Digital Monitoring Systems for FSSM

September 30, 2021

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Support to Government of Maharashtra for FSSM

Maharashtra

Swachh Maharashtra Mission, Urban

Scaling up FSSM and urban sanitation under Swachh Maharashtra Mission



Policy, guidelines and strategic support for implementation



FSSM strategy and scale up plan for safe sanitation



Technical support in day to day operations

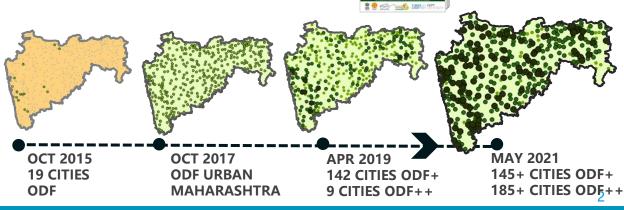


Strengthening local government capacity for ODF, ODF+ and ODF++

State become ODF on 1st Oct 2017 and now aspires to become ODF+/++ with 311 FSTPs under implementation

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Making cities ODF+-

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Maharashtra has taken up FSSM in a big way ...

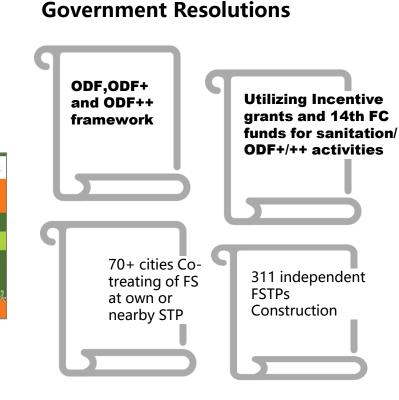
Increased focus on moving cities towards ODF+/++ (FSSM) after declaring Urban Maharashtra ODF on 2nd Oct. 2017

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Support to cities for sanitation improvement

Wai, Sinnar, Kolhapur, Satara, Khopoli

Comprehensive City Sanitation planning

Pioneer cities in India to implement citywide scheduled emptying of septic tanks



Scheduled emptying of septic tanks



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Use of Own (DBO) /

Philanthropy funds

for FSTPs



Levying a Sanitation tax to support operations

Reuse of treated

心ち wastewater





Faecal Sludge and Septage treatment facility (FSTP)



Online monitoring systems for emptying and treatment

oo Involvement of SHGs



Municipal council commitment and leadership





Gender inclusivity in sanitation



Equitable Services for Slums and Vulnerable areas



City Wide Inclusive

Sanitation









Scheduled desludging service

- Current practice of septic tank owners is to call desludging operators only when tanks overflow
- Under a scheduled desludging service... all septic tanks in the city are visited... once during a fixed cycle according to a predetermined schedule...
 - by one or more **service providers**...

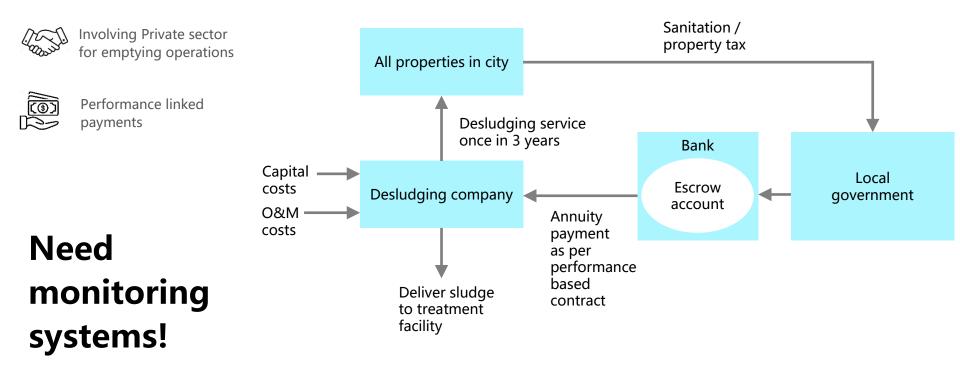
who collects and transport feacal waste safely to a **designated** site for treatment and reuse

paid through **annuity payment** linked with tax collection systems





PLAM - Performance linked annuity model for scheduled desludging



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Monitoring needs for FSSM





Ensure desludging at regular intervals.



