

**FAECAL SLUDGE AND SEPTAGE MANAGEMENT ·
CITYWIDE INCLUSIVE SANITATION**

Beyond the sewer: how Odisha built a state system for faecal sludge management

From sewerage to FSSM: Odisha's citywide inclusive sanitation story, policy to practice

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Odisha FSSM: from Sewer to non-sewered journey

115

urban local bodies,
7.74 million urban residents

62%

of urban people live in 110
non-sewered towns

120

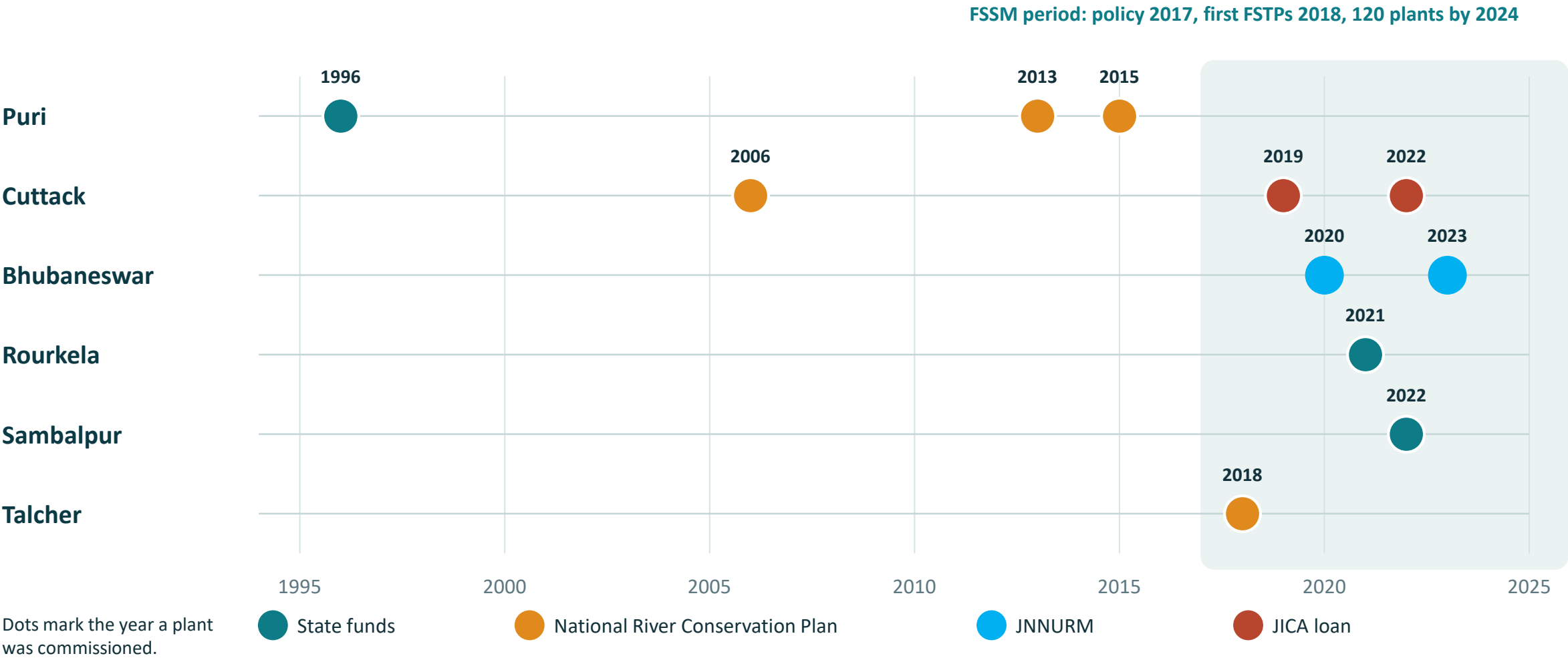
faecal sludge treatment plants,
2.087 MLD combined capacity

108

women-led and transgender-
led groups run plant
operations



Sewage treatment plants, mostly commissioned after 2015



Five sewered cities together serving 2.93 million people



Bhubaneswar

1.07 M people
988 km sewers
5 STPs, 183 MLD



Cuttack

0.78 M people
360 km sewers
3 STPs, 85 MLD



Rourkela

0.40 M people
176 km sewers
1 STP, 40 MLD



Sambalpur

0.43 M people
79 km built of 250+
1 STP, 40 MLD

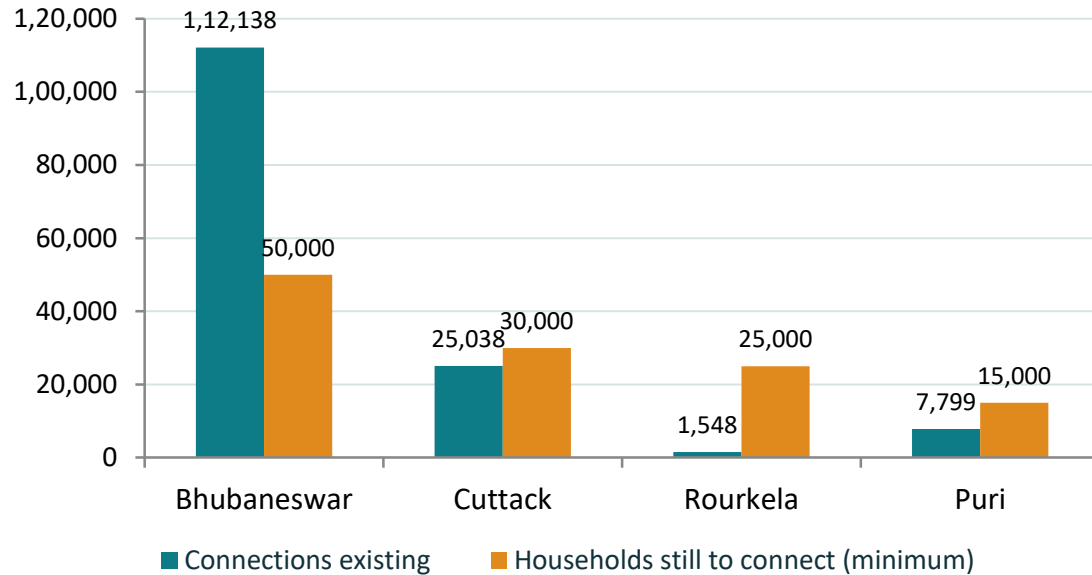


Puri

0.26 M people
129 km sewers
1 STP 15 MLD + drain 10 MLD

Aerial photographs show the sewage treatment plant (STP) in each city.

Sewers are slow to build and slow to connect, so Odisha turned to faecal sludge management



1

Sewers take years

Puri's first system dates from 1996 and still needs 15,000+ connections. Sambalpur has built 79 km of 250+ km.

2

Connections are slow

Rourkela has a 40 MLD plant but 1,548 connections. Sambalpur has 105.

3

Streets resist digging

Residents object to trenches in narrow lanes, which delays trunk and lateral lines.

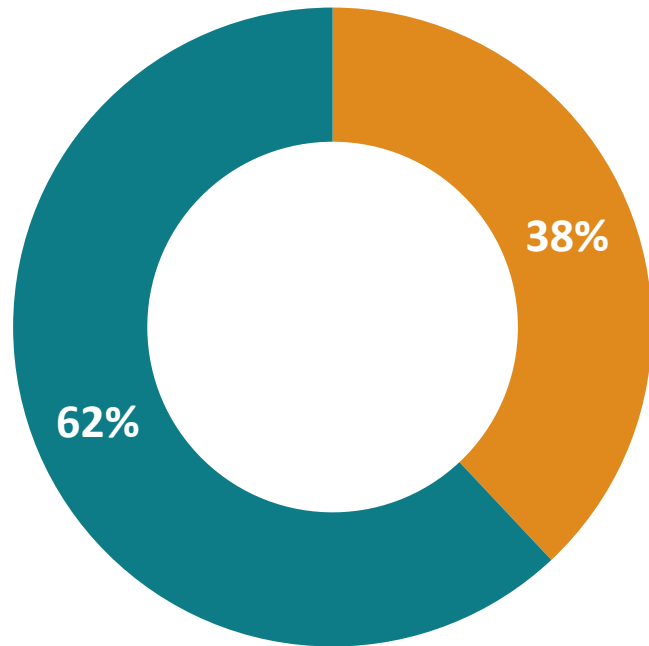


The answer: faecal sludge management

Use the septic tanks homes already have. Empty them and treat the sludge in a small plant.

In 2015 only 2% of Odisha's faecal sludge was treated

Share of urban population (7.74 million)



■ Sewer network (5 cities) ■ On-site systems (110 towns)

33%

of urban households practised open defecation (Census 2011)

2%

of faecal sludge treated in 2015

What the five sewered cities show

- Bhubaneswar, Cuttack, Rourkela, Sambalpur, Puri: network plus STPs
- Connections trail capacity: Rourkela 1,548, Sambalpur 105
- Sewers alone would take years for the other 62%

Policy first, then rules, plants, people, platform and learning

1

Policy

A state policy that names faecal sludge, then a new one that names inclusion

Slides 8–9

2

Institutions and rules

One lead department, a technical agency, ULBs as service providers, and FSSM regulations

