



City wide FSSM plan – Khopoli City

Center for Water and Sanitation, CEPT University

May 2022



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Acknowledgements

Many towns in India are completely dependent on onsite sanitation. Over 47% urban households depend on onsite facilities (Census, 2011). In the absence of adequate safe and sustainable sanitation, many Indian cities are already facing the consequences, in the form of health ailments and serious pollution of water and soil (Faecal Sludge and Septage Management Policy, 2017). In this context it is crucial to pay attention towards Faecal Sludge and Septage Management in cities.

CWAS, CEPT University has been supporting Government of Maharashtra in implementation of Swachh Maharashtra Mission in the state. At local level, CEPT team has supported small and medium towns in managing safe sanitation practices and implement FSSM plans in the cities. CWAS has signed an MoU with the Khopoli Municipal Council for providing support for sanitation improvement in the city. The three main focus areas under this MoU are: Sanitation assessment and FSSM plan of the city; Moving towards universal coverage of Individual Household Toilets; Scheduled desludging of septic tanks and monitoring systems for desludging and treatment services.

The support was provided under the project “Technical Support to State Government of Maharashtra on Urban Sanitation and FSSM (TSU) Project”. This report is based on the study carried out by CWAS, CEPT University. Special thanks to Khopoli Municipal Council officials for their support.



About Khopoli

Khopoli is located in Konkan division in Maharashtra with ~84,000 population

Khopoli is a Class 'B' Industrial Municipal council in Konkan Division located in Raigad District. It is part of Mumbai Metropolitan Region (MMR)



83,500
Population
(2020)



22,490
Households



4.51
Average
Household Size



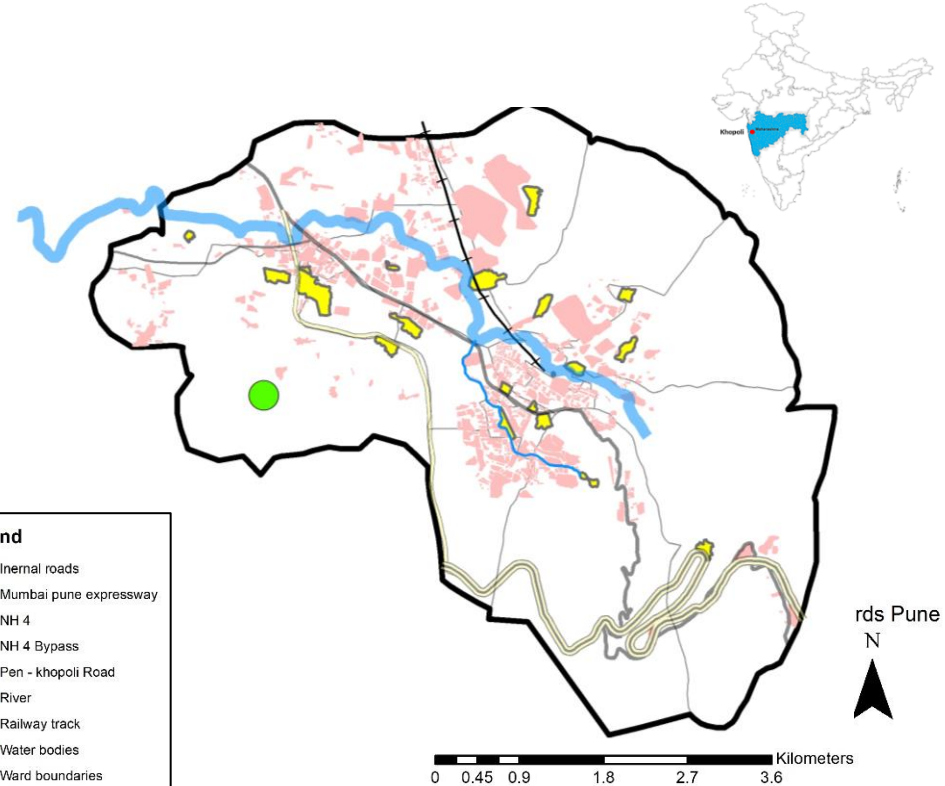
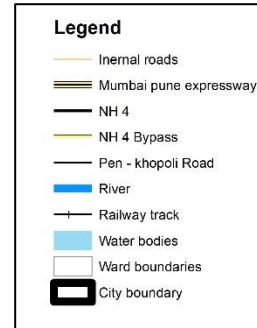
31.45 Sq.Km
Area



14
Wards



26.50 %
Decadal Population
Growth



Base map of Khopoli

There are 20 non notified slums consisting city's 30 percent population



20
Total slums



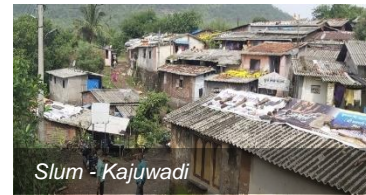
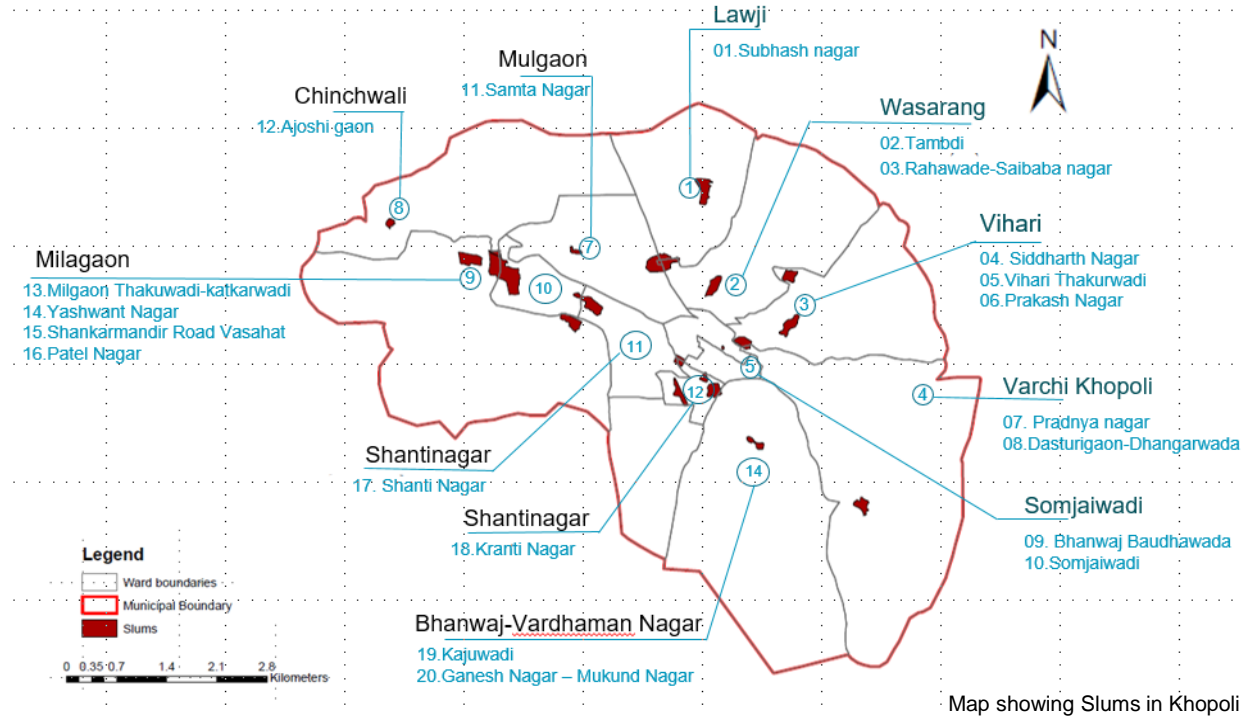
25,196
Slum Population



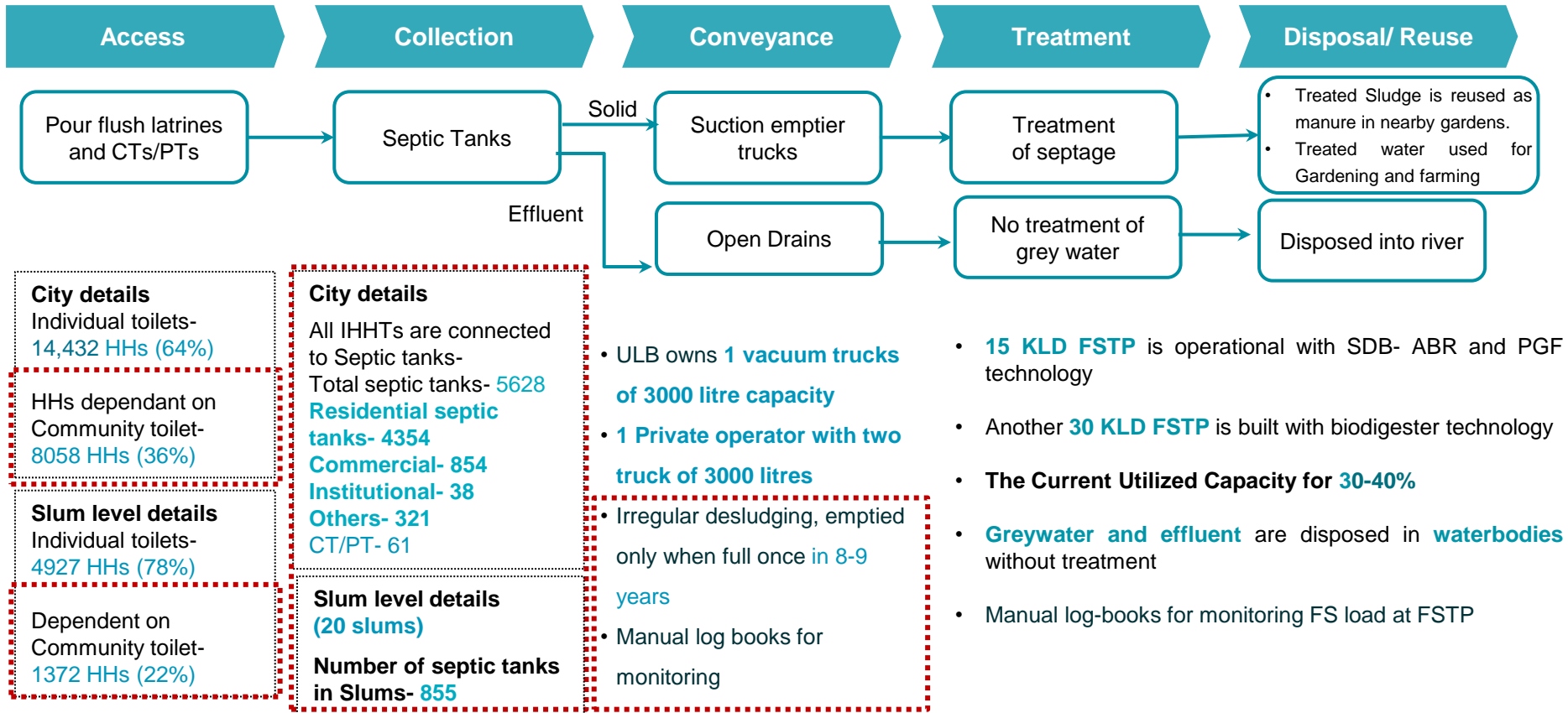
6299
Total slum
Households



30%
City's population



The overall sanitation status of Khopoli across the sanitation chain



CWAS has signed an MoU with KMC for supporting in improvement in sanitation services

MoU signed with KMC for support for sanitation improvement in the city focusing on the following three aspects

1 Sanitation assessment and FSSM Plan of the city

2 Moving towards universal coverage of Individual Household Toilets (IHHT)

3 Scheduled desludging of septic tanks and Monitoring systems for desludging and treatment services



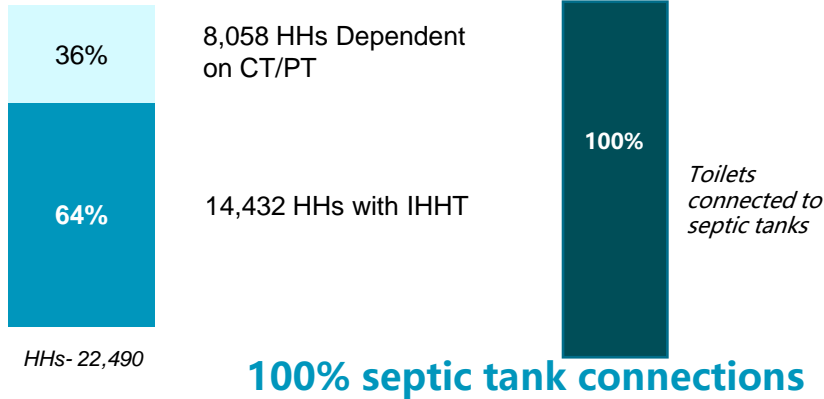


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Access and Containment

i. Existing scenario

64 percent households have access to individual toilets



Total No. of Slum Households	6299
Total No of slum households having IHHT	4927
Total no. of Slum households having individual toilets connected to septic tanks	855
Estimated number of Slum HH's dependent on CT/PT	1372

- All the toilets are connected to septic tanks. The septic tanks are further connected to soak pits
- Average cost of Toilet Construction is Rs. 30,000/-.Construction cost ranges form Rs.12000 to Rs. 40000/-
- Rs. 12000 subsidy is given to the beneficiaries from the State and Centre subsidies
- **620** more individual toilets can be constructed with ULBs Pending fund.



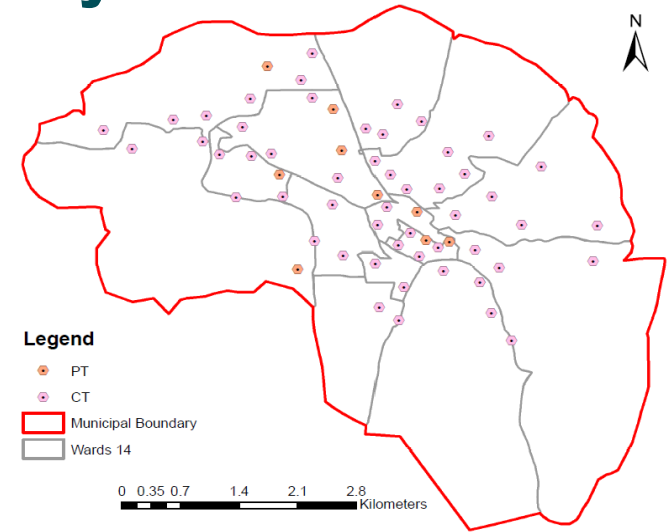
Source: Health department, KMC

36% households dependent on Community and Public Toilets

Total No. of CT and PT	61
No. of Public Toilets	09
No. of Community Toilets	52

Community toilets and KMC schools

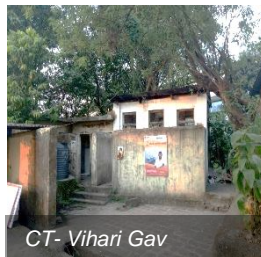
Seats	668 seats
O & M	Sewa Foundation
Contract cost and time period	54,10,800/- per year, contract of 3 years
Monitoring	By respective Mukadams in the ward and update SI



Map showing Location of CT/PTs in Khopoli



PT - Bus Stop



CT- Vihari Gav



Public Toilet



Community Toilet

K.M.C. TOILET BLOCK CLEANING MONTH-NOV-2021						
Sl. No	Area Name	Men	Ladies	Urinal	Total	2 Ngr
1	Bazar Peth	2	2	7	11	Yes
2	R D Complex	3	0	1	4	Yes
3	Bus Stand	4	0	0	4	Yes
4	Bus Stand(History Club)	8	3	5	16	Yes
5	Mangal Bazar Market	0	0	4	4	Yes
6	Wholesaler behind Shinde House	8	7	18	33	Yes
7	Mangal KMC School No 11	10	13	0	23	Yes
8	Shinde Nagar	8	7	3	18	Yes
9	Shinde Nagar	4	4	0	8	Yes
10	Shinde Nagar Public Toilet	3	3	0	6	Yes
11	Shinde Nagar	4	0	0	4	Yes
12	U. C. Nagar (Dhulepat)	2	2	0	4	Yes
13	Shinde Nagar (Dhulepat)	2	2	0	4	Yes
14	Shinde Nagar Market	2	4	5	11	Yes

Record book

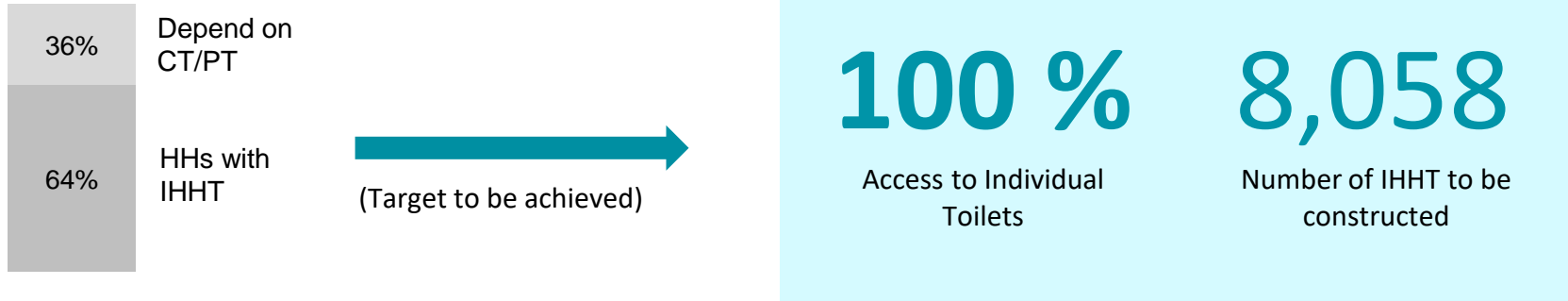


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Access and Containment

II. Proposed plan for access to toilets

To move towards universal coverage of IHHT city should plan to increase access of IHHT to 100%



- Covid-19 has refocused the attention on the significance of individual toilets.
- To understand the IHHT demand, a quick survey can be conducted with households dependent on CT/PT
- CWAS can provide a medium to conduct these survey- SaniTab, a mobile based app
- Along with the survey, awareness material can also be floated to educate the family regarding the importance of individual toilet

Two main constraints are commonly faced in constructing individual household toilets

Space and infrastructure challenges



- Space constraints in high density areas with small dwellings
- Lack of space for septic tanks
- Behavioral issues
- Other infrastructural issues such as inability to get a sewerage connection especially in dense settlements in large cities, or lack of water supply



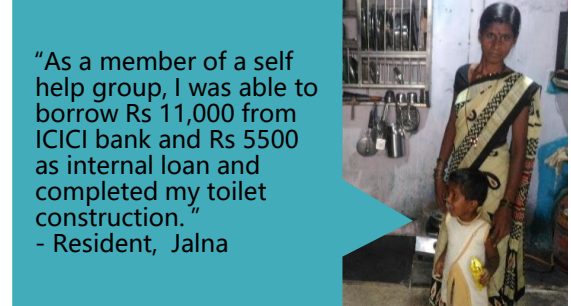
Financial constraints



Lack of funds, as the SBM incentive is often not enough in many areas with high construction costs



“There is no space in my house. My application got rejected and also that we do not have money to construct toilet other than subsidy provided.”
- Resident, Wai.”



“As a member of a self help group, I was able to borrow Rs 11,000 from ICICI bank and Rs 5500 as internal loan and completed my toilet construction.”
- Resident, Jalna



“Do not want to build toilet inside house and outside it is road widening. Also subsidy not enough here excavation cost for tank is very much.”
- Resident, Sinnar

Community septic tank by the Khopoli Municipal Council and Group and shared toilets efforts by various councils

- To tackle the problems of space and funds, KMC developed an innovative solution to construct a group septic tank for a number of individual toilets in close vicinity.
- Group septic tank of appropriate size was designed to cater to 25-30 household toilets.



Khopoli - Shared septic tank in connected to 25-30



Individual household toilets in Khopoli connected to shared septic

Shared toilets constructed through collective efforts by women: Case of Mumbai slums



Gated societies to restrict the users

Group toilets as an option to community toilets Cases from Wai, Mahad, Sinnar, Vadagaon and Vita

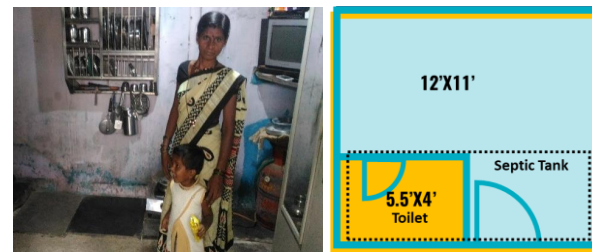


Group toilet in Vita

Group toilet in

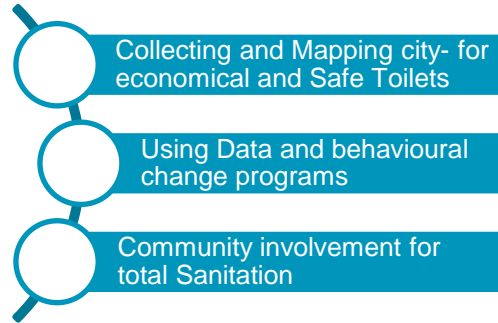
Sanitation credit from banks through SHGs and aggregator support: Case of MAVIM in Jalna

- Although a partial incentive for toilet construction address affordability concerns to an extent, most applicants may require access to credit to build a toilet.
- There is some willingness to take a loan to build a toilet – but, SHGs and MFIs were the only options available for households.
- A demonstration project for household sanitation credit for individual toilets was implemented with support from CWAS, CEPT University.
- Sanitation loans were mobilized for 300 women by linking SHGs to scheduled commercial banks in Jalna through MAVIM and its Community Management Resource Centre (CMRC).



City can also engage NGO's/SHG's Partnership In Sanitation for universal IHHT coverage

Pune Municipal Corporation partners with **Shelter Associates** under the **One Home One Toilet Model**



Mahila Housing Trust in Amalner, Maharashtra

facilitated construction of more than 600 IHHTs, formed Community Action Groups, helped in providing microfinance loan through community mobilization and carried out awareness generation activities



Engagement of SHGs in awareness generation for IHHT construction



IHHT constructed through Vipanchi Area level federation



Leveraging credit through bank linkages



Women masons involved in construction of IHHT



Sanitation sub committees discussing issues related to sanitation

A survey is going to be conducted to understand the demand of individual toilets in Khopoli

- With the support of SaniTab app by CWAS, KMC has decided to conduct IHHT demand survey
- The questionnaire was developed with the coordination between CWAS team and the KMC officials.
- The KMC officials will carry out the survey and the SaniTab dashboard will help the city to identify the IHHT demand and the beneficiaries
- The survey will be commence soon





Conveyance of septage

I. Existing demand-based desludging
practice

At present for desludging of septic tanks, Khopoli has one ULB truck and two trucks of private operator

- The ULB practices on-demand based desludging for emptying septic tanks
- The service is provided by both ULB and private operator.
- ULB truck capacity- 3000 L (one truck)
- Private operator truck capacity- 3000 L (two trucks)
- Around 15- 20 Demands per month are received for desludging property level septic tank.
- Around 15 - 20 trips per month are made for desludging CT/PT septic tank
- Existing user charges for carrying out desludging services by ULB is Rs. 2000 per trip and by Private Desludger is Rs. 2500 per trip.



Source - Primary data from ULB



Conveyance of septage

**II. Proposed scheduled desludging plan
and steps taken by KMC**

To move towards safe sanitation system, the ULB should adopt scheduled desludging of septic tanks

Demand Desludging

Desludging is done **on-call** basis

Desludging **services** treated as a **complaint redressal** system

Households **pay user charges**

v/s

Scheduled Desludging

Septic tanks is desludged **once in three years** on pre-determined schedule

Service provision (service contract) + regulations to ensure scheduled desludging

Sanitation tax/ earmarking % of property tax for scheduled desludging

This measure will also support in sustaining ODF++ status and achieve the water plus status

Infrastructure requirements for scheduled desludging

- As per the scheduled desludging plan of three-year cycle for Khopoli, **2 suction trucks are required**.
- KMC has one suction truck. KMC can decide to conduct the desludging activity **on its own or outsource it to private operator**
- **There is an existing private operator who owns two trucks** and is permitted by the KMC to carry out desludging activities.
- **Treatment facilities are adequate if the second plant is also made functional** to fulfil the scheduled desludging criteria so further expansion of treatment facility is not required.

Septic tanks per day



6-7 septic tanks/day

Scheduled desludging:
Desludged 7 septic tanks per day i.e. it will generate 45 KLD septage.
(~1800 septic tanks annually)

Desludging Trucks



X 2 @ 3KLD

Two trucks of 3000 litres for scheduled desludging in Khopoli

FSTP



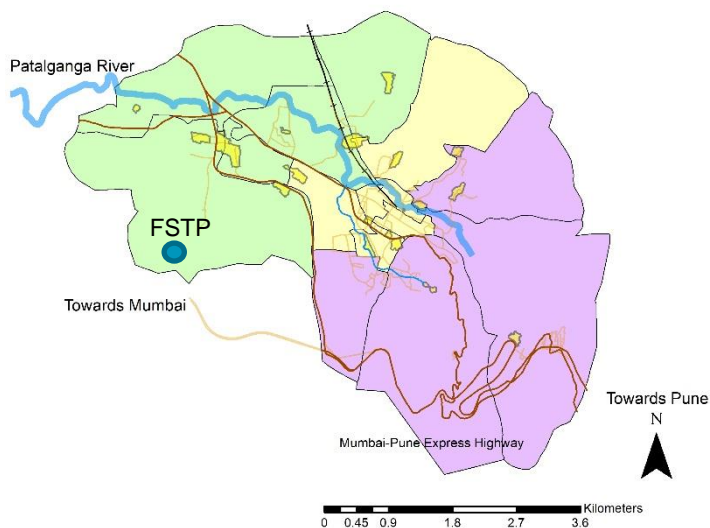
15 KLD
Existing FSTP operational

30 KLD
FSTP is built

The 30 KLD FSTP plant can be made operational to cater to septage disposed during the scheduled desludging practice

For scheduled desludging two suction trucks will be required and the city will be divided into three zones

Zone A Zone B Zone C



Zone	Zone-A	Zone-B	Zone-C
Wards	1,7,8,9,10	2,5,6,11,12	3,4,13,14
Total households	8017	7586	6888
HH with individual toilet	4996	4859	4577
No. of septic tanks	1850	1803	2036
Slum HH	1978	1711	1673
Number of PT CT	6 22	3 17	0 13

Table: Profile of desludging zones

The city is divided into **3 zones for scheduled desludging**, zone A, zone B and zone C.

Introduction of sanitation tax or earmarking property tax for scheduled desludging activity will lead to equitable and inclusive sanitation services

- For financing the scheduled desludging services, **sanitation tax** can be levied instead of user charges collected at time of desludging.
- **Sanitation tax** will be introduced instead of user charges to sustain the services
- The sanitation tax can be a part of overall **property tax/ water tax** which is paid annually by property owners
- This allows the tax to be more **equitable** as those with larger and better properties pay a higher property tax
- This will also make the desludging service more **affordable** for the **low income groups**
- The sanitation tax ensures that **adequate funds** are available for **payments if any private service provider** is involved in this activity

Estimated Sanitation tax per property
(Considering Opex Cost for only
desludging)

~Rs. 100 Per
property

Estimated Sanitation tax per property
(Considering Opex Cost for desludging
and FSTP)

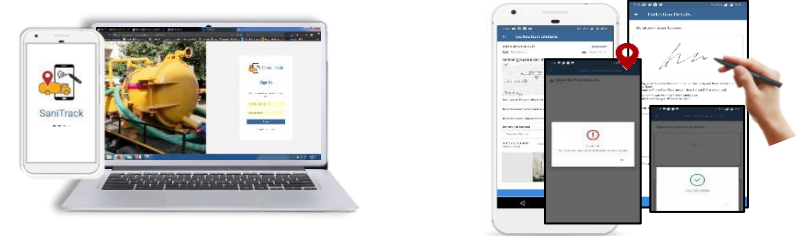
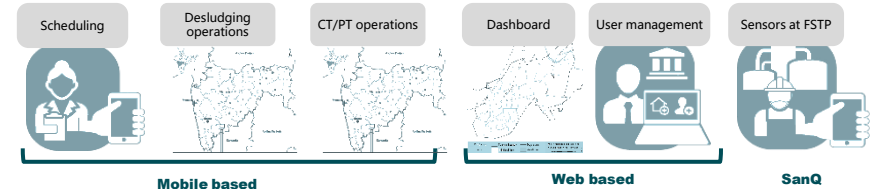
~Rs. 150 Per
property

The sanitation tax demand introduced will be 2-3% of total property tax demand

Online Monitoring systems can be used for scheduled desludging

- Currently city is maintaining desludging service record on Manual log-books.
- **Online monitoring systems** can be adopted for tracking desludging and treatment services efficient services.
- Online monitoring systems called **Sanitrack** can be used in pilot scheduled desludging zone.
- Sanitrack can help monitor scheduled desludging service at property end and safe decanting at FSTP
- CWAS can provide training assistance to ULB staff and private operator and set-up system for online monitoring through Sanitrack.

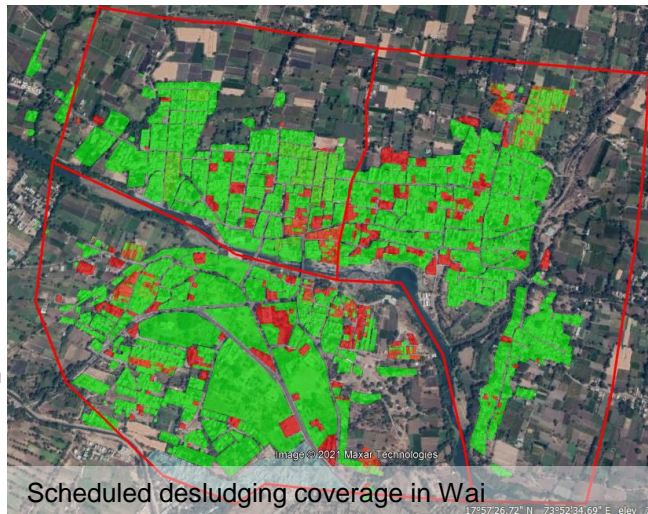
SaniTrack - End to End Monitoring for FSSM



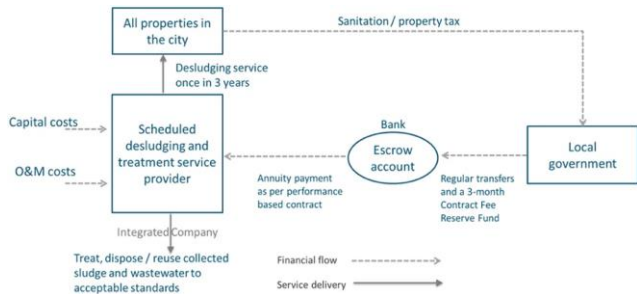
CWAS can provide training assistance to ULB staff and private operator and set-up system for online monitoring through Sanitrack

Case of Wai, Maharashtra for scheduled desludging

- On May 30, 2018, Wai Municipal Council in Maharashtra became the first city in India to start a Scheduled Desludging service.
 - In Wai, the council appointed a private operator to carry out scheduled desludging service
 - The private operator bears the Capex cost of the truck and Opex cost of the desludging service.
 - The private operator is paid against performance linked to the number of septic tanks emptied.
- All property owners pay sanitation tax to the local government, which ensure that adequate funds are available to recover the cost of desludging service.
- The risk of late payment raised by private players is mitigated through an escrow account mechanism



Performance Linked Annuity Model (PLAM) for conveyance in Wai



Benefits



Performance Based Contract



High Quality Service Level



Sanitation tax linked to property tax - equitable

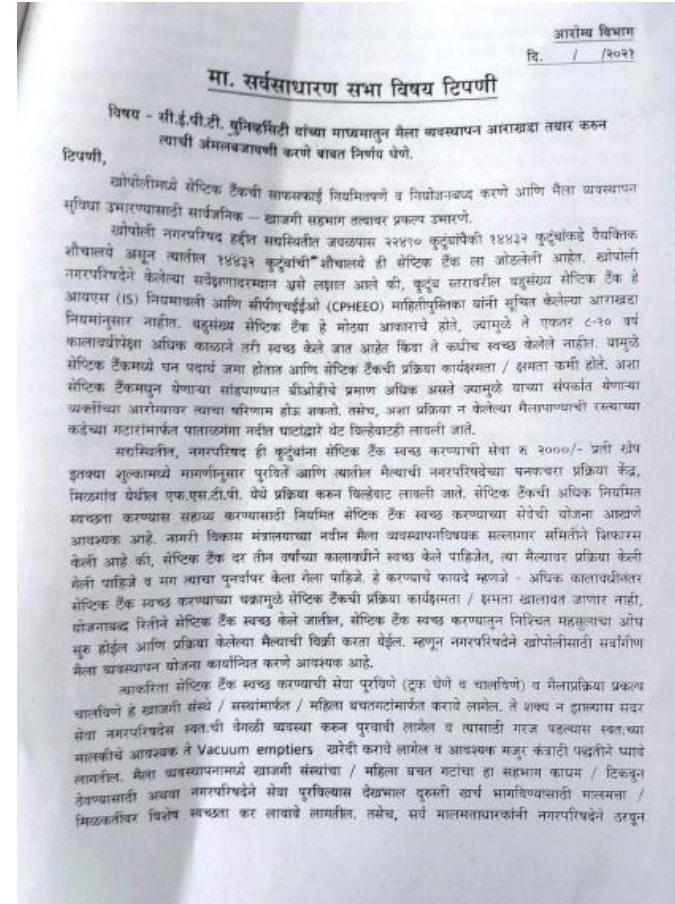


Low desludging Charges – inclusive – all properties are covered

Sinnar, Kolhapur and Satara ULBs have also adopted scheduled desludging practice

The ULB has passed the General Body resolution to implement scheduled desludging

- On 1st November 2021, the GB resolution on scheduled desludging was passed.
- The GB note covers scheduled desludging of septic tanks in Khopoli and setting up model for faecal sludge management- ULB led/ PPP
- It also discusses about the sanitation tax – “As Municipal Council is providing the services, special sanitation tax will have to be levied on the property to cover the maintenance and repair costs.”



KMC has selected the PPP mode for implementing scheduled desludging

- After passing the GB resolution, KMC has decided to adopt the PPP model to implement scheduled desludging in Khopoli
- The tender is finalized on scheduled desludging with support from the Nodal officer, awaiting final approval from the administrator
- Once the tender is rolled out, a private operator will be chosen based on the criteria mentioned in the tender and the scheduled desludging work will commence

TENDER DOCUMENT

<p>Name of Work "Service contract for scheduled emptying of septic tanks, Khopoli"</p>
--

E.M.D. : Rs. |

Office of the

Chief Officer,
Khopoli Municipal Council, Khopoli

Sanitary Inspector

Chief Officer



Treatment and Reuse

Currently 15 KLD and a 30 KLD capacity FSTPs treats the incoming septage

- The treatment plant at Khopoli has the SDB-ABR-PGF technology for treatment; It operationalized in January, 2020
- The operations of the FSTP is managed by Khopoli Municipal Council
- QA/QC, Third party check, Log book are available at the FSTP site
- The current Utilization Rate of FSTP plant is 30-40 %
- Additional 30 KLD FSTP (biodigester) is built in Khopoli and is operational since November 2021.

Treated Water Utilisation



- After PGF, the chlorination is done to improve the water quality and make it use for landscaping and Agriculture purpose.



- The water sampling shows different colour, the transparent colour symbolizes the good quality of water treated with proper process.

- With proper piping connection, the water is distributed in nearby area for Gardening purposes and Farming Purpose.

Treated Sludge Utilisation



- The Dry sludge is collected after certain days of drying period and it is allowed after collection and later ready to use as Manure.

- The dry sludge can be used for landscaping purposes and sell out to agriculture purposes.



KMC has taken commendable efforts on FSTP landscape and reuse of treated wastewater and sludge

Capacity of FSTP	15 KLD
Average daily load	3-6 KLD
Treated water	90% water
Dry sludge	10% sludge

- Garden is developed within the FSTP and SWM site. Garden is maintained by garden department workers.
- Treated wastewater is reuse within the site only. Treated water and dried sludge compost is used for gardening purposes



Treated water is used for gardening purposes

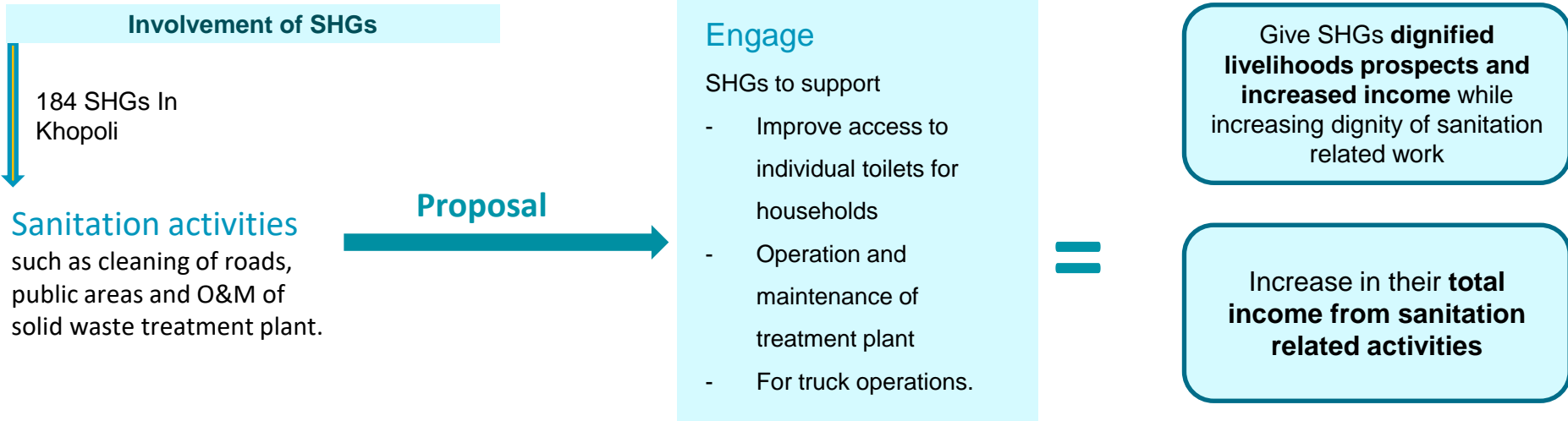


Landscaping near FSTP



Sludge compost is used for gardening purposes

Involvement of women from the local Self Help Groups (SHGs) for scheduled desludging or operating and maintaining FSTP



Name – Aamrapali Bachat gat

Contract with ULB for 1 year

Ulb will pay 7 lakhs /- per month for all the maintenance.

They are given responsibilities of cleaning all the tourist places and public areas and recreational areas within the city.



Involvement of SHGs in FSSM activities in Sinnar, Vasai-Virar and Odisha

Sinnar- FSTP Landscape



Odisha- O&M of FSTP



Vasai Virar- Desludging



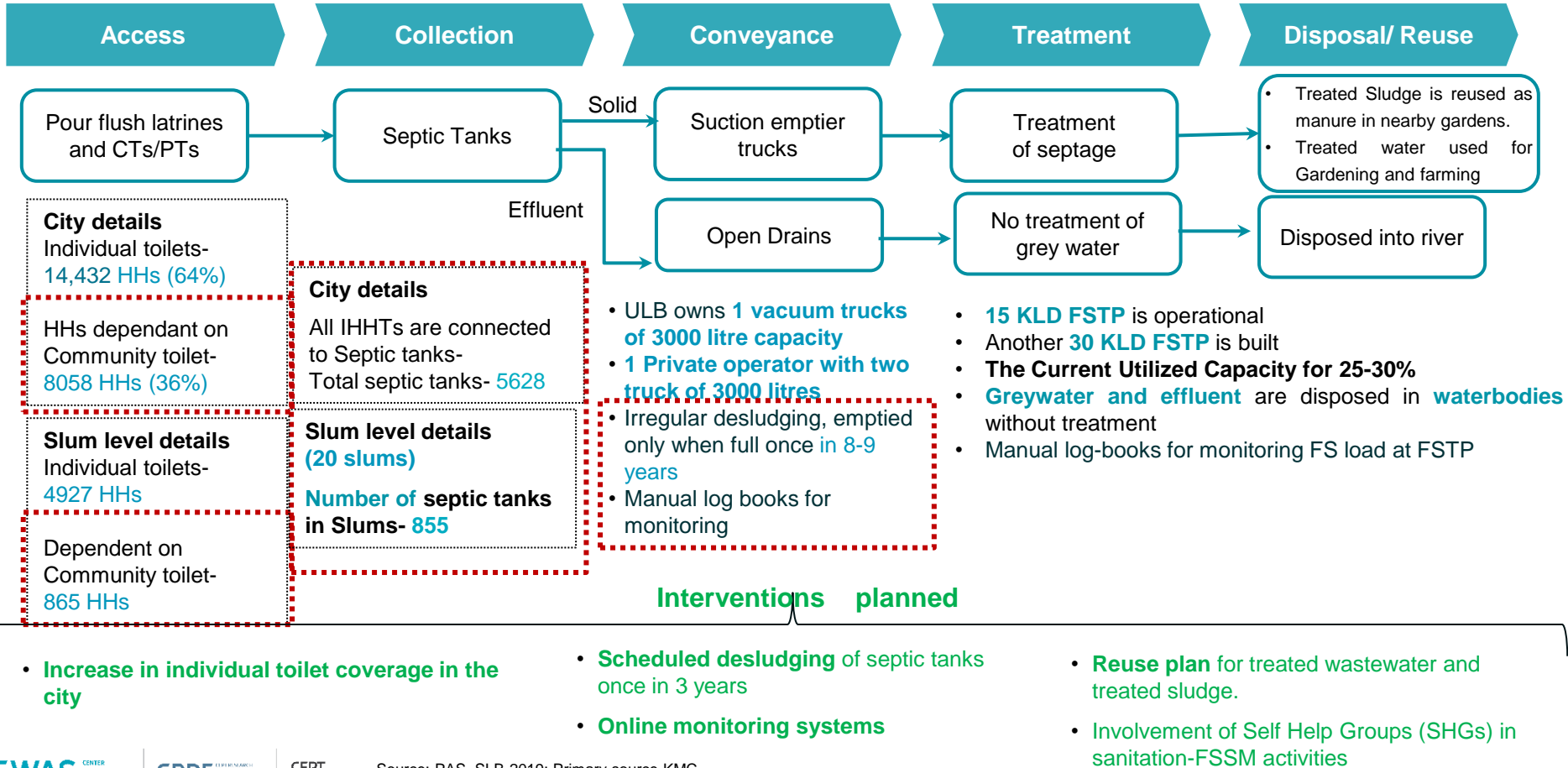


Way Forward

Way Forward

- With commencement of the IHHT survey and understanding the demand for it, the IHHT coverage will increase in KMC
- The implementation of scheduled desludging after selection of the private operator will help the city to move towards safe sanitation and adhere to the central government guidelines
- The reuse of the treated wastewater and dried sludge is closing the loop and making efficient use of the treated products. With the involvement of SHGs in the maintenance of FSTP, community involvement and livelihood will be promoted

The impact of these FSSM activities will lead to safe sanitation



CWAