs in six towns of Berhampur, Bhubaneswar, Dhenkanal, Puri, Rourkela and Sambalpur are on the verge of being commissioned. Additionally, construction of five other FSTPs is also under progress in the towns of Angul, Balasore, Baripada, Choudwar and Cuttack. With the quantity of septage presently made available to the plant, the effluent characteristics are found very encouraging.

There is still a long way to go and it is expected that the Odisha Water Supply & Sewerage Board works hand-in-hand with other government, quasi-government and independent/private agencies will not only continue to improve upon the standards of septage facilities but also spread the system throughout the state and beyond.

M.R. Das
Member Secretary
Odisha Water Supply & Sewerage Board

Acronyms



11

Abbreviation	Definition
ABR	Anaerobic Baffled Reactor
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BeMC	Berhampur Municipal Corporation
BMGF	Bill & Melinda Gates Foundation
BUSP	Basic Services to Urban Poor
CBO	Community-based Organization
CSP	City Sanitation Plan
DEWATS	Decentralized Wastewater Treatment Systems
DMF	District Mineral Fund
DRE	Deep Row Entrenchment
FSSM	Faecal Sludge and Septage Management
FSTP	Faecal Sludge Treatment Plant
GoO	Government of Odisha
GPS	Global Positioning System
H&UDD	Housing & Urban Development Department
ICT	Information and Communications Technology
IHSDP	Integrated Housing and Slum Development Program
IPC	Interpersonal Communication
JICA	Japan International Cooperation Agency
MAS	Mahila Arogya Samiti
MoUD	Ministry of Urban Development
MoHUA	Ministry of Housing and Urban Development
NAC	Notified Area Council
NULM	National Urban Livelihood Mission
O&M	Operation and Maintenance
OMBADC	Odisha Mineral Bearing Area Development Corporation
OUSP	Odisha Urban Sanitation Policy
OUSS	Odisha Urban Sanitation Strategy
OWSSB	Odisha Water Supply & Sewerage Board
PPE	Personal Protective Equipment
SeTP	Septage Treatment Plant
SHGs	Self-Help Groups
ULB	Urban Local Body
CPR	Centre for Policy Research
FSM	Faecal Sludge Management

Acknowledgements

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In its endeavor to make the cities of Odisha healthy and livable, the Housing & Urban Development Department (H&UDD), Government of Odisha initiated work on faecal sludge and septage management since 2016. The department has had several partners on this journey.

H&UDD would like to thank the Honorable Chief Minister for providing the vision of a clean, sanitized and healthy Odisha and the Honorable Minister for Housing and Urban Development for his able leadership under which Odisha has been able to embark and thrive on its journey of FSSM for its urban centers.

The H&UDD would specifically like to recognize the efforts of Odisha Water Supply & Sewerage Board (OWSSB) for the work they had undertaken in identifying the key areas of FSSM investment for the government. OWSSB has also been a pioneer in executing some of Odisha's major septage management projects, which has been instrumental for Odisha's remarkable progress on the FSSM agenda in the state. Additionally, the legal department, who have been a tremendous support in creation of the FSSM regulations that has been a benchmark in institutional and regulatory strengthening of FSSM across the state.

The H&UDD department would like to take this opportunity to thank the governments of the respective cities and ULB government officials for their hard work to help the government transform its vision of making the urban areas of Odisha clean, sanitized and healthy as recognized by the Odisha Urban Sanitation Policy.

The H&UUD would like to take this opportunity to thank the Bill & Melinda Gates Foundation for envisioning Odisha to become a pioneer in FSSM implementation in India. The investments made by the foundation in Odisha has indeed helped the government transform the urban regions of the state to lead the way on FSSM and become a torchbearer for other states in the country.