Slides 10–11

3

Treatment plants

Gravity-based, nature-based plants scaled from 6 to 120 in six years

Slides 12–15

4

People

Mission Shakti and transgender groups operate plants; GARIMA protects workers

Slides 16–17

5

Platform and reach

SUJOG-FSSM digital platform and urban–rural convergence

Slides 18–20

6

Learning

Co-treatment, under-use, and what reached national guidance

Slides 21–23

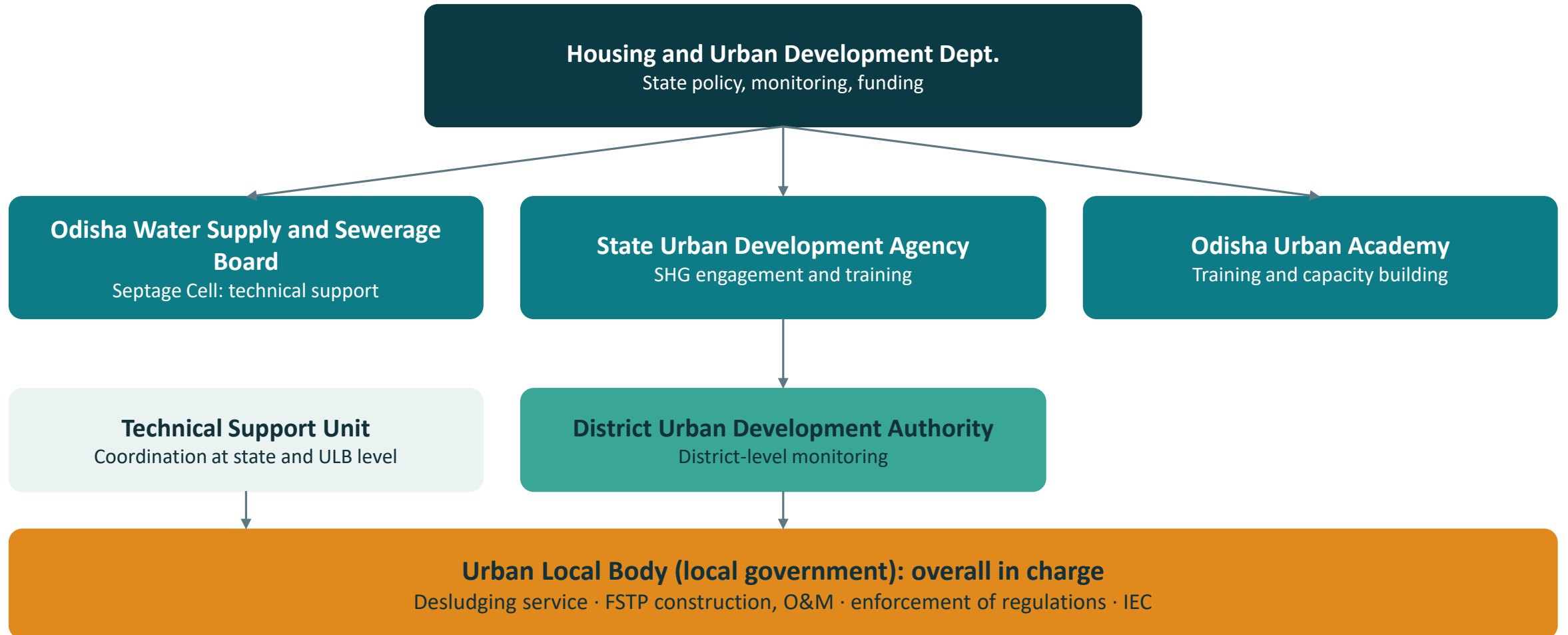
Policy mandate for faecal sludge



The 2024 policy widened the lens from sludge to people, rural reach and data

Dimension	Urban Sanitation Policy 2017	Inclusive Urban Sanitation Policy 2024
Frame	Total sanitation with FSSM emphasis; open-defecation-free and open-discharge-free	City-wide inclusive sanitation (CWIS), aligned with SDG 6
Vulnerable groups	Women, girls and other vulnerable groups	Also, persons with disabilities, transgender persons, slum dwellers and sanitation professionals
Geography	Urban local bodies	Urban–rural convergence: H&UDD sets service standards and tariffs for rural users
Data	Management information and monitoring	Scale digital public infrastructure to all waste streams
Workers	Prohibition of manual scavenging; safety measures	Sanitation workers recognised as professionals; GARIMA benefits

