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**Operationalizing FSM regulations at city level:  
a case study of Warangal, India**

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*Warangal is the first city in India to introduce and operationalize Faecal Sludge Management (FSM) regulation. Evidence based advocacy, leadership at city level, citizen awareness campaigns, capacity building of stakeholders particularly the mechanised desludging operators, extensive use of information and communication technology (ICT) tools for monitoring have played an important role in operationalizing the regulation. The City government through FSM regulation has successfully introduced : a) empanelment and training of masons (as toilet builders) to ensure toilets are built as per design principles, b) site inspection by the sanitation team prior to issuance of building plan approval, c) licences to operate mechanised desludging and service level agreement with private operators d) usage of personal protective equipment by the desludging operators e) a mobile app in vernacular language for record keeping on desludging f) a dedicated helpline for citizens to seek support on FSM operations and g) awareness campaigns on safe FSM and scheduled desludging. Lessons from Warangal are being scaled up through introduction of State level FSM regulation and operational guidelines.*

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## **Introduction**

Over 65 percent of urban India relies on onsite sanitation (septic tanks and pits) which operates in the near absence of a regulated system to manage sanitation across the value chain resulting in unmanaged faecal sludge. The existing standards on the design of septic tanks and the requirement for periodic desludging are not followed; emptying and transportation of septage is not based on scientific principles, and the septage treatment facilities are not developed in most cities. Indiscriminate disposal of septage has significant health and environmental implications. The Ministry of Urban Development (MoUD), Government of India, has brought out an Advisory Note and Primer on FSM and Septage Management in Urban India in 2013 and in 2016 and encouraged urban local bodies (ULBs) to formulate their own bye laws and rules for management of septage in the city in consonance with municipal act in place (MOUD 2013, MOUD 2016). The Greater Warangal Municipal Corporation (GWMC) while recognizing the importance of safe FSM took a lead in developing a regulatory framework covering entire sanitation value chain.

## **FSM services in Warangal**

Warangal city with a population of 610,000 as per 2011 census, is the second largest city in the newly formed state of Telangana, India. The Administrative Staff College of India (ASCI) in partnership with GWMC conducted a detailed diagnostic study in 2015 to understand the status of FSM in Warangal. The understanding gained was furthered with continuous interactions and in-depth interviews with FSM operators and functionaries of GWMC, field visits and focus group discussions with other stakeholders during 2015-16.

- In 2015 about 77 percent of households had access to onsite sanitation (59 percent had septic tanks, 18 percent had pit toilets). The design and construction of toilets was not regulated and there was prevalence of insanitary toilets - pit toilets (typically comprising both single and twin pits) and septic tanks (in many cases without soak pits) having an outlet directly connected to open drains.
- The existing process of building approval requires citizens to submit the house construction plan along with the design of the septic tank as compliant with standards for construction of septic tanks (National Building Code through conforming to the Government Order Ms. No. 168 dated 07-04-2012). This practice was not followed.
- No field inspections were being conducted by GWMC staff to ensure compliance. Field visits undertaken by the ASCI team to residential areas with low coverage of toilets, particularly slums (Ambedkar Nagar, BR Nagar, OS Nagar) revealed non-compliance of toilet construction standards even for newly constructed toilets under Swachh Bharat Mission.
- Desludging was not periodic and customers as well as desludging operators had limited appreciation of the reasons for, requirements, standards and operating procedures related to periodic desludging.
- The transportation of faecal sludge collected from septic tanks was not as per Central Public Health and Environmental Engineering Organisation (CPHEEO) guidelines. The desludging operators / workers were not equipped with protective gear such as gloves, mask etc. The trucks were not equipped with any safety kit. Also, manual scavenging with the help of buckets was practiced in areas where desludging trucks could not reach or where the sludge was too thick or solidified for the pump to work effectively.
- Although the trucks being used by the private desludging operators were found to be in compliance with design requirements, the operators and workers had not undergone formal training programmes on the transportation and associated aspects such as use of personal protective equipment, disposal etc. as per regulations and procedures.
- The faecal sludge generated in the city was not scientifically treated and disposed. The sludge collected from households was being disposed on agricultural land, drains, low lying areas and water bodies around the city due to non-availability of a designated place for disposal and/ or treatment. There is no effective monitoring process for FSM by the municipal officials due to lack of operative regulation and supporting guidelines. Hence there was a need for developing comprehensive faecal sludge management guidelines. (ASCI, 2015).

