



Reuse Of Treated Wastewater And Sludge From Faecal Sludge Treatment Plants: Existing And Potential Practices

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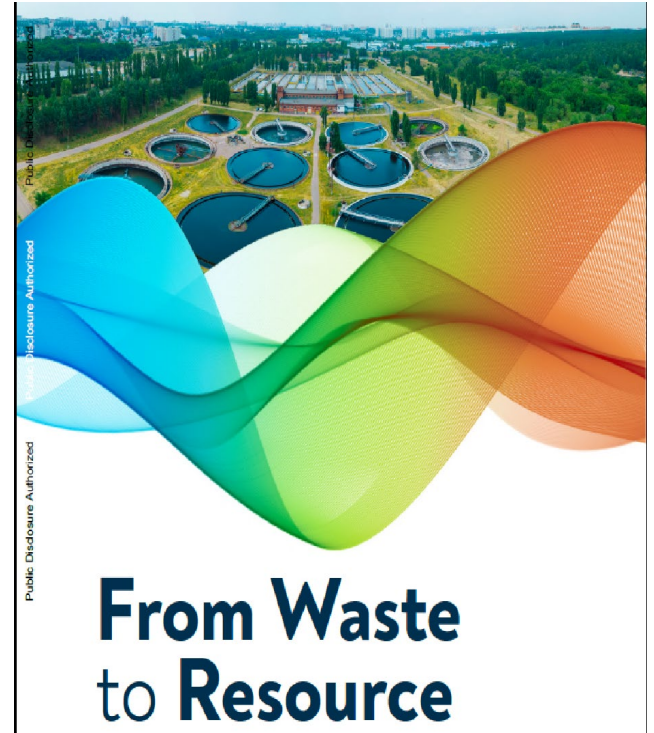
Why WasteWater?

Indian Cities generate 72 Billion litres of wastewater every day

Only 28 percent of wastewater is treated and discharged in waterbodies of

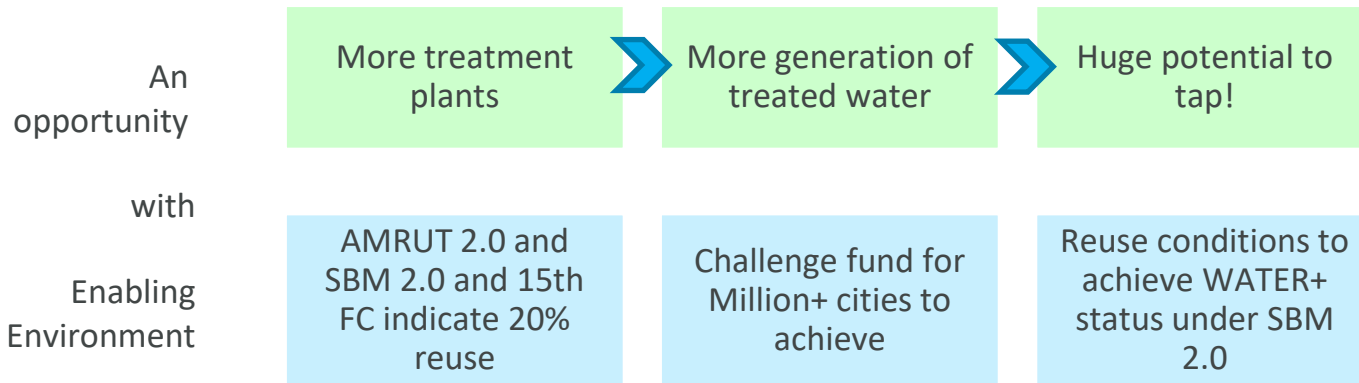


Wastewater re-use is the solution to India's water woes !!



An opportunity with enabling environment in India . . .

- The Service Level Benchmarks for Water and Sanitation in India recommend 20% reuse of treated water as the performance benchmark for Indian Cities
- Though without treatment, there is little scope for reuse!
- For the first time in India, Govt. programs focusing on 100% treatment in all cities with financial outlay

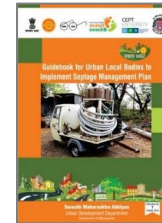


Paradigm shift From **WASTE**water to **USED**Water

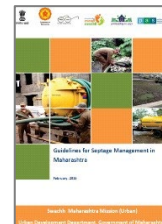
Maharashtra has taken up FSSM in a big way . . .

- Maharashtra is one of the most urbanised states in India
- 350+ cities in Maharashtra are dependent on onsite sanitation systems
- After becoming Open Defecation Free in 2017, the state issued a 7-point ODF-Sustainability charter that mentions FSSM as an area of focus.

