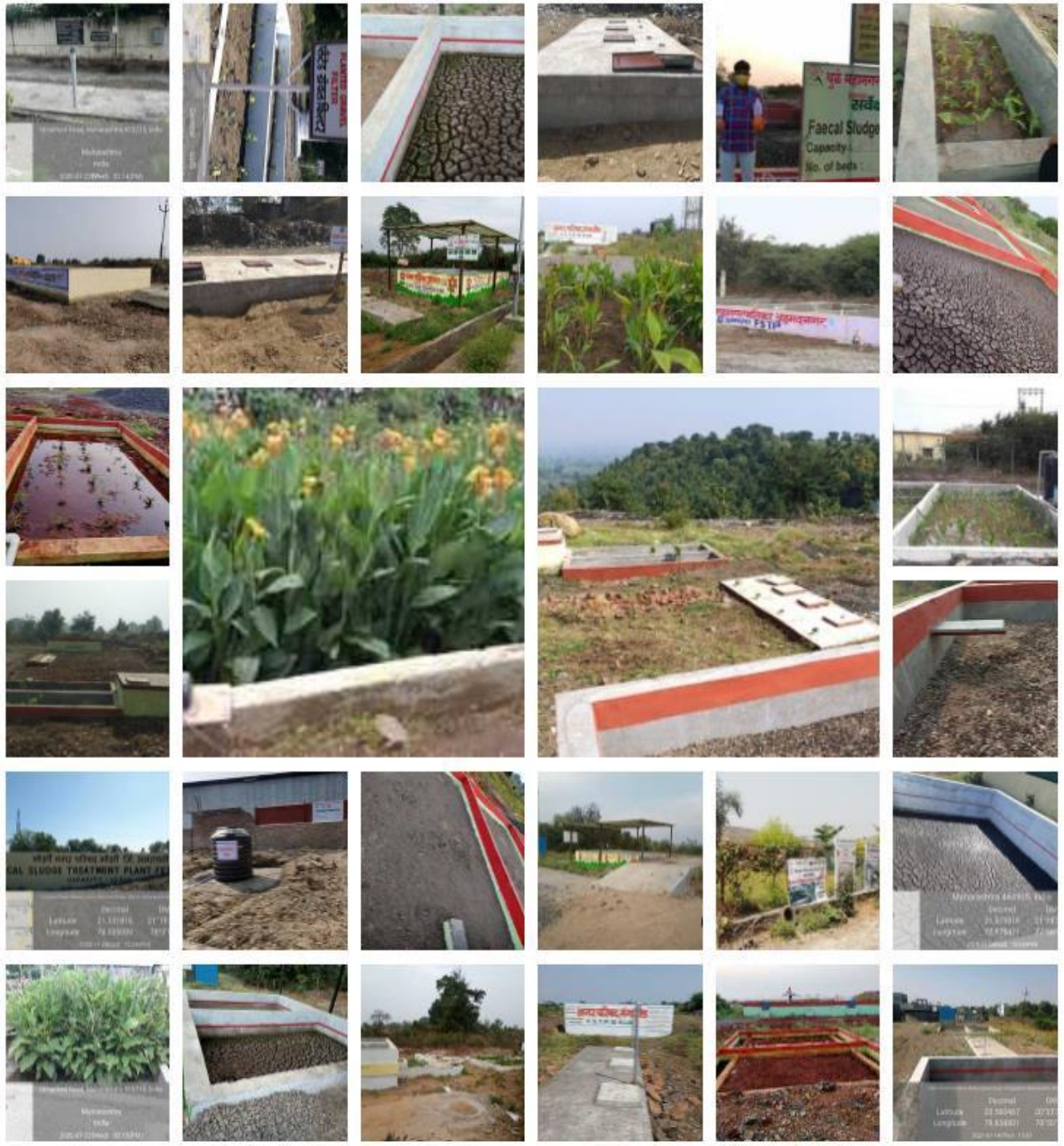

Reuse of treated wastewater and sludge from Faecal Sludge Treatment Plants (FSTPs) in Maharashtra, India

Aditi Dwivedi

5th November

7th India Water Week 2022

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Center for Water and Sanitation

CEPT UNIVERSITY › CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION › CWAS CENTER FOR WATER AND SANITATION

- ✓ Human habitat and academics
- ✓ Research, advisory and capacity building

"Transforming governance and monitoring systems for safe and equitable water and sanitation services at scale"

CWAS focus on sanitation

Performance Assessment for Urban Water and Sanitation-PAS - Focus on onsite sanitation indicators and equity