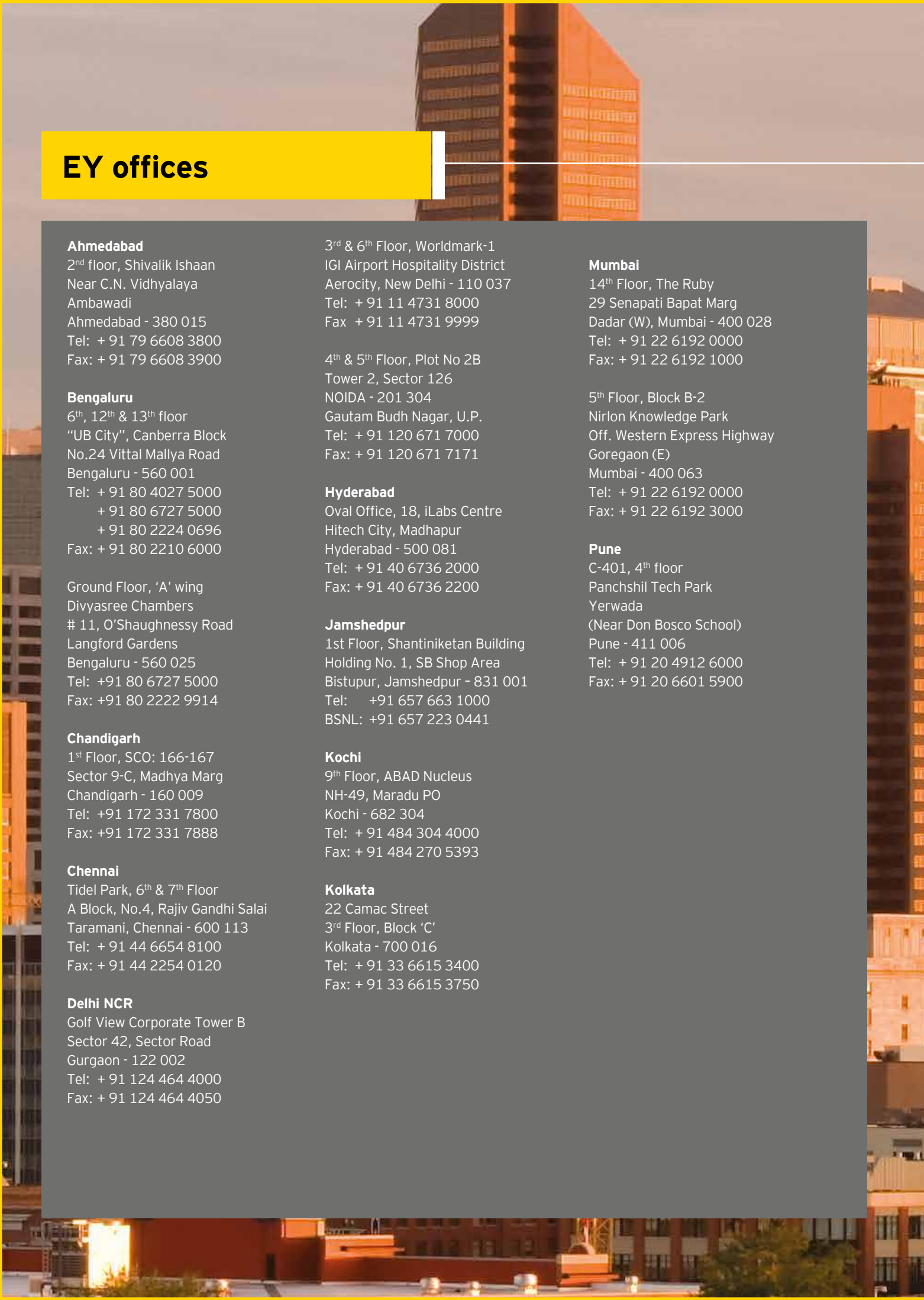
The department would also like to thank the international expert on FSSM, Mr. Dorai Narayan, for sharing his experiences and technical expertise which, have been a foundation and helped in building several of the FSSM interventions.

The department would also like to thank the members of the NFSSM Alliance for the constant encouragement and support provided to the government on all aspects of FSSM. The work of the NFSSM Alliance on identifying innovative FSSM solutions has been instrumental in helping the Government of Odisha to move the envelope forward on the FSSM agenda.

Furthermore, the department would like to bring forth the contribution of our partners, Arghyam, Practical Action and Centre for Policy Research. Our partners have been commendable for the towns of Anugul and Dhenkanal and these towns have helped us embark on our FSSM journey.

Last but not the least, H&UUD would like to thank the Technical Support Unit of Ernst and Young LLP for consistently providing their technical assistance to the government on various facets of FSSM. EY has successfully facilitated grassroots-level implementation of the FSSM agenda in the state and have stitched a collaborative effort between the various stakeholders. The efforts have helped the state transform its FSSM vision into reality in a short period of time. Furthermore, EY has been a knowledge partner for Odisha's Journey of Faecal Sludge and Septage Management: Towards sustainable sanitation goals book.

We wish this book to be a successful endeavor in its purpose of sharing our ideas and innovative solutions that can help transform the way governments and partners approach addressing FSSM challenges both in the short and the long term.



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