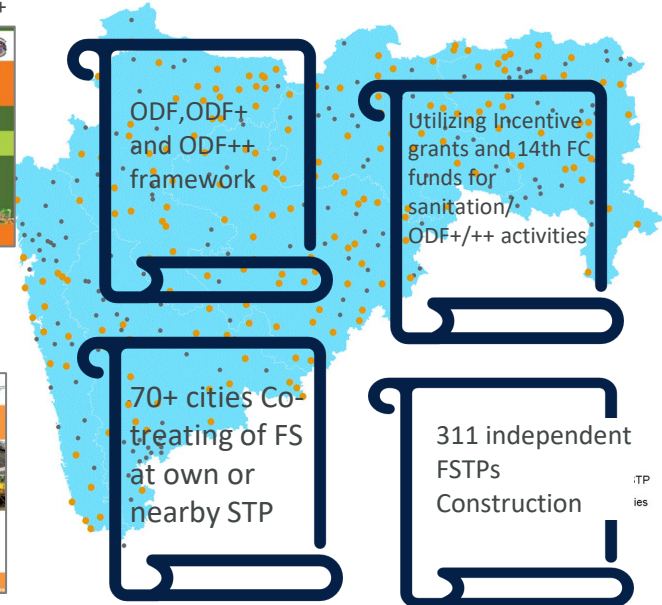
Step by Step Guide for ODF+



Septage Management Guidelines



Government Resolutions



A two-pronged approach for scaling up FSSM strategy

Co-treatment at own/nearby STP Cities - 70

Category A cities:
ULBs with STPs

Co-treatment at own STP and
accept FS from nearby cities

Functional/proposed STPs
35 cities

Category B cities:
Co-treatment at nearby
STPs

Co-treatment at nearby STPs
within 20 km

Co-treat at nearby STPs
35 cities

Independent FSTP Cities - 311

Category C cities:
Independent FSTPs

Remaining ULBs will treat septage at
FSTPs

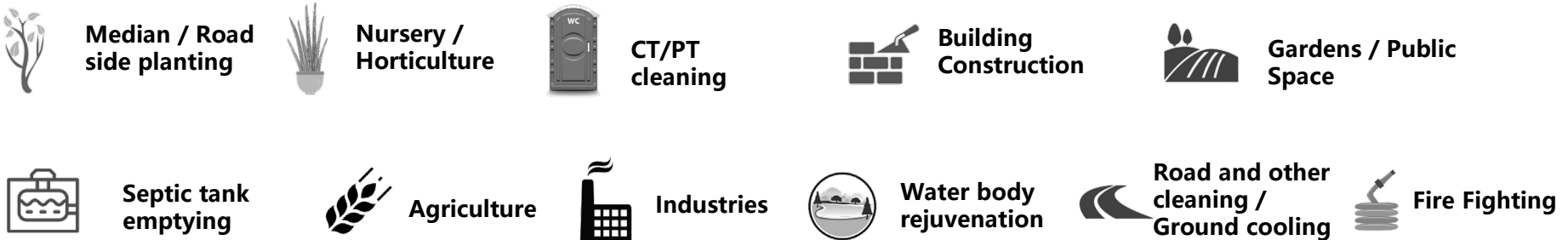
Independent FSTP
311 cities

Potential Reuse Options for treated USEDwater from FSTPs . . .

ONSITE – Reuse within the FSTP site

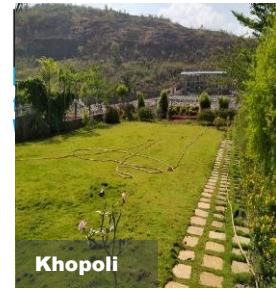


OFFSITE - Reuse outside the FSTP site where the treated USEDwater needs to be transported



Many cities have already taken up reuse practices

- **Used water reuse** : Many cities in Maharashtra use treated wastewater and dried sludge for landscaping and plantation purposes
- **Aesthetic developments** in the form of landscape , plantations, urban forests add value to FSTP infrastructure and around city
- **Dried sludge**: Cities using the by-product in the form of compost and fertilizer for gardening purposes
- **Harit Brand**: 119 cities Harit brand certified. Maharashtra Govt. SWM initiative,. Cities mixing sludge from FSTP for compost
- **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
- **Quality control**: Regular monitoring of the treated wastewater samples



Case of Wai, Sinnar, Satara and Vita cities of Maharashtra...



These cities are representative of 4000+ small and medium cities of India

Wai and Sinnar are the first cities of India to implement scheduled desludging of septic tanks

FSSM activities undertaken



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...

In a these small and medium towns ~70 million liters treated wastewater reused . . .

- More than **7,000 trees** covering **16,300 sq.m.** area are planted in all four cities
- Treated wastewater for maintaining the urban forest and landscape saving over ~70 million litres of fresh water
- The barren land of around **16,322 sq.m.** converted with **forest cover**
- 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.