Safe withdrawal of sludge by following necessary protocol



Safe conveyance to designated treatment site



Indicators for making decisions on "performance linked payments"



Collect data on onsite systems



Why use digital monitoring tools?

Originally - Paper based monitoring for Scheduled desludging under Performance Linked Annuity Model





- Successful desludging = signature of the customer on a paper form at collection as well as signature of FSTP operator at unloading.
- Submission of required number of such forms is mandatory for municipality to approve monthly payment
- Four copies for the forms are made, one each for customer, FSTP, private desludger and municipality
- For issues like manual scavenging, illegal dumping, spillage, damage to septic tanks only option is to complain by phone
- Forms only record basic data such a amount of sludge, date and time No way to visualize geographical coverage and other performance metrics
- Not capturing post-commencement issues like customer readiness (septic tank covers not open), refusals and rescheduling, high trip ratio
 CWAS memory CRDF commencement
 Linux-customer Linux-



SaniTab - Mobile App for Sanitation Survey



Key Features of SaniTab application: -

- Citywide digital data collection
- Custom survey forms
- Also capture location and photos
- Supports local languages



In 2015: > 10,000 properties surveyed in Wai for sanitation baseline assessment

- ✓ Citywide survey on :
- Toilet availability

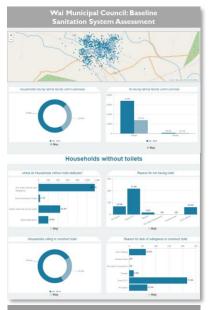
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- Type of disposal system
- Size and shape of septic tank
- Location of septic tanks
- Accessibility of septic tanks
- Last time septic tank was emptied
- ✓ Online dashboard for analysis of data

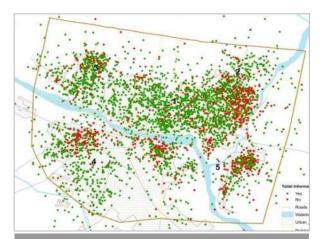
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Dashboard generated from SaniTab



Spatial distribution of properties with and without access to individual toilets in Wai (2015).

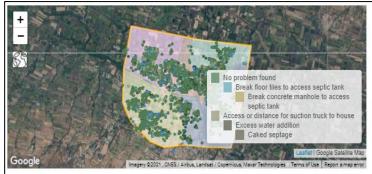


On-field surveyors conducting surveys using SaniTab

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Currently – Form for monitoring desludging services + developing a database of onsite systems

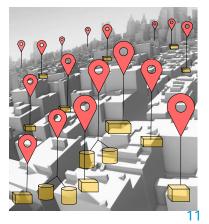
- Customizable app not only as a data collection tool but also as a monitoring system
- Desludging monitoring form created for monitoring the performance of the desludging services being provided by the private sector service provider and the ULB truck
- Dashboard developed for easy monitoring of the desludging operations.
- Creating a unique database of onsite systems Added questions about septic tanks
- If all tanks are to be visited in 3 years use this opportunity to create a database!











Surveyor app + Monitoring Dashboard

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dit Saved Form (1)	Monitoring Emptying Services by ULB in Sinnar
end Finalized Form	Version: 20190723 Added on Tue, Dec 03, 2019 at 13:05 Monitoring Emptying Services by ULB in
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	Start GeoPoint
	Photographs
	Take Picture
	Choose Image
	Mark form as finalized
	Save Form and Exit

