21st African Water Association International Congress & Exhibition
and The 7th International Faecal Sludge Management Conference

IT enabled systems for monitoring citywide FSSM services

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22nd February 2023, Abidjan, Côte d'Ivoire

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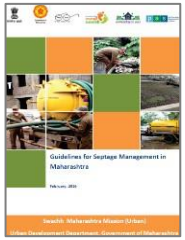
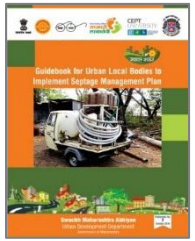
In India, Maharashtra state has taken up FSSM in a big way

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

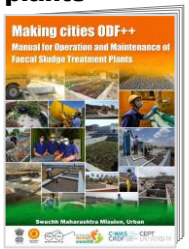
Septage Management Guidelines



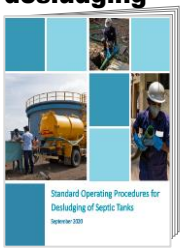
Step by Step Guide for ODF+



O&M of treatment plants



SOP for scheduled desludging



Co-treatment at own/near by STP Cities - 71

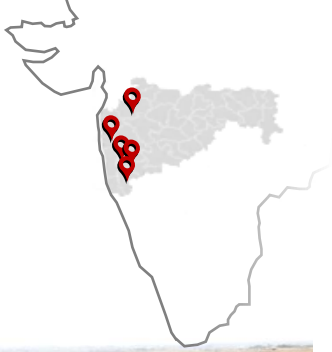
Independent FSTP Cities - 323

Category A cities: ULBs with STPs	Category B cities: Co-treatment at nearby STPs	Category C cities: Independent FSTPs
Co-treatment at own STP and accept FS from nearby cities	Co-treatment at nearby STPs within 20 km	Remaining ULBs will treat septage at FSTPs
Functional STPs **35 cities**	Co-treat at nearby STPs **36 cities**	Independent FSTP **323 cities**

State level policy for taking up scheduled desludging across all 390 + cities . . .

Ideas demonstrated in these cities have become models for FSSM in India

Wai, Sinnar, Kolhapur, Satara, Khopoli



Comprehensive City Sanitation planning

- Scheduled emptying of septic tanks
- Faecal Sludge and Septage treatment facility (FSTP)
- **Online monitoring systems for emptying and treatment**
- Involvement of SHGs

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

- Involving Private sector for emptying operations
- Use of Own (DBO) / Philanthropy funds for FSTPs
- Municipal council commitment and leadership
- San Workers training

City Wide Inclusive Sanitation

- Levying a Sanitation tax to support operations
- Reuse of treated wastewater
- Gender inclusivity in sanitation
- Equitable Services for Slums and Vulnerable areas

Introduction of scheduled desludging services

- 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…

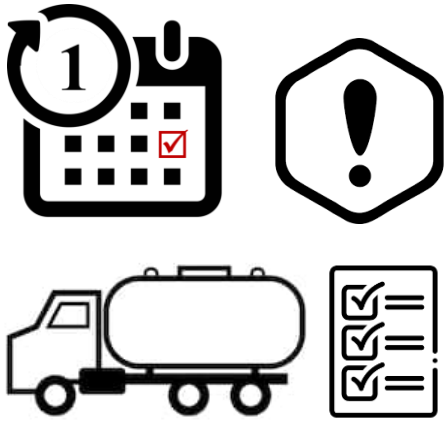
  once during a **fixed cycle** according to