Bringing sustainable and equitable sanitation services to small and medium towns -Wai and Sinnar

Citywide Inclusive Sanitation – Wai

Making Sinnar ODF+ and ensuring sustainability

Support to Kolhapur and Satara for FSSM

Support for Scheduled desludging pilot in Kabwe, Zambia

Capacity Building of Cities as part of the Sanitation Capacity Building Platform

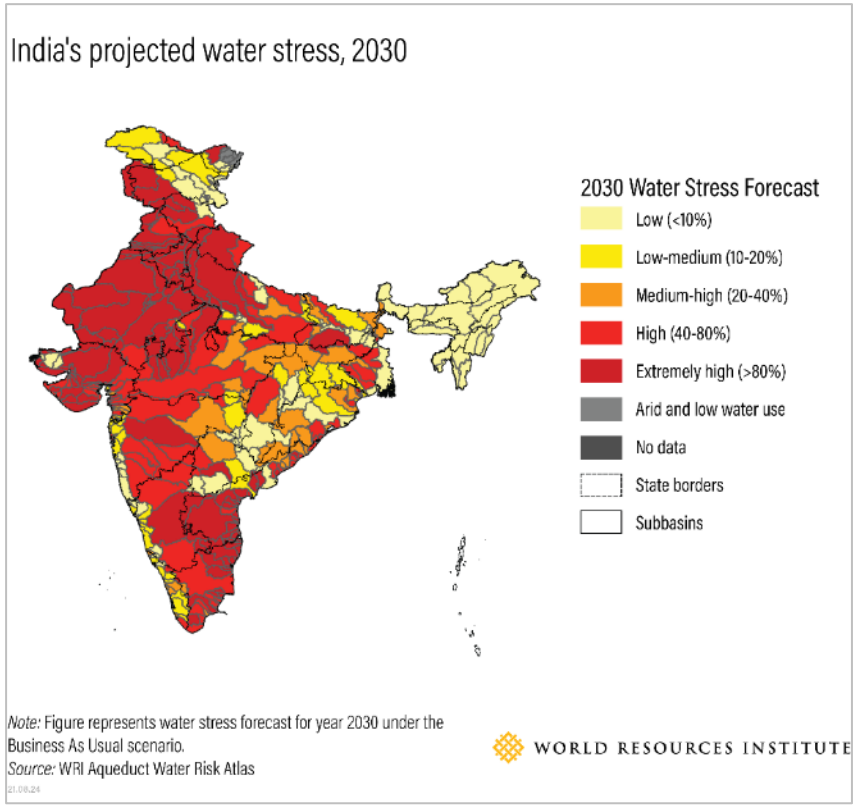
Technical support to the State Government of Maharashtra on urban sanitation and FSSM

Why Waste Water?

Until very recently….
~80% of wastewater in India was untreated

Treated or untreated …
This water is let out in our rivers and water bodies

Meanwhile 54% of India faces high water stress
By 2030, India's water demand to be twice the available supply



Wastewater re-use is the solution to India's water woes !!

An opportunity with enabling environment

The Service Level Benchmarks recommend 20% reuse of treated water as the performance benchmark for Indian Cities ….

Now, for the first time in India, Govt. programs focusing on 100% treatment in all cities with financial outlay -

AMRUT 2.0
Making Cities Water Secure

स्वच्छ भारत 2.0
एक कदम स्वच्छता की ओर

…but without treatment, there is little scope for reuse!

An opportunity with Enabling Environment

More treatment plants	More generation of treated water	Huge potential to tap!
AMRUT 2.0 and 15th FC indicate 20% reuse	Challenge fund for Million+ cities to achieve	Reuse conditions to achieve WATER+ status

Wai and Sinnar. . .

From URBAN LABORATORIES to LIGHT HOUSE cities . . .

- Wai and Sinnar are cities in Maharashtra having 43,000 and 72,000 population respectively
- **These cities are representative of 4000+ small and medium cities of India.**

FSSM activities undertaken from 2014. . .