The findings of the diagnostic study were disseminated widely amongst multiple stakeholders at city and state level through workshops and training programs for elected representatives, senior administrators and through consultations with citizen groups. Social media and opinion polls were also used. A City Sanitation Task Force comprising multiple stakeholders including civil society groups was established for dialogue and participation. GWMC addressed this multi-faceted FSM challenge by introducing FSM regulations and septage management guidelines in compliance with and drawing upon provisions and specifications related to septage management in various national level guidelines and regulations (National Building Code, 2005, revised *CPHEEO* Manual on Sewage and Sewerage Treatment 2013, Advisory Note on Septage Management in Urban India, 2013 and National Urban Sanitation Policy 2008). The objective of the regulation and guidelines was to promote a comprehensive and integrated approach to FSM and septage management covering collection, storage, desludging, transportation, treatment, disposal and reuse. GWMC formalized FSM regulations and supporting operative guidelines by issuing a council resolution on 25th March 2016, making Warangal the first city in India to introduce a comprehensive FSM regulatory framework.

The guidelines cover the following key elements of septage management:

1. Design and construction of septic tanks
2. Conversion of insanitary latrines into sanitary latrines
3. Septic tank pumping and de-sludging
4. Septage transportation
5. Treatment, disposal and reuse of septage
6. Information, education and communication
7. Training programs
8. Record keeping and reporting (MIS)
9. Help line for septage management (S-line).

## Operationalizing regulations – FSM interventions and changes

The city has developed an institutional framework defining roles and responsibilities of stakeholders and enforcement and monitoring strategies for successful implementation of FSM systems. During the last year, the city government has taken several initiatives:

- **Improving design and construction of septic tanks:** Adoption of improved designs of septic tanks for households. Also, the use of advanced septic tanks (three chamber septic tank with better settling capacity and retention time) and Decentralized Waste Water Treatment (DEWAT) systems by institutional and bulk consumers such as hotels, colleges and apartments etc. This is being achieved by adopting regulations on septic tank designs and construction methods as part of building plan regulations.
- **Conversion of insanitary latrines into sanitary latrines:** The public health department of the Corporation has completed a 100% household survey to identify the insanitary latrines and improperly constructed septic tanks. The information will be used for educating and giving notices to the households with insanitary toilets to retrofit them as per the approved designs. The conversions would lead to a reduction in direct (unsafe) disposal of faecal matter into the drains and open areas by households. In addition to safe containment, the process would contribute to periodic desludging and therefore safe management of faecal sludge. A funding support of USD 90 is being made available to the household for the conversion. Till date of 181 applications received, approval has been granted to 176, amounting to a subsidy grant of USD 15840. Of these 176 households, 148 have completed the conversion of their insanitary toilet to sanitary toilet.
- **Septic tank pumping and de-sludging:** GWMC has established a formal process of licencing desludging operators. The process involves issuance of notification and calling for applications from operators to apply for license to operate. GWMC has issued licenses for collection and transportation operations on 26th October 2016 to the three operators running eight trucks. The licence is valid for 5 years and needs to be renewed every year. Currently an operator charges anywhere between 30- 40 USD per visit. The households are informed to engage the licensed operators for collection and transportation to desludge. The list and contact details of licenced operators have been displayed on the website of GWMC. A letter has been issued by GHMC to police commissioner to seize desludging operators vehicles and operators who are operating without a license to operate. Multiple rounds of training and demonstrations have been organised to explain the approved standards and procedures for pumping and desludging and about the use of Personal Protective Equipment (PPE).
- **Septage transportation:** The empanelled desludging operators have trucks that meet the approved standards for desludging and transportation. They have trained workers equipped with uniforms, safety gear, tools and vacuum trucks. As per the requirements, the vehicles have been fitted with a Global Position System (GPS) by the operators at a cost of USD 120 per truck. The data is tracked by GWMC for vehicular monitoring. Going forward the GPS tracking can also be used for assignment of desludging requests to the nearest located vehicle. Operators have supported regulation and monitoring process as they anticipate increase in business volume due to scheduled desludging of toilets.
- **Treatment, disposal and reuse of septage:** Series of interactions were held with technology vendors and two suitable technologies, compliant with the norms as per the relevant legislations have been identified. GWMC has identified four land parcels meeting environmental requirements and standards needed for construction of the septage treatment plant and appropriate financing model including Public Private Partnership (PPP) for construction and Operations & Maintenance (O&M) of septage treatment and disposal facilities are being finalised. The treatment is achieved by anaerobic stabilization of sludge and drying it on unplanted drying beds. The liquid fraction is treated by a Decentralized Wastewater Treatment Systems (DEWATS) using settler, anaerobic filters and constructed wetlands. The by-products such as bio solids can be reused in agriculture as soil conditioners and treated water can be used for irrigation or safely disposed into the nearby water bodies. These disposal options are approved by Government of India as well as State Pollution Control Board. The other technology identified is co-treatment with municipal solid waste (biomethanation) and Council resolution has been passed.
- **Information, education and communication:** GWMC held awareness generation camps in slums and non-slum areas and also established sanitation resource centers in some slums to promote adoption of proper toilet designs, construction methods, periodic desludging and safe sanitation practices. Workshops were held with masons, builders and desludging operators to expose them to better designs and better methods of construction. Posters have been displayed on public toilets and on septic tanks to