  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

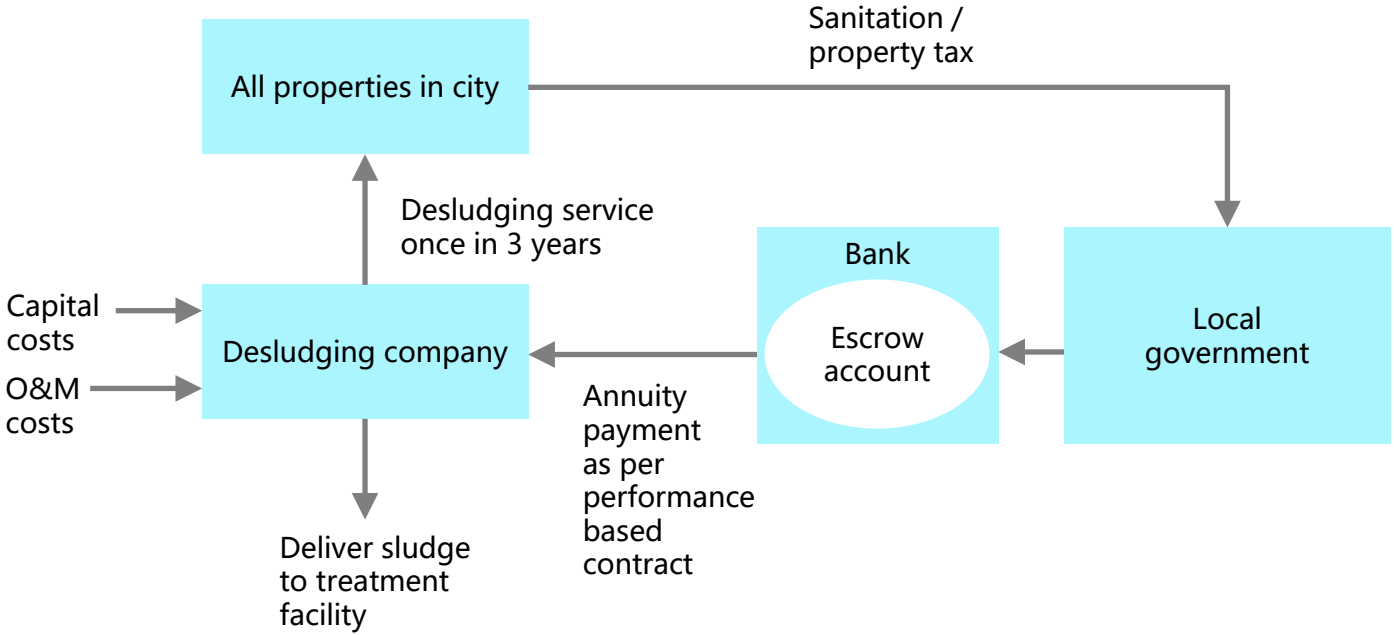


PLAM - Performance linked annuity model for scheduled desludging

Involving Private sector for emptying operations

Performance linked payments

Ensure safe collection

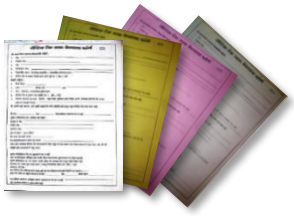


Need monitoring systems for FSSM !

1. Ensure desludging at regular intervals
2. Safe collection of sludge by following necessary protocol
3. Safe conveyance to designated treatment site
4. Indicators for making decisions on “performance linked payments”
5. Collect data on onsite systems

Why use digital monitoring tools?

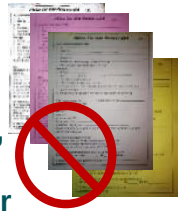
Originally - Paper based monitoring for Scheduled desludging under Performance Linked Annuity Model



- 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
- 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 as 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

"Real time" monitoring
No need to process data for results

Easy to Operate, Reduce paperwork, Minimize human error



Integrated monitoring system – Across FSM service chain

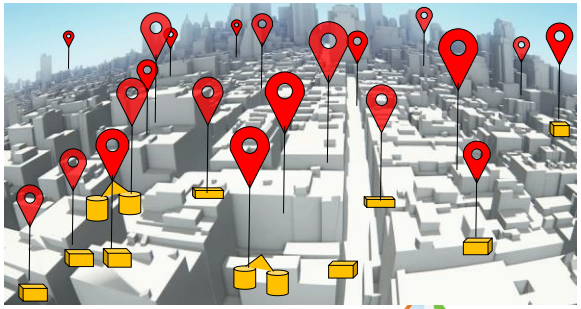
Inclusive – support vernacular language

Can view progress easily and process payments

SaniTab - Mobile App for Sanitation Survey

Key Features of SaniTab application: -

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

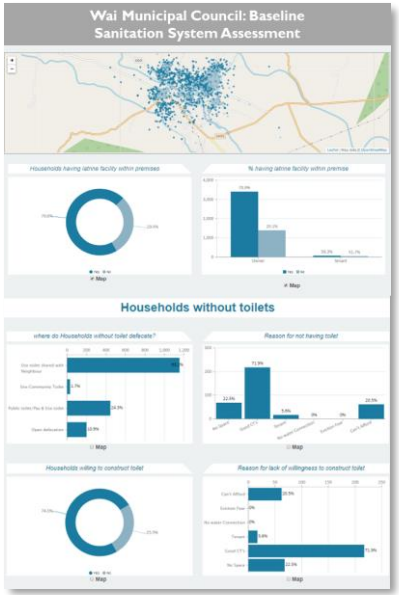


In 2015: > 10,000 properties surveyed in Wai for sanitation baseline assessment

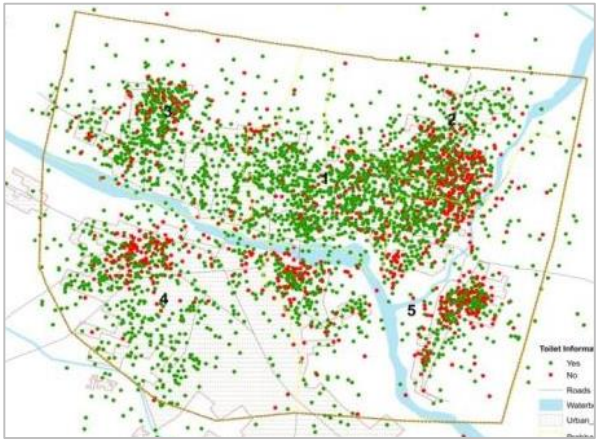
✓ **Citywide survey on :**

- Toilet availability
- 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**



Dashboard generated from SaniTab

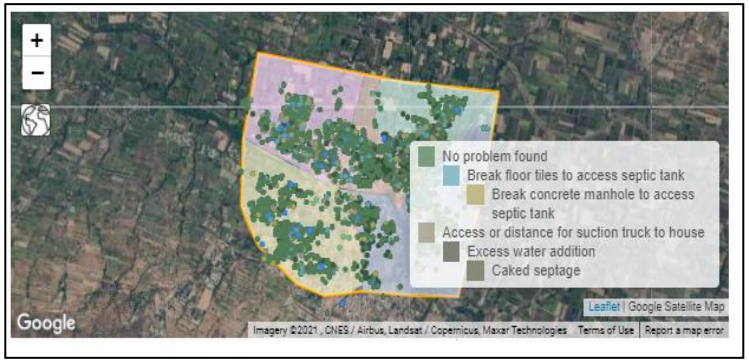


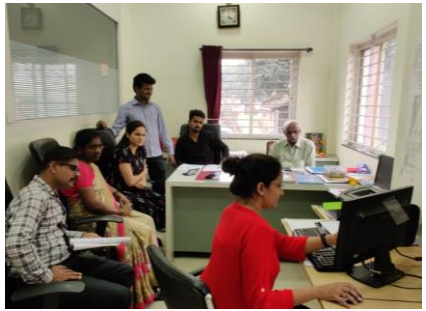
Spatial distribution of properties with and without access to individual toilets in Wai (2015).

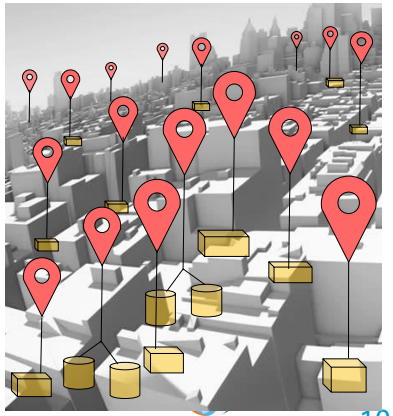
On-field surveyors conducting surveys using SaniTab

Currently – developing a database of onsite systems

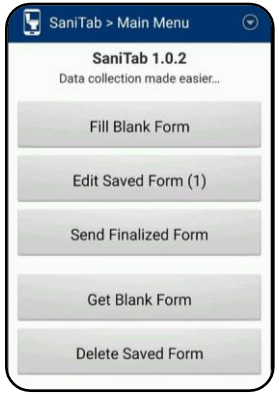
- Customizable - not only as a data collection tool but also as a **monitoring system**
- **Desludging monitoring form** for monitoring performance of the desludging services the private sector service provider and the ULB truck
- **Dashboard**
- If all tanks are to be visited in 3 years – use this opportunity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