- Scheduled emptying of septic tanks
- Faecal Sludge and Septage treatment facility (FSTP)
- Reuse of treated wastewater
- Municipal council commitment and leadership
- Equitable Services for Slums and Vulnerable areas

& many more…

Scheduled desludging improved drain water quality but also generated higher volumes of treated used water and sludge

Improved performance of septic tanks resulting in improved drain water quality flowing into river

Reduction in Nitrogen, Total Suspended solids and Organic loads in septic tanks effluent after desludging

In open drains of desludged areas-
- 50-60% decrease in the value of TSS
- 50-60% decrease in BOD load

Regular desludging services will eventually improve the quality of river water and ground water as the quality of drain water and supernatants will improve

Sinnar FSTP
70 KLD UASB+SDB

- Treated Water - 20 KLD
- Dried Sludge - Nominal

Wai FSTP
70 KLD Thermal FSTP

- Treated Water - 20 KLD
- Dewatered sludge -1000 KG
- Biochar – 39 kg

Sinnar: reuse of water for development of garden and urban forest

- **8000 square** meters of urban forest and landscaped area in midst of barren land
- **1400 trees of 16+ species** planted
- Treated **water** is used for **watering the plants** through a **drip irrigation system**
- **Sludge used as fertilizers at the urban forest or taken away by farmers.**
- The **quality** of the treated products are **regularly monitored** through testing the samples.
- The landscaped area was designed by professional landscaping consultants.

Environmental and social benefits

Community empowerment and livelihood development

- SMC engaged a SHG for maintenance of garden and urban forest through a **contract** and **paid on a monthly basis**.
- **handholding support and trainings**

Greenification and Bio-diversity

- Green oasis amidst barren land
- **Strong roots of planted trees – local plant species**
- **Attracting 10+ bird species and butterfliers – previously not seen**
- **CO2 emissions mitigation: 6.3 Metric ton/annum**

16 million+ litres water reused

21,000 kg CO2 sequestered

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Wai: landscaping, composting and other pilots

15 million+ litres water reused

Treated Wastewater

FSTP landscape and site maintenance

Vehicle washing

Demonstration for fire fighting at SWM site

Dewatered Sludge

Stored to render neutral

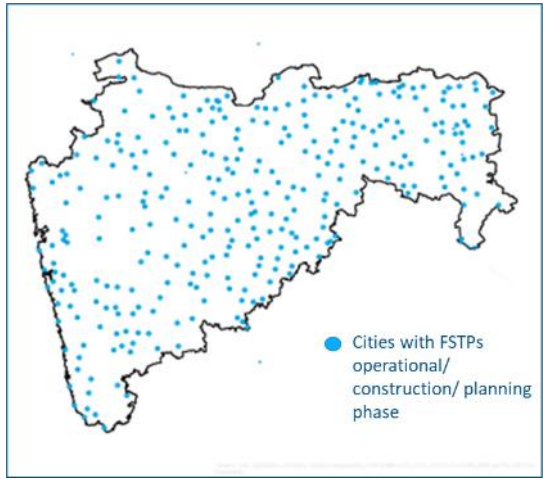
Shared with farmer on trial basis

Biochar

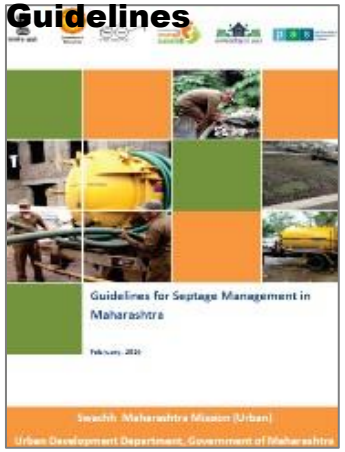
It shows BOD and COD as required

Composting pilot

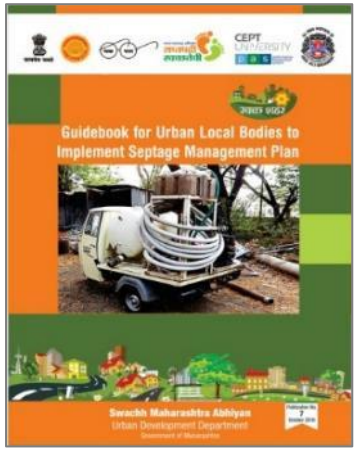
Zooming out - Maharashtra has taken up FSSM in a big way



Septage Management Guidelines



Step by Step Guide for ODF+



Government Resolutions

ODF,ODF+ and ODF++ framework

Utilizing Incentive grants and 14th FC funds for sanitation ODF+/++ activities

70+ cities Co-treating of FS at own or nearby STP

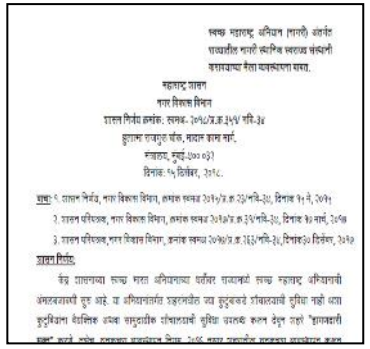
311 independent FSTPs Construction

A two-pronged approach for scaling up FSSM strategy

Co-treatment at own/near by STP Cities - 70		Independent FSTP Cities - 311
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/proposed STPs **35 cities**	**Co-treat at nearby STPs** **35 cities**	**Independent FSTP** **311 cities**