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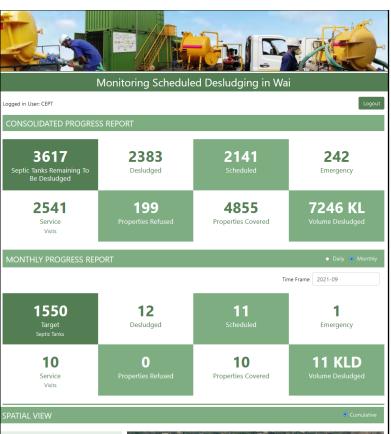
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1. Form id (should be same as the or used in emptying form) 2. Zone no. (as per schedule emptyin plan) 3. Ward Number
plan)
3. Ward Number
4. What is the name of the locality?
5. Property number as per Council property tax records:
6. Status of property during the visit
7. Nature of service
B. Is owner ready to empty the septic tank/pit today?
10. Type of Property
14. Name of Apartment/Building/ Property
15. Name of the respondent/ building secretary
16 Contact no of respondent / huildi
Go Up Go To Start Go To End
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Property Details



+

Downloadable MIS results

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What data are we collecting?

Property and owners

- 1. Property Tax number
- 2. Ward Number
- 3. Owner name and phone number
- 4. Address
- 5. GPS location
- 6. Type of property
- 7. Is it a shared system?
- 8. Prop. no of sharers
- 9. Readiness of owners to receive service
- 10. Ownership of Property Owner or Tenant?

Service Delivery / Desludger Performance

- 1. Volume desludged in lts.
- 2. No. of Trips
- 3. Use of PPE

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4. When was the last time the septic tanks was emptied

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- 5. Problems faced during emptying?
- 6. Was there any septage spill?

Onsite Sanitation System characteristics

- 1. Type of Disposal System
- 2. Is it a shared system?
- 3. Size & location of disposal system
- 4. Shape of disposal system
- 5. Accessibility from road
- 6. Type of access cover

27 data points for properties

data points for CT/PT

CWIS Principles

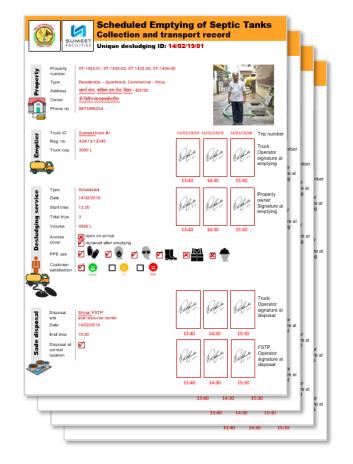
- Vulnerable Areas Covered BPL Card Holder, width of road on which property is located, caste
- 2. Gender Aspect gender of the person responding to the form and gender of the person supervising the emptying service

CT/PT emptying

- 1. Type of toilet CT/PT/IHHL
- 2. Details of Property (if IHHL) or toilet (If CT or PT)
- 3. Problems faced during emptying
- 4. Volume desludged in litres.
- 5. Total no. of trips
- 6. Use of PPE
- 7. GPS location

One step further -





SaniTrack - end to end monitoring for FSSM

End to end monitoring for desludging operations from service at property end to safe unloading at FSTP

Web and mobile modules catering to every stakeholder – truck operators, ULB Officials, administrators etc

Can handle both scheduled emptying as well as demand based operations

Integrate validation checks. Simpler choice based questions, location checking, volume and truck capacity

On-screen signatures like modern delivery apps (eg: Amazon). Can also generate individual reports automatically like paper form reporting system.

Real time results on dashboards. Key performance indicators displayed. Basic analysis possible.

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Performance linked payments – Payment to private operator can be linked to results from this system