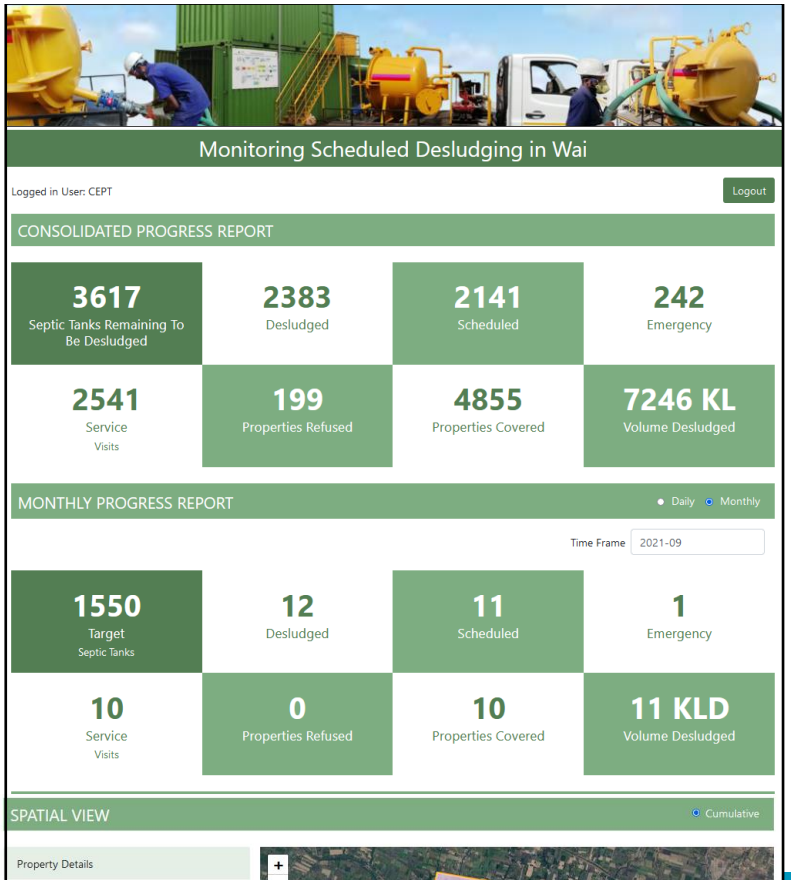




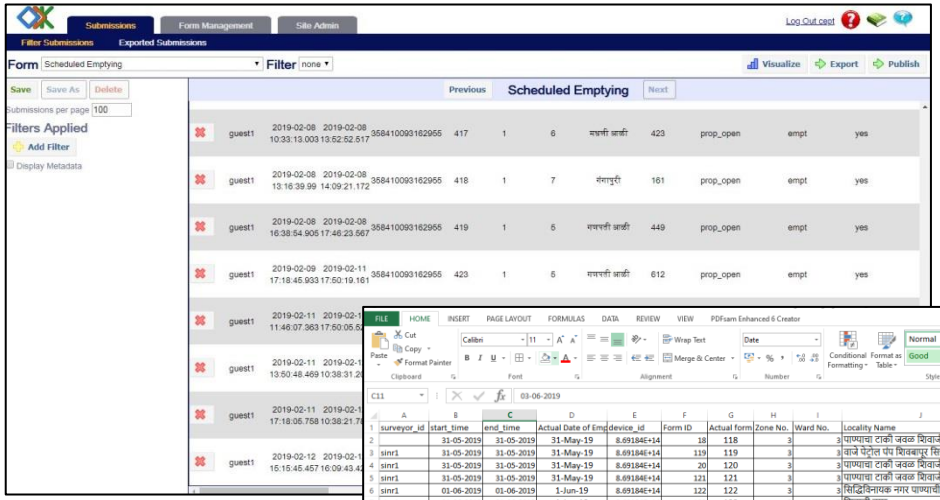


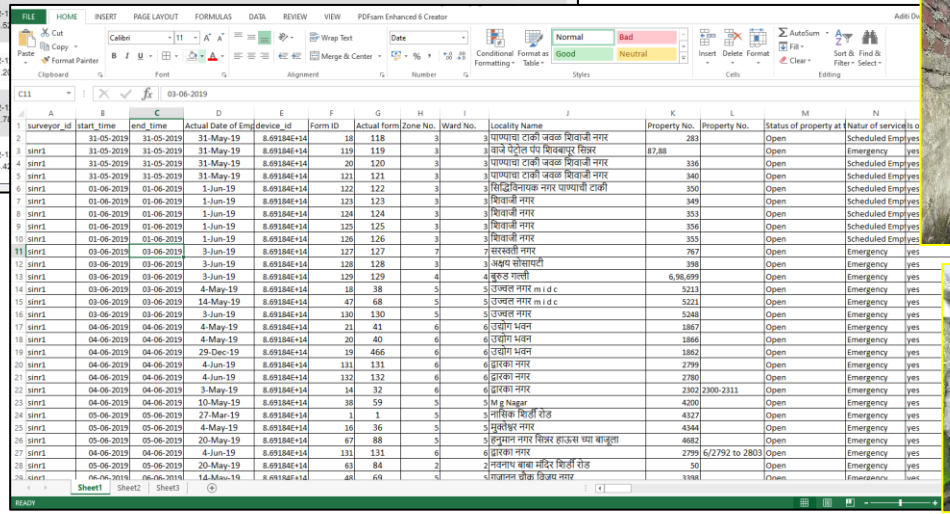
Surveyor app + Monitoring Dashboard





Downloadable MIS results





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?

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

7 data points for CT/PT

Service Delivery / Desludger Performance

1. Volume desludged in lts.
2. No. of Trips
3. Use of PPE
4. When was the last time the septic tanks was emptied
5. Problems faced during emptying?
6. Was there any septage spill?

CWIS Principles

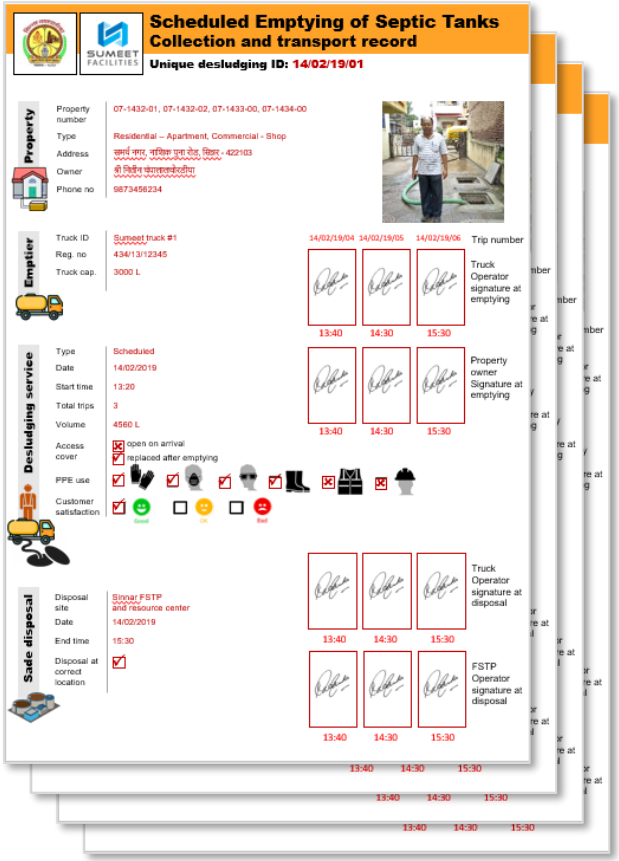
1. Vulnerable Areas Covered – BPL Card Holder, width of road on which property is located, caste

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

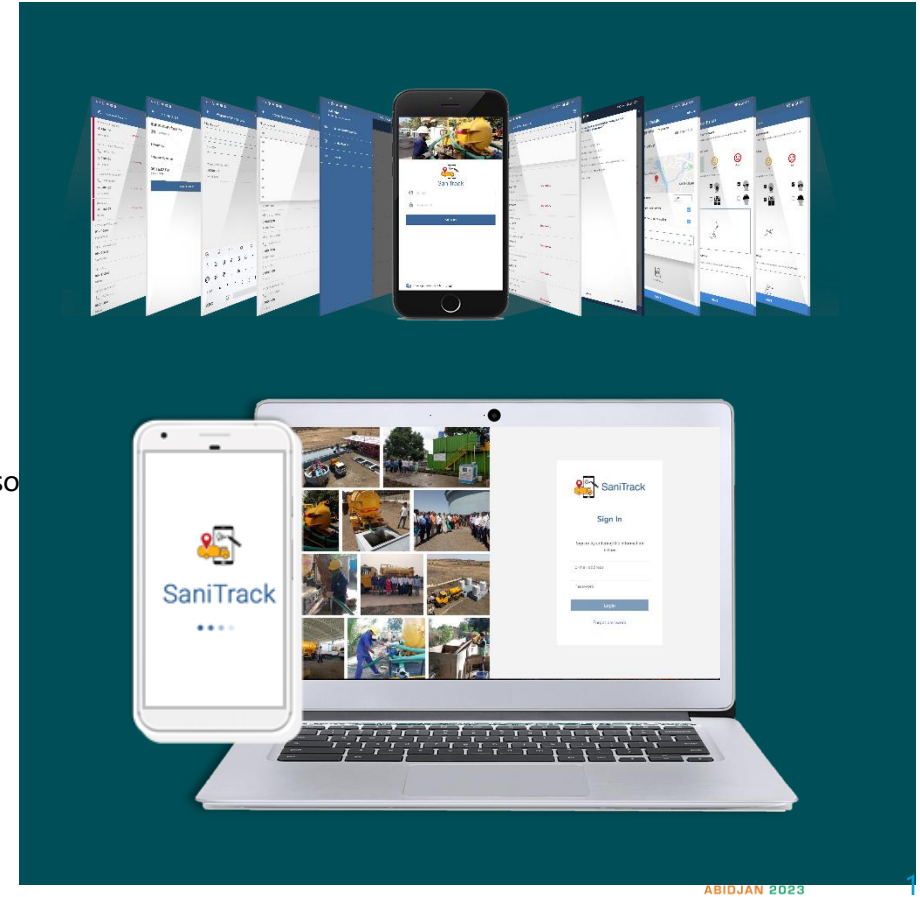
Can handle both scheduled emptying as well as demand based operations