generate awareness and provide a channel for citizens to seek information. School children have involved in undertaking Information, Education and Communication (IEC) campaigns. Resident welfare associations (RWAs) and Self Help Groups (SHGs) are gainfully engaged to promote safe FSM practices.

- **Training programs:** GWMC is supporting capacity building of various stakeholders including its own staff through appropriate institutions of repute namely ASCI, Consortium of DEWATS Dissemination (CDD) society etc. An organisational strengthening and training Needs Assessment study has been commissioned with Kakatiya Institute of Technology and Science (KITS) Warangal to identify the training and capacity building requirements of different stakeholders. CDD has been engaged to design and deliver a 'Toilet Builder' training program leading to certification and empanelment of masons to influence the quality toilet constructions. More than 70 masons have been empanelled so far and their details are shared with citizens who come to GHMC office for submitting applications for new toilets and also the details are displayed on the GWMC website. The city has set a target to become Open Defecation Free (ODF) by June 2017 and is taking steps for ensuring additional trained masons so that the quality of new toilet constructions is as per prescribed standards. Around 200 masons have applied for empanelment and will be undergoing the toilet builder training program in April 2017.
- **Record keeping and reporting (MIS):** GWMC is building the data base and information related to septage generation from households and commercial establishments, insanitary latrines, location of septic tanks, details of operators responsible for collection of desludge and details of septage treatment plant. In addition to the GPS in vehicles, an FSM tracker mobile app was developed in vernacular language and is implemented for capturing information on septage collection on a real time basis to aid effective implementation of the regulations. Detailed records of the operations covering households, area and location, type of septic tank, age of septic tank, date of desludging, quantity of septage, user charges collected, accidents and spillages and the next date of scheduling for desludging are being maintained. In the month of November 2016, 41 records were made by the 8 trucks run by the 3 empanelled operators. The number of records in the months of December 2016, January and February 2017 stood at 69, 86 and 87 respectively. The records reported are lesser than the actual operations due to low education levels of operators and inertia for record keeping particularly using a mobile app. Daily follow up is done to help achieve a more realistic record of operations. A draft framework for linking information gathered through mobile app to property database of the city is developed for ensuring scheduled desludging.
- **Help line for septage management:** GWMC has established Sanitation Helpline (S-Line), a single point contact for citizens to reach out for FSM related services. GWMC's existing toll free phone line is extended to service three purposes: (a) Request for new toilets, (b) Technical support for construction of toilets - design, material for construction; trained and empanelled masons etc, (c) Citizen services and grievance redressal including accessing desludging services, subsidy flows, complaints and suggestions related to provision of public toilet facilities etc. The system is IT enabled after undertaking process reengineering. The S-line services are institutionalized under IT department of GWMC and works closely with sanitation and town planning departments of GWMC. Launched in May 2016, S-line has become popular and on an average receives 45 requests every day, with more than 60% of callers being women. 80% of the calls received are for new applications. In the pilot phase of 4 months, 542 grievances were redressed and technical assistance provided to all the 160 callers. S-line has started receiving calls for booking trucks for desludging. As on date, Sline was able to facilitate GWMC to release subsidy amount of the USD 438806 to 1800 new beneficiaries and clearance of pending subsidies to 3104 beneficiaries. The successful pilot is being scaled up city wide to make Warangal a model sanitation city.

## Drivers of change

Following are the key triggers that enabled the situation to change in Warangal:

- **Evidence based advocacy:** Compelling evidence gathered through diagnostic study with regard to FSM practices revealing potential public health and environmental risks and inverse linkage to health was shared extensively with city stakeholders and state government. Bringing evidence to public domain was a wakeup call and led to stakeholder consensus for action.
- **City level leadership:** Committed leadership at state and city level which recognised the need and urgency for addressing unregulated septage management practices. Introduction to national and international good practices through exposure visits led to confidence building.