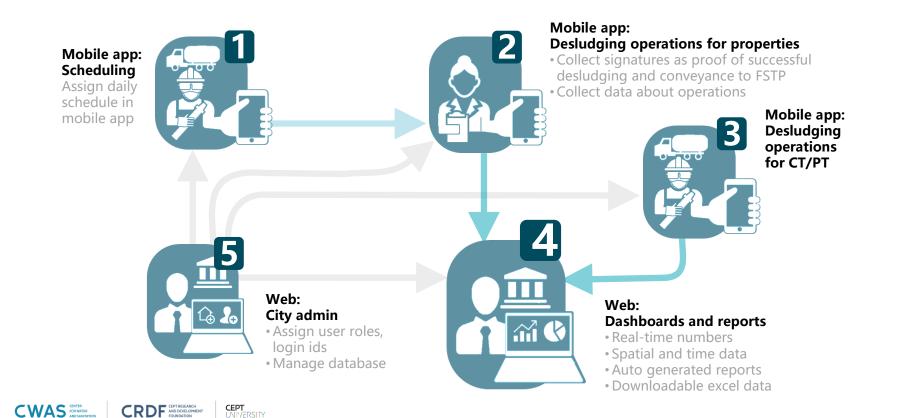
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Components and modules



How does it work?

1 System set up – one time

- ✓ User profiles created admin, scheduler, delsudger
- ✓ Uploaded a list of properties
- ✓ Registered trucks and set location of treatment facility

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- Supervisor login for scheduling module
- Select and schedule properties to be serviced today from available list
- "Today's Schedule" goes to truck operator



How does it work?

3 **Desludger records operations** and signatures on app - daily

- Truck operator login for desludging module
- Select scheduled/emergency properties visible in <---Ţ "Today's Schedule"
- Location and address of property appears on Ţ screen
- Fill simple form with basic questions Ţ
- Take signature and feedback of household after ţ emptying
- Unload at FSTP and take signature of FSTP operator

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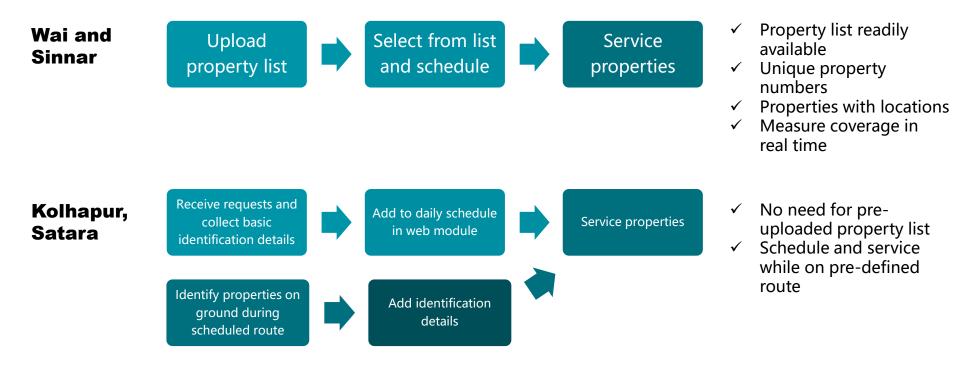
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11:56 🚥 🖻 🕒 🚥	0.18 K/s 🚄 🛸 89%	Signature of property owner	
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		Caution	
		You are not near designated site. Illegal dumping is a	

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Next iteration – delinking from property list