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

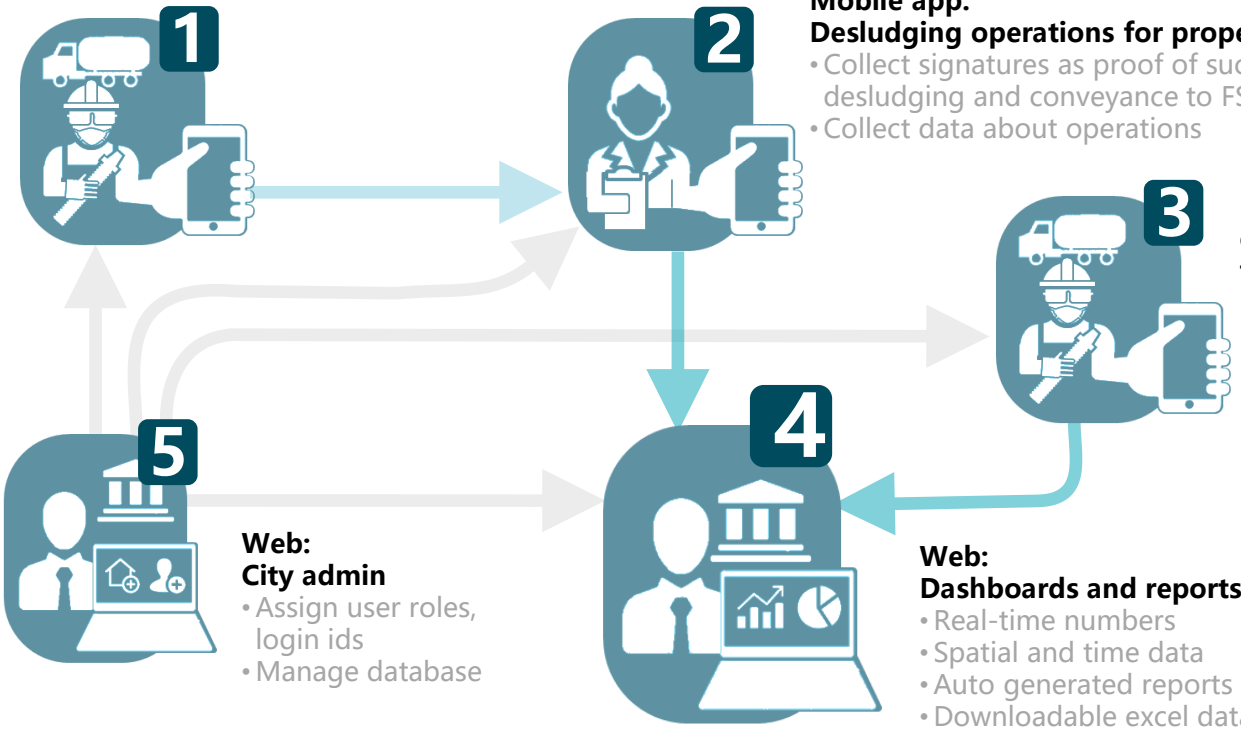
On-screen signatures like modern delivery apps (eg: Amazon). Can also generate individual reports automatically like paper form reporting system.

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

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



Components and modules



Mobile app:
Scheduling
Assign daily schedule in mobile app

Mobile app:
Desludging operations for properties
- Collect signatures as proof of successful desludging and conveyance to FSTP
- Collect data about operations

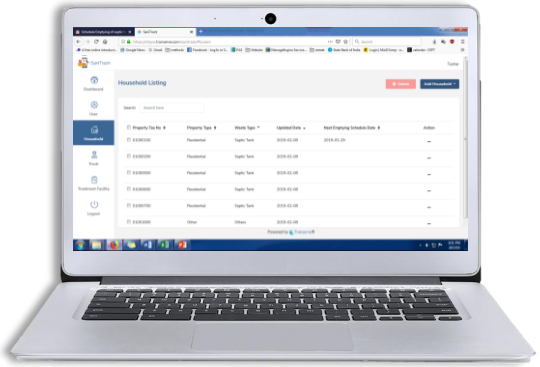
Mobile app:
Desludging operations for CT/PT

Web:
City admin
- Assign user roles, login ids
- Manage database

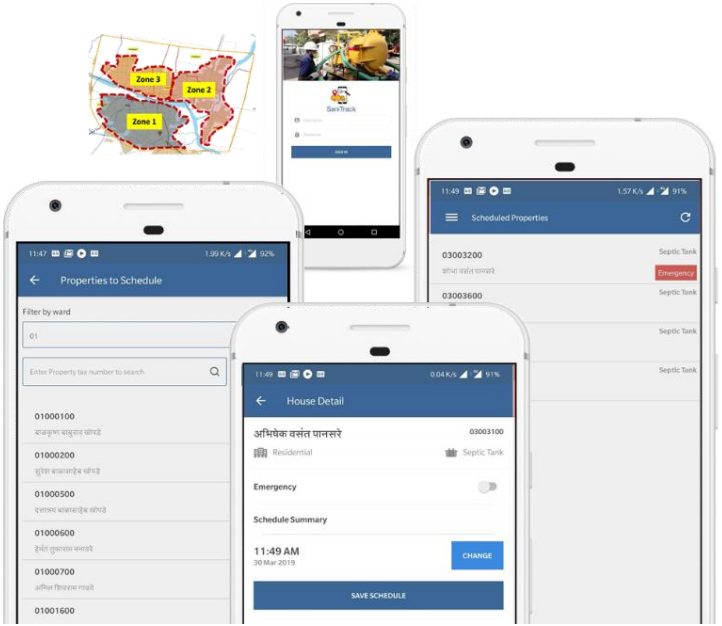
Web:
Dashboards and reports
- Real-time numbers
- Spatial and time data
- Auto generated reports
- Downloadable excel data

How does it work?