Department steers and the ULB owns the service



Regulation made safe desludging a service

Local regulations

Bye-laws for standard containment design, access and desludging frequency

Service

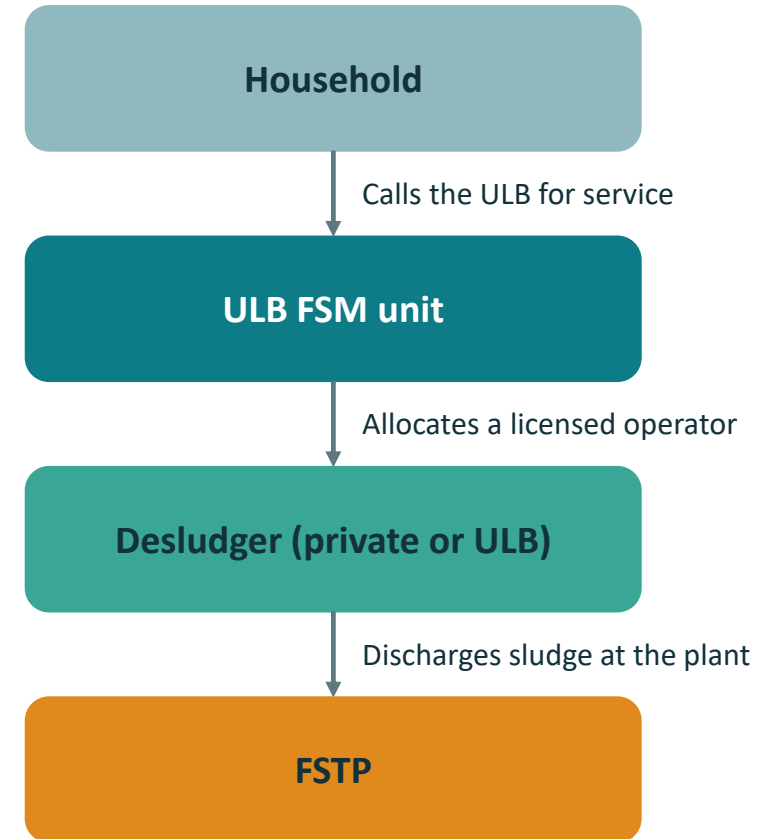
Licensed operators; desludging rates fixed by ULBs