70 ULBs practicing co-treatment and have achieved ODF++

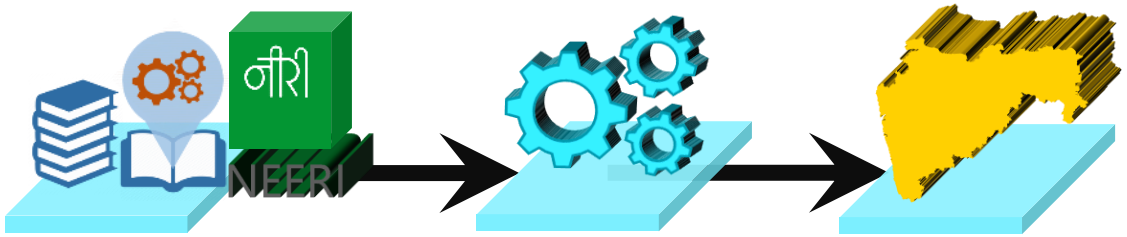
Government resolution on co-treatment of Septage – Own STP and Cities within 20 km of a nearby STP city



Institutionalize FS co-treatment through MoU between sending and receiving cities

Designated FS discharge point (at wet well at pumping station/STPs or maintenance hole)

210 independent FSTPs are functional



Model DPRs for FSTP technologies vetted by NEERI

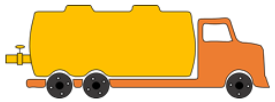
Technology selection

Single window approval of FSTPs

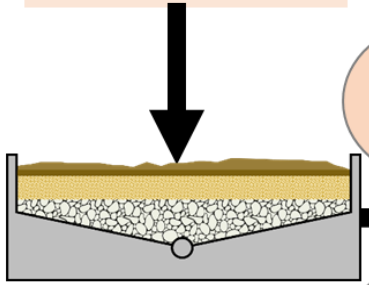
Adoption of cost effective and less mechanized technology for setting up faecal sludge treatment facilities

Huge potential for scaling up reuse

Liquid treatment unit



Septage from septic tank

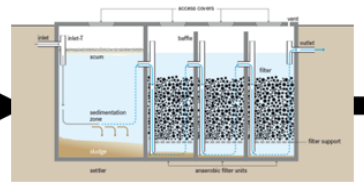


Sludge Drying Bed

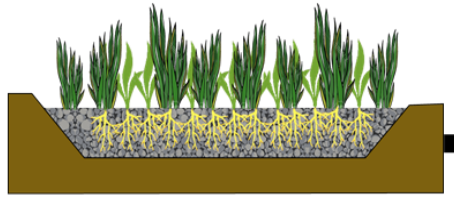
Liquid

Dried Solids

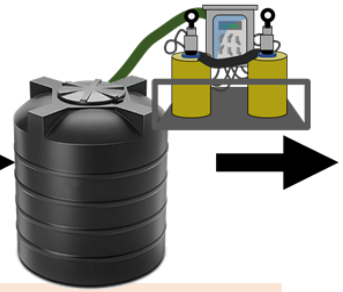
Solid-liquid separation unit



Anaerobic Baffle Reactor (ABR)



Horizontal Planted Gravel filter (PGF)



Disinfection unit + Treated Water tank

Reuse for landscape

Solid treatment unit

Platform for Drying or storage

Co-compost with municipal solid waste

Reuse

Physical		Finance		User Perspective	
Land Availability	Quantity of TWW	Capital Cost		Human contact	
Quality of TWW	Distance of Reuse from FSTP	O&M cost		Demand	