- **Environmental concerns:** Evidence of contamination of drinking water bodies falling in the pathway of faecal waste disposal areas as reported by local media has led to public outcry for action.
- **Civil society participation:** Active dialogue with Resident Welfare Association (RWAs), City Sanitation Task force (CSTF) members, Town level federation (TLF) members, non-governmental and private sector players led to ownership of FSM initiatives and acceptance of new practices.
- **Active support of desludging operators:** Two major private desludging operators holding eight trucks service the city. Operators welcomed regulation and requested city government to prioritize FSTP. Another reason for their support is the perceived risk to their business from small time operators (involved in manual/semi manual desludging) and the need to create a level playing field.

## Lessons learnt

Lesson learnt during the last one year while implementing FSM regulations in Warangal are:

- **Urgency to establish Faecal Sludge Treatment Plant:** Because of delay in establishing FSTP, operators continue to dispose sludge in an unregulated manner and citizens did not see significant change. Technology selection process, Detailed Project Report (DPR) preparation and earmarking of land for FSTP should begin early on in the project cycle and FSTP should be prioritized and implemented concurrently along with other components of regulations.
- **Site selection for FSTP:** The land parcel identified for FSTP is over 20 km away from city limits. Selection of suitable land parcel(s) closer to the market, preferably within a travel distance of 10 km will enhance compliance and improve financial viability of the initiative.
- **Defining institutional arrangement for FSM:** There is no clear assignment of roles and responsibilities of stakeholders for safe management of faecal sludge. State government could play an enabling role and define upfront responsibilities of citizens, GWMC, Pollution Control Board, civil society groups etc. Further, at the municipal level, organisational structure and staff responsibilities should be clearly defined for success of FSM activities.
- **Strengthening data systems at municipal level:** The city level data systems with regard to toilet coverage, toilet typology, property numbers are disorganized hindering effective planning of FSM. It is important to strengthen data systems using Geographic Information System (GIS) tools to enable effective planning and for introducing scheduled desludging of toilets.

## Way forward

Following the successful enactment of FSM regulation, the city is geared up to address outstanding challenges by undertaking various initiatives along the sanitation value chain:

- **Establishing Faecal Sludge Treatment Plant (FSTP):** A detailed project report for FSTP has been prepared, land and financial resources have been earmarked and technology partner identified. Public private partnership model with Service Level Agreement (SLA) approach is being considered for FSTP.
- **Introducing city wide Global Information Systems (GIS) mapping:** International best practices have been identified, consultant and technology finalised, mapping households and linking the data to desludging schedule has been sought.
- **Conversion of insanitary to sanitary toilets:** The city has appointed nodal officers for each of its 58 election wards for better supervision and coordination of works. Sline is being scaled up to handle the quick processing of applications, fund disbursement and toilet construction/ repair.
- **Conducting awareness campaigns** involving RWA, bulk generators and municipal functionaries emphasising the need for conversion of insanitary to sanitary toilets, periodic desludging practices etc. Monitoring environmental quality around existing disposal areas to sensitize residents is also planned.
- **Monitoring** desludging operators in terms of ensuring usage of PPE and other commitments outlined in SLAs is a must. City has appointed a sanitary office responsible for monitoring desludging operators. Study tours and exposure visits are being planned for the desludging operators.
- **Currently the price charged by the operators is market determined.** However, going forward as the number of operators increase and periodic desludging sets into motion, it may be prudent to regulate price to protect the interest of the citizen.
- **Enforce strict restriction** on the growing number of non-empanelled operators and impose fines for non-compliance for scheduled desludging by households and bulk generators.

In summary, Warangal City has introduced several innovative processes and solutions (S-line, co-treatment of faecal sludge and municipal solid waste, FSM tracker, GPS systems in desludging trucks to illustrate a few) to operationalize FSM regulation. The response from stakeholders is encouraging due to concerted evidence based advocacy. The city is poised to address challenges, deepen implementation and earmarked financial resources. Public Private Partnerships (PPP) models are also considered. Lessons from Warangal are being scaled up across the State of Telangana through introduction of State level FSM policy and operational guidelines. Several national and international cities have visited Warangal to witness success and learn lessons for mutual benefit.

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#### **Note**

*Central Public Health and Environmental Engineering Organisation (CPHEEO)* is the Technical Wing of the Ministry of Urban Development, Government of India.

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