Infrastructure

Vehicles matched to access, including mini cesspool vehicles for narrow lanes

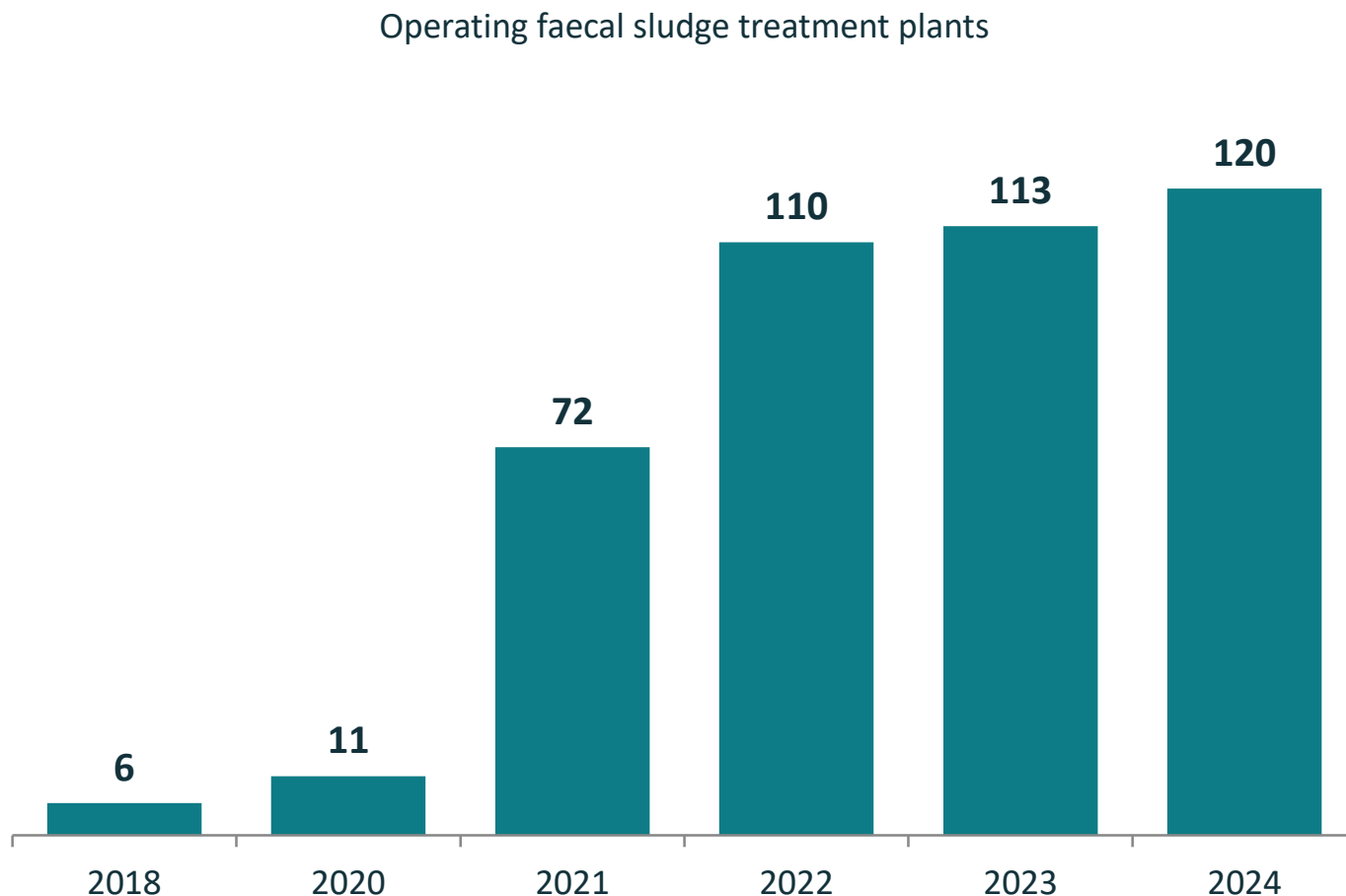
Awareness and capacity

PPE, hazard training; strict enforcement of the 2013 Act against manual scavenging



The ULB monitors every step and fines violations.