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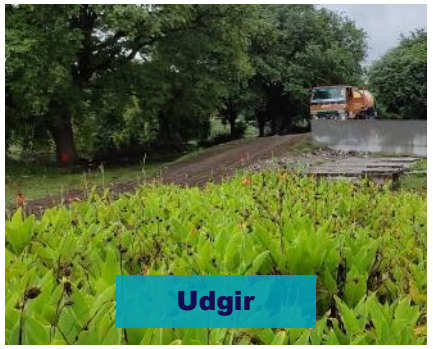
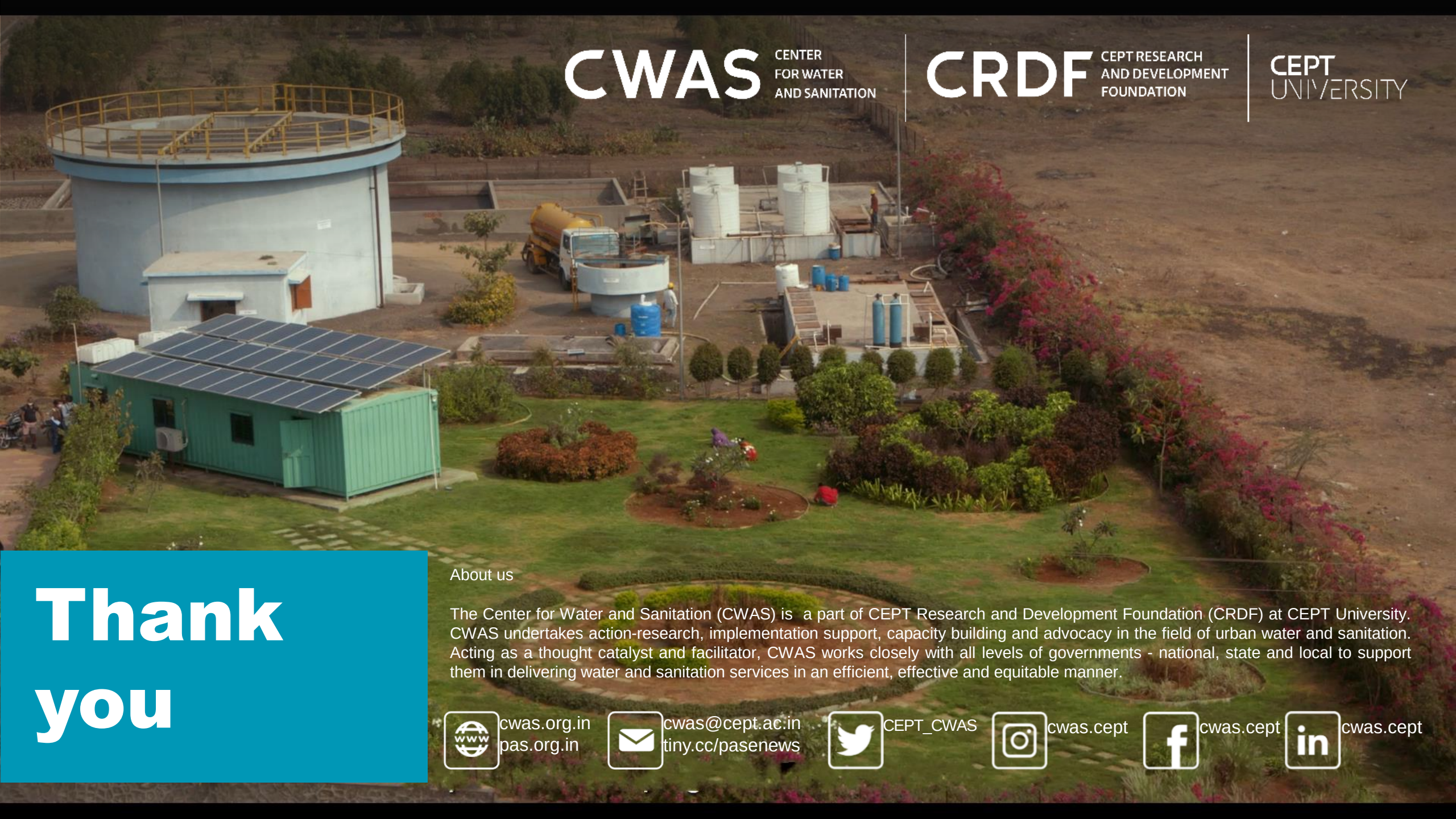
Many FSTP cities have already taken up reuse practices

- **Used water reuse :** 15+ cities in Maharashtra use treated wastewater and dried sludge for landscaping and plantation purposes.
- **Aesthetic developments** in the form of landscape and plantations add value to FSTP infrastructure
- **Quality control:** Regular monitoring of the treated wastewater samples
- **Dried sludge:** 10+ cities using the by-product in the form of compost and fertilizer for gardening purposes.
- **Non-food farming:** Dried sludge also being given to farmers for their use. Mostly the reuse of dried sludge is carried out for non-food crops.





Thank you

About us

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.

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