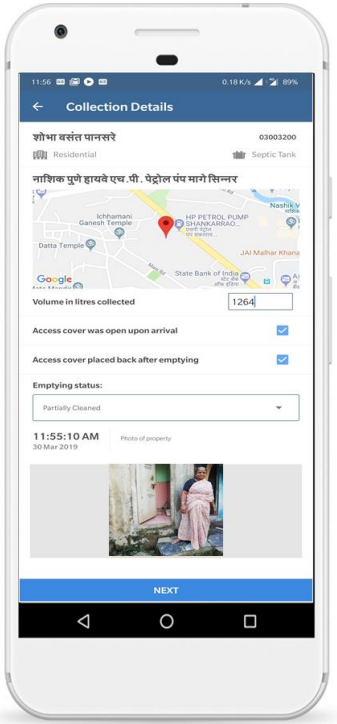
1 System set up – one time



2 Supervisor creates daily schedule in app - periodically

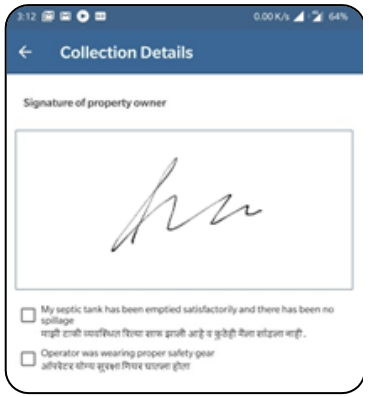


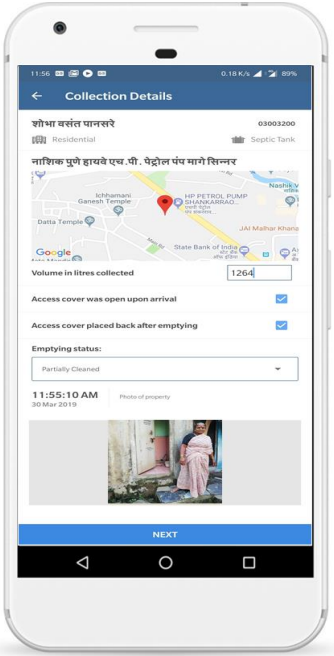
3 Desludger records operations and signatures on app - daily



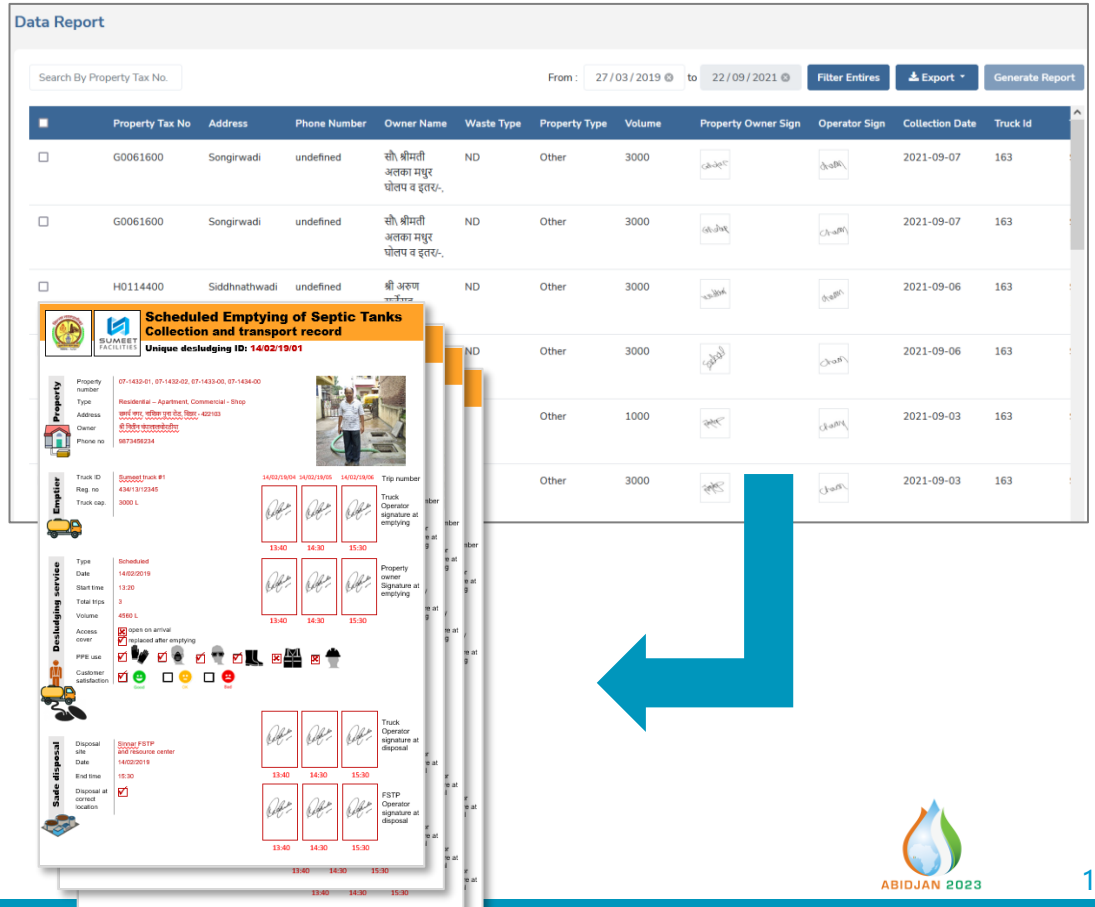
Validation checks at various points!