Treatment plants went from 6 in 2018 to 120 in 2024



2016

Convergence with AMRUT: 9 FSTPs taken up; BMGF and CPR partnership for 2 pilots

2018

State directive covers all ULBs; model FSSM regulations adopted by ULBs

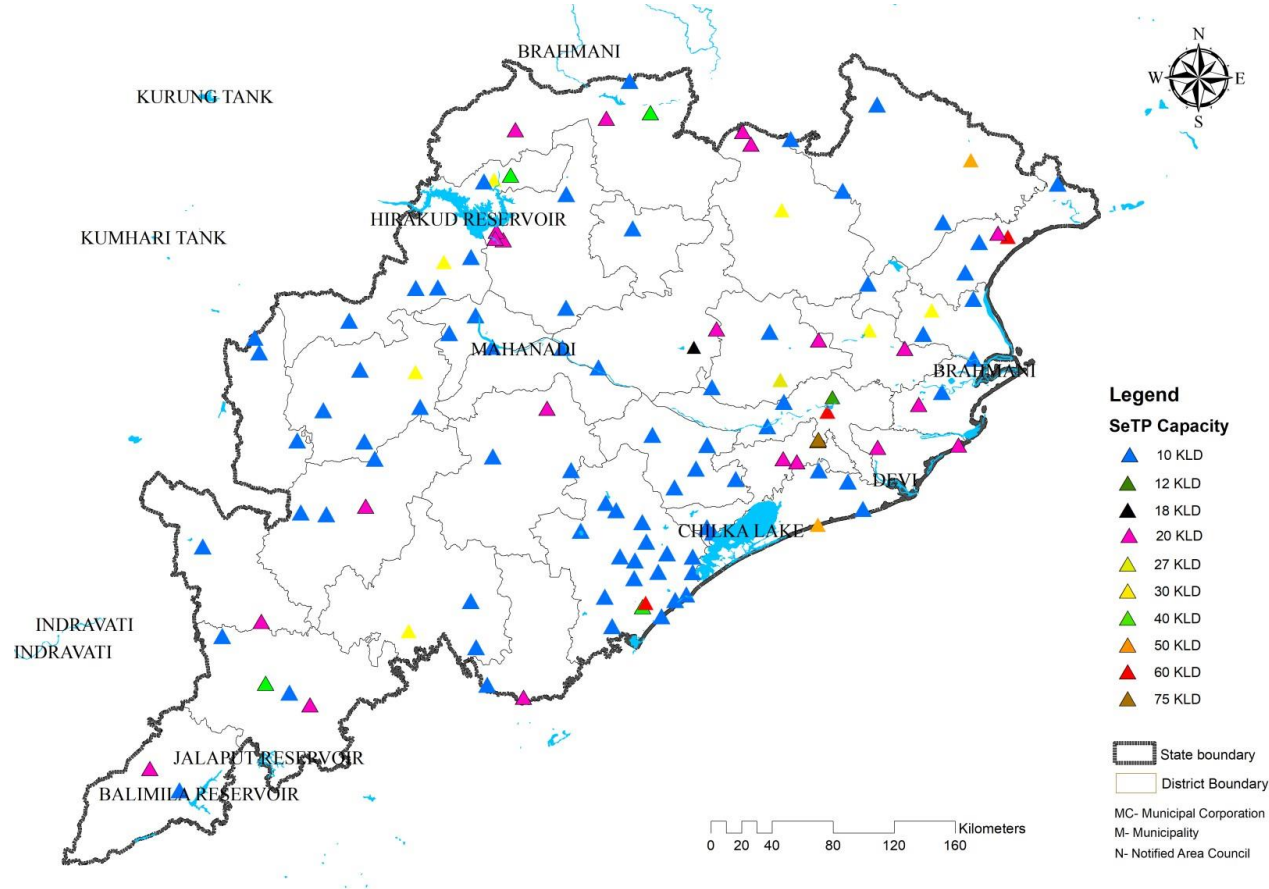
2020

O&M of 9 plants handed to SHGs; 24 mini cesspool vehicles for narrow lanes

2021-22

72 plants operating in 2021, 110 in 2022; SHGs run 85 of them by 2022

Every ULB now has a FSTP to take its sludge



120

plants in 115 ULBs

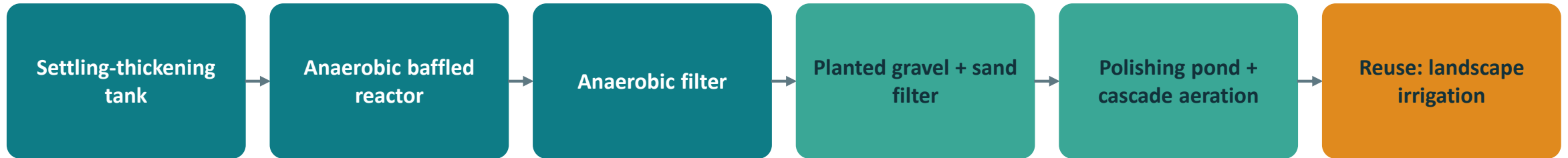
2.087

MLD combined capacity



Core treatment units are only 20–45% of plant cost; roads, drains, walls, landscaping and buildings make up the rest.

A gravity-fed, nature-based design that SHGs can run without engineers on site



Sludge drying beds → co-composting (pilot)



Non-mechanised

Gravity flow keeps O&M simple and low-cost

DEWATS + drying beds

Decentralised treatment sized for small ULBs

10 kW solar

Grid-connected unit at each plant

Effluent reuse

Treated water irrigates the plant landscape

The plant removes 98–99% of solids and organics

98%

TSS removed

99.5%

COD removed

98.7%

BOD removed

Treatment

The design targets solids and organics. Nitrogen and phosphorus removal is not targeted.

Parameter	Raw sludge	Treated	MoEF 2017	NGT 2019	Result
pH	6.97	7.39	6.5–9.0	6.5–9.0	Meets
TSS (mg/L)	615	10.3	<100	<20	Meets
COD (mg/L)	8,975	45	–	<50	Meets
BOD (mg/L)	824	11	<30	<10	Meets 2017; just above 2019
Total P (mg/L)	89.7	3.16	–	<1	Not targeted
TKN as N (mg/L)	596	46.7	–	–	Not targeted

Mission Shakti groups run the plants on a fixed monthly contract

Resources	10–29 KLD	30–59 KLD	60 KLD and above
Sanitary workers	3	4	5
Gardener-cum-watcher	1	1	1
Plant manager	1	1	1
Mission Shakti Group (per month)	Rs 70,000	Rs 83,500	Rs 97,000
Lab technical resource person (woman)	Rs 15,000	Rs 15,000	Rs 15,000

Paid on time: Automatic bank transfer by the 7th of each month

No tipping fee: Desludgers discharge free at the FSTP

ULB pays: O&M cost is borne by the urban local body

Lab run by women: Women technical resource persons test and record



Operating the plants gave women and transgender groups a livelihood; GARIMA protects the workers



108

women-led and transgender-led groups manage plant O&M

10,198

core sanitation workers identified in 115 ULBs

GARIMA scheme

- Safety, dignity and socio-economic security of core sanitation workers (2020)
- Disability support and illness allowance under the scheme
- Core sanitation workers brought under the Minimum Wages Act schedule (2021)
- Compensation and ESI benefits extended to workers outside those Acts (2022)

SUJOG-FSSM puts the citizen, ULB, desludger and plant on one platform

Citizen

- Raises a desludging request on the web
- Pays before or after service
- Can request multiple trips
- Gives feedback

ULB

- Assigns a cesspool operator
- Tracks and manages requests
- Collects payment
- Reports desludging and collection

Desludging operator

- Carries out assigned requests
- Updates number of trips
- Discharges at the FSTP

FSTP

- Records every trip and volume received
- Flags unregistered vehicles
- Records lab test results

Open-source DIGIT platform, built with the eGov Foundation

Piloted in three towns (2022) · scaled to all 115 ULBs in three phases · ULB officials trained at each phase

The platform answers the questions a manager asks

Coverage

Are we missing anyone? Which areas and property types?

Service delivery

What is the service level of ULB? When are requests attended?

Waste custody

Is septage lost between pickup and disposal?

Capacity

Do FSTPs fully utilized, any spare capacity?
Are vehicles used well?

Treatment

Is quality to standard? Are tests on schedule?

Revenue

What does FSM service earn, and where is it rising?

"There is no longer any need to maintain records in excel because everything can be tracked from the platform."