Before



After



Treated wastewater is reused to create carbon sinks in these cities . . .

- The urban forests developed act as carbon sinks and have supported in capturing the carbon dioxide emissions
- This will contribute to reducing the greenhouse effect and enrich the biodiversity.
- At its full potential, the forest and landscaped areas have the ability to absorb over **~14,000 tonnes of CO₂** over 25 years

Values of CO₂ absorption derived from studies- [Sharma, R. et. al., 2021](#) and [Crisil Foundation, 2021](#); Formula considers- species of tree, tree height and girth and their CO₂ equivalents



On moving towards clean energy usage, the treatment plants use solar power systems . . .

- Wai, Sinnar, and Satara have installed solar panels of total 68 kW
- The Solar FSTPs have reached **net energy positive** stage which helps to mitigate tons of CO2 emissions
- These activities have led to use of 68 kW of alternative energy in three cities which will lead to **reduction of 2100 metric tons of CO2 emissions for 25 years**
- These activities will help in reduced recurring expenses for city governments and improved environment.



Calculation based on- [National Portal for Solar Rooftop tool](#), Ministry of Renewable Energy (MNRE), Govt. of India

Community empowerment and livelihood development . . .

- Cities have involved SHGs for maintaining the garden and urban forest
- This has provided them a sustainable livelihood opportunity
- This formal engagement with the councils has enabled them a regular source of income
- It also boosted their confidence of public speaking, managing finances etc.



Quality of the treated products are regularly monitored . . .



Testing samples



Stored to render neutral

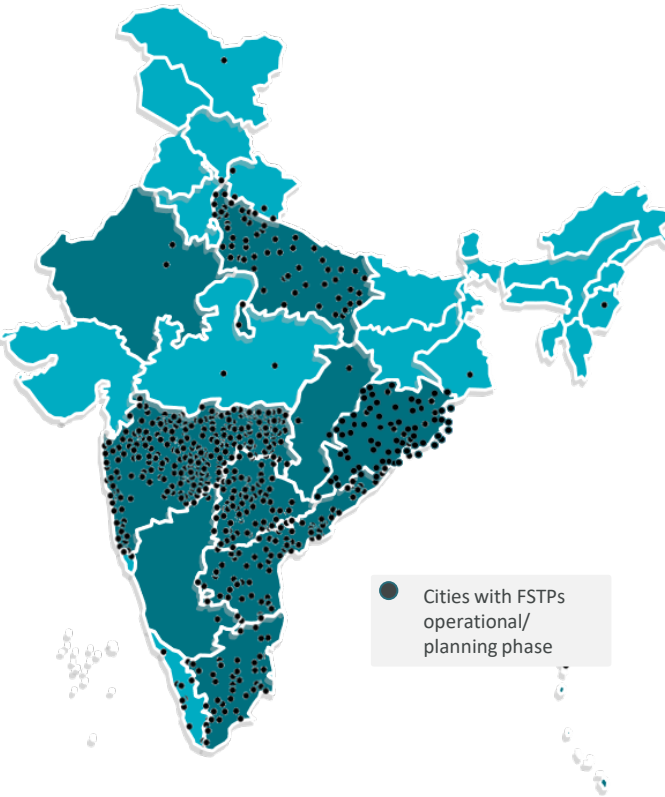


Dynamic online BOD and COD monitoring system



Biochar

Great potential of replicating the systematic approach of USEDwater from FSTP being reused in various cities of India . . .



- Learnings from these cities is being scaled up across 300+ FSTPs coming up in Maharashtra
- With various FSTPs coming up across India, replicating and adopting sustainable reuse practices is highly feasible.
- Scaling-up to other cities will occur through linkages with programmes like Swachh Bharat Mission, NULM, AMRUT mission, Majhi Vasundhara (Scheme in Maharashtra state focusing on climate change).

Benefits of treating USEDwater and its reuse potentials contributing to SDG 6, SDG 5 and SDG 13

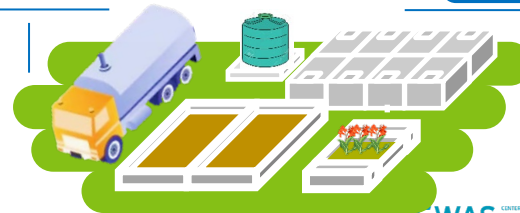
Sustaining freshwater supply

Improved green cover in urban areas

Energy efficient, self sustained FSTPs

Treatment of excreta to enable safe disposal and reuse

Contributing towards reducing water and soil pollution



Partnerships and collaboration to attain Scale . . .



BILL & MELINDA
GATES foundation



Government of Maharashtra

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**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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