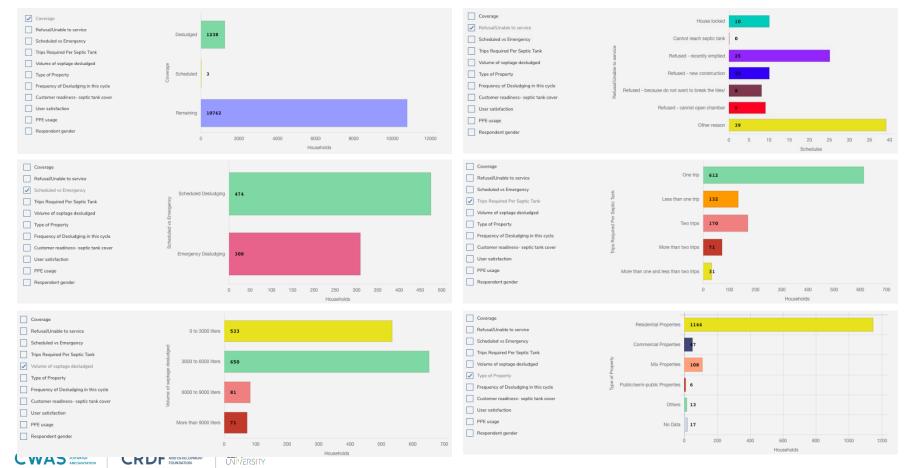


Dashboard, database and reports



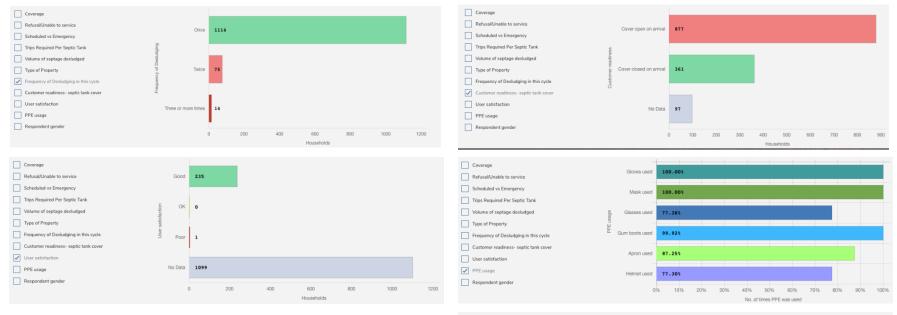
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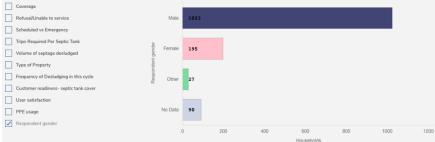
Web module – Dashboard



Web module – Dashboard

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What data are we collecting?



Pre-uploaded database

- 1. Property Tax number WARD:NUMBER:PART
- 2. Owner name and phone number
- 3. Address
- 4. GPS location

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- 5. Type of property
- 6. Type of sanitation system

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- 7. Is it a shared system?
- 8. Prop. no of sharers



Property desludging data

- **Emergency or Scheduled**
- 10. Unique Desludging ID
- 11. Service refusal
- 12. Time stamps and dates
 - Scheduled
 - Desludging started
 - Desludging ended
 - Delivery at FSTP
- 16. Respondent gender
- 17. Status of access cover
- 18. Volume collected
- 19. PPE usage
- 20. Trips taken

- 21. Signatures
 - Property owner at collection

29 data points

for properties

- Operator at collection
- Operator at delivery to FSTP
- FSTP operator at delivery
- 25. Photo at collection
- 26. User Satisfaction level
- 27. Desludged by which truck
- 28. If near FSTP at delivery
- 29. Delivered to which Treatment Facility

15 data points for CT/PT



CT/PT desludging data

- 1. Name of CT/PT
- 2. Unique Desludging ID
- 3. Time stamps and dates
 - Desludging started
 - Desludging ended
 - Delivery at FSTP
- 6. Volume collected
- 7. PPE usage
- 8. Trips taken
- 9. Signatures
 - Operator at collection
 - Operator at delivery to FSTP
 - FSTP operator at delivery
- 12. Photo at collection
- 13. Desludged by which truck
- 14. If near FSTP at delivery
- 15. Delivered to which Treatment Facility

SaniTab and SaniTrack Key Benefits - Program efficiency for FSSM services

Integrated monitoring system – Across FSM service chain



Citizen awareness about emptying procedures



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"Real time" monitoring No need to process data



Photo stamping, Geo stamping, Signatures



Easy to Operate, Reduce paper work, Minimize human error



Unique database



Can view progress easily and process payments



Supports vernacular language



Partnerships and Collaboration

BILL& MELINDA GATES foundation



10.974x 350123; 94.92.98(02

CWAS CENTER FOR WATER







Government of Maharashtra









CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION

Thank you

About us

The Center for Water and Sanitation (C-WAS) at CEPT University carries out various activities – action research, training, advocacy to enable state and local governments to improve delivery of services.









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