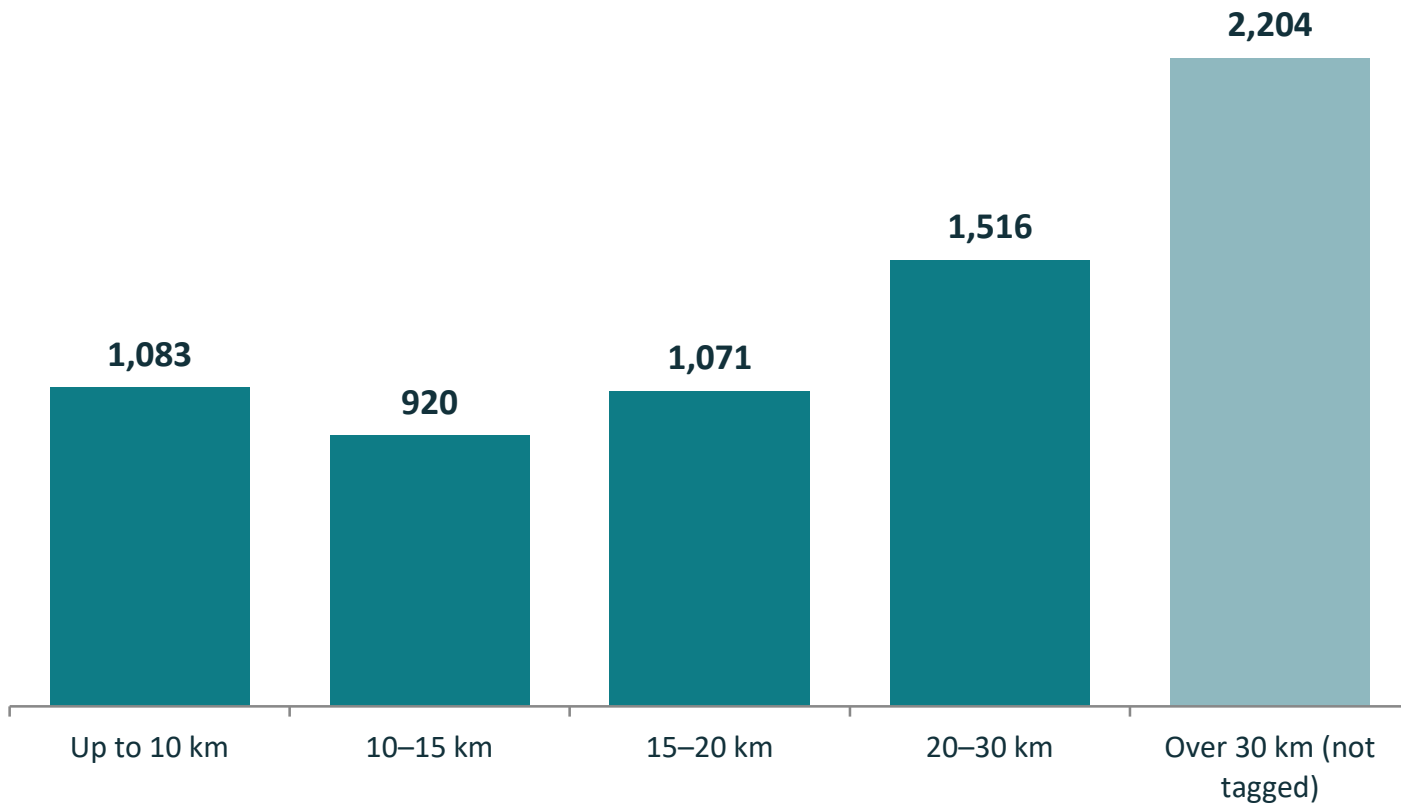
Sulochana Sahu, FSSM Executive, Dhenkanal Municipality

"The simplest things matter the most and SUJOG-FSSM is simple to use."

Subhasinee Sahoo, Technical Resource Person, Talcher Municipality

Urban–rural convergence tags villages to the nearest plant, and most lie within 20 km