Truck operator knows the daily schedule	Owners are ready with access covers open	Signature proofs and photo for safe collection
Tanks are fully emptied – multiple trips if neded	Correct protective equipment is used	Truck capacity is not exceeded by load
Access covers placed back	Correct GPS location for unload	Signature proofs for safe disposal

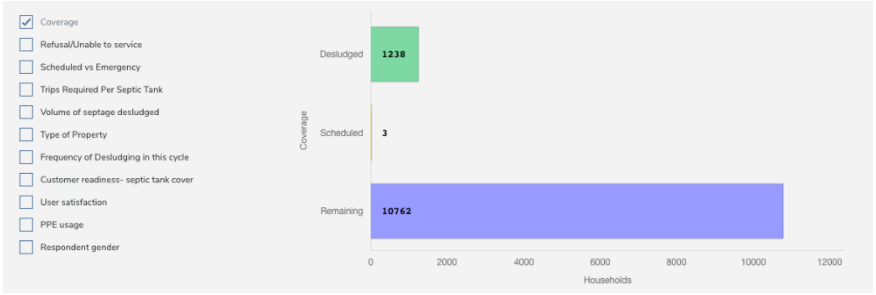


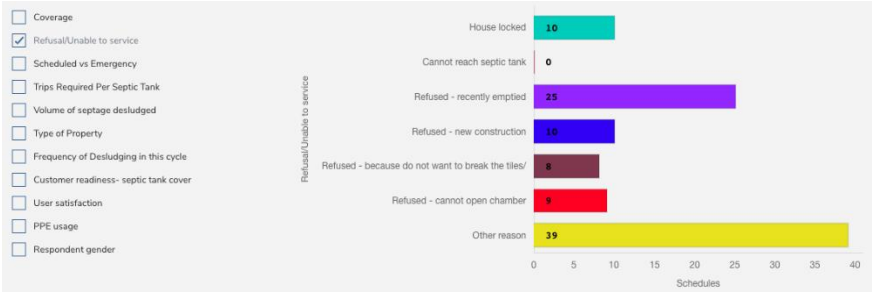


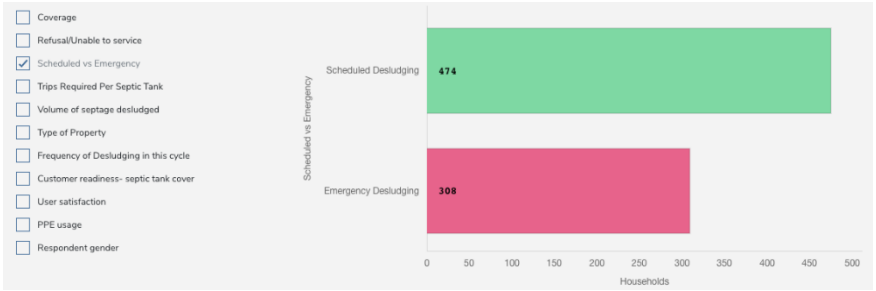
Dashboard, database and reports

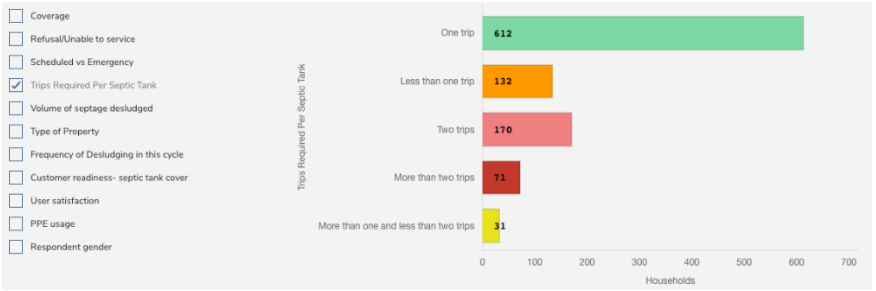


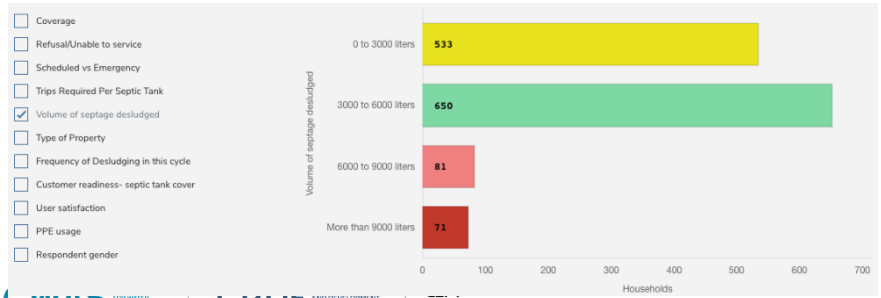
Web module – Dashboard

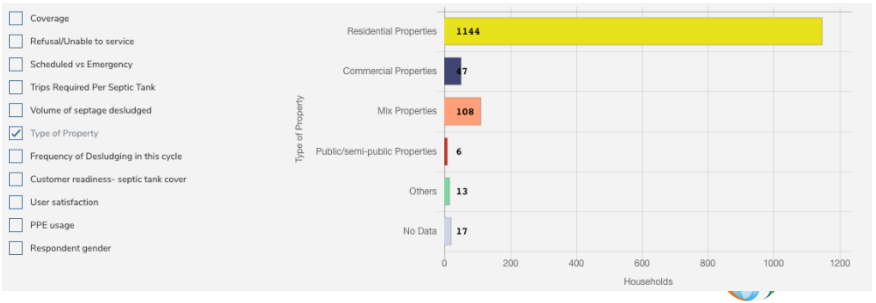




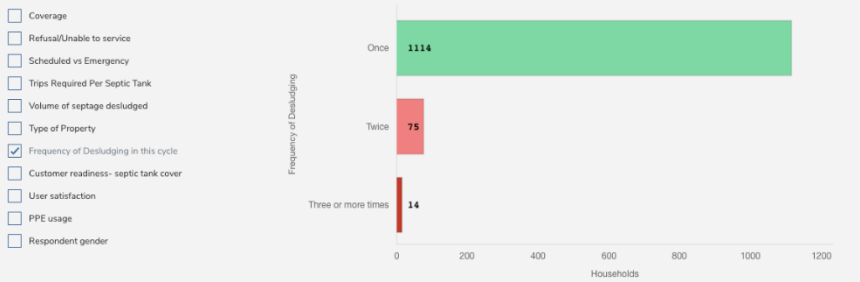


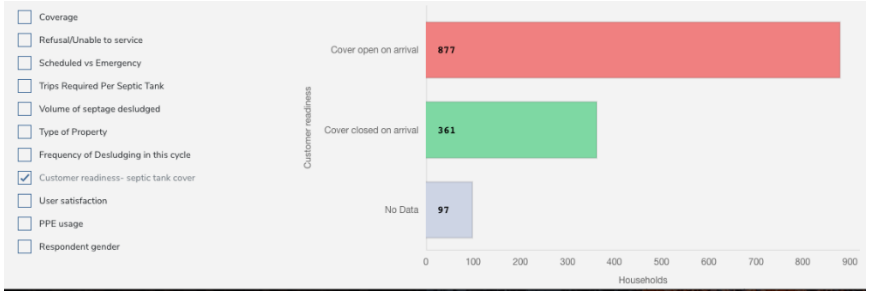


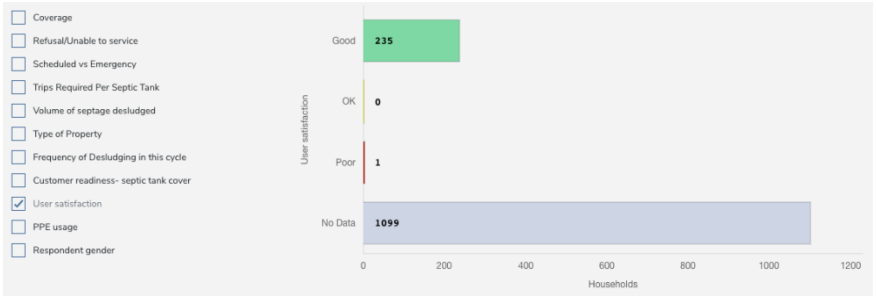


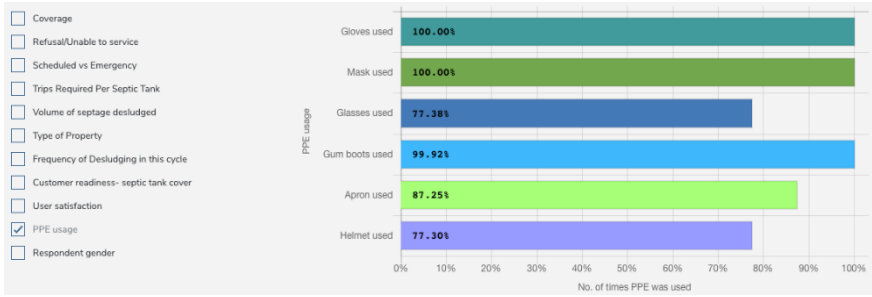


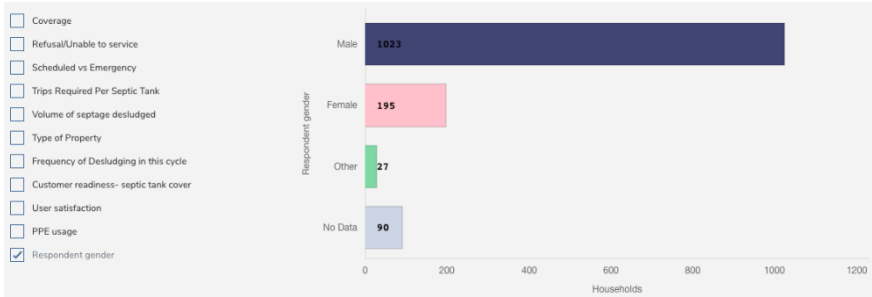
Web module – Dashboard











What data are we collecting?

29 data points for properties

15 data points for CT/PT

Pre-uploaded database

1. Property Tax number – WARD:NUMBER:PART
2. Owner name and phone number
3. Address
4. GPS location
5. Type of property
6. Type of sanitation system
7. Is it a shared system?
8. Prop. no of sharers

Property desludging data

9. 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
    - 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

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
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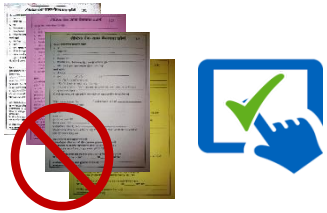
SaniTab and SaniTrack
Key Benefits - Program efficiency for FSSM services

Integrated monitoring system – Across FSM service chain

“Real time” monitoring No need to process data

Easy to Operate, Reduce paper work, Minimize human error



Can view progress easily and process payments

Citizen awareness about emptying procedures

Photo stamping, Geo stamping, Signatures

Unique database

Supports vernacular language

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Partnerships and Collaboration

BILL & MELINDA GATES foundation

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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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