Gram panchayats by distance from the nearest urban FSTP



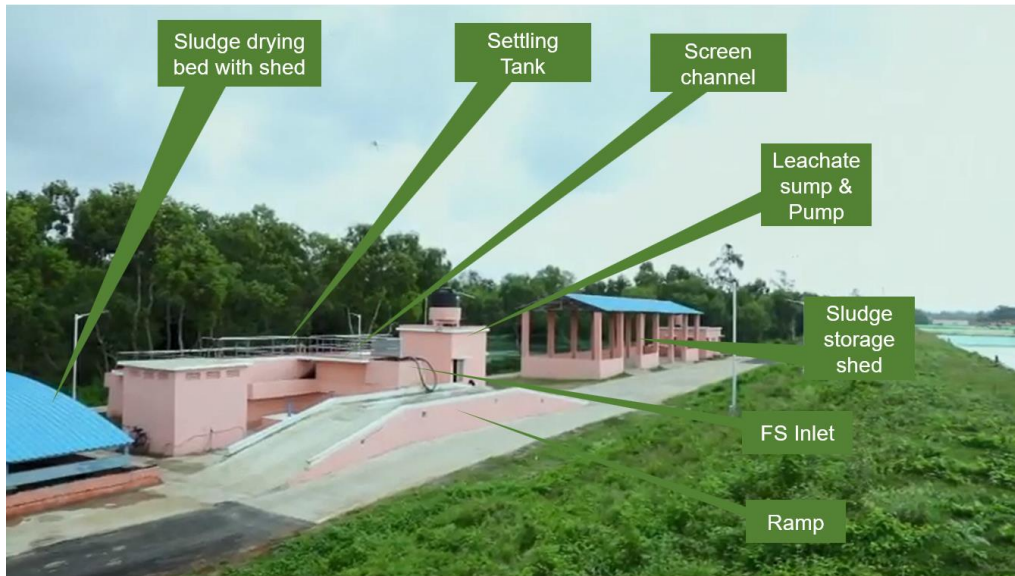
4,590 of 6,794

gram panchayats tagged to an urban FSTP

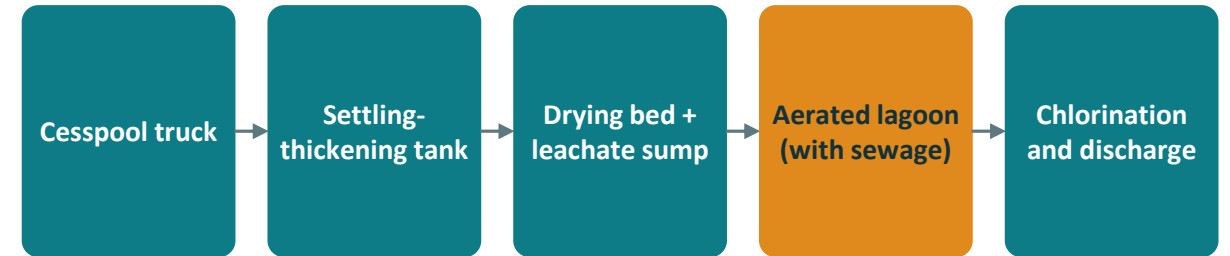
Why it works

- Plants already exist in every ULB
- The 2024 policy has H&UDD set rural service standards and tariffs
- Desludging requests for village residents on the platform
- Piloted first in the Dhenkanal cluster

Puri showed that existing sewage treatment plant can also treat faecal sludge (in 2017)



Co-treatment at Puri stp



mg/L	Faecal sludge	Sewage	Treated effluent
COD	7,200	240	50
BOD	620	141	14
TSS	416	500	70

Where an STP exists, co-treatment saves land, capital and operating cost. New small-town STPs can be built as STP-cum-FSTP.

New FSTPs under-loaded

10–80%

range of FSTP capacity utilisation

>100%

older plants, over capacity

<10%

newer plants, under-used

Capacity under-utilisation

- Plants sized for a 10-year demand horizon
- Desludging is on demand by households
- Vehicles are available with ULBs

Next steps

- Scheduled desludging backed by awareness
- Desludging services for slum areas
- Co-compost dry sludge to free plant space

National guidance now reflects what Odisha practised on the ground

What the national guidelines say

§7.8.5 Co-treatment first

Where a town has an STP, co-treat faecal sludge there; in new small ULBs, plan STP-cum-FSTP together.

§2.6.10 Cluster-based infrastructure

Plan facilities for groups of neighbouring ULBs and rural areas so they are used fully.

Existing FSTPs serve peri-urban and rural areas

Spare plant capacity can treat septage from surrounding villages.

What Odisha was already doing

Puri, 2017

Faecal sludge co-treated at an existing aerated-lagoon STP

Dhenkanal cluster, then 4,590 tagged villages

Urban plants serving surrounding gram panchayats

SUJOG-FSSM, 2022 onwards

A state digital platform linking citizen, ULB, desludger and plant

Ten lessons other states and cities can take away

1

Policy first

Write faecal sludge into state policy, not just toilets

2

Regulate the entire service chain

Containment, emptying, transport and disposal rules

3

Build treatment plants early

But plan how demand will reach it

4

Keep technology simple

Gravity-based, nature-based plants for small ULBs

5

Use STP for co-treatment

Co-treat at STPs; share plants with villages

6

Engage local groups/local community

Pay on time, train, and give them the lab

7

Protect sanitation workers

Safety, benefits and recognition, as in GARIMA

8

Build digital rails (DPI)

One open platform for the whole service chain

9

Monitor the capacity utilization & quality

Track utilisation and effluent quality

10

Plan for scheduled service

Awareness and fixed desludging cycles create demand

Odisha's message: build the whole chain

1

Sequence matters

Policy, then rules, then plants, then people, then platform

2

Inclusion is operational

Women-led and transgender-led groups run the plants; GARIMA protects the workers

3

Build demand, not only capacity

Scheduled desludging and awareness fill the plants that policy built



Thank you

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Sources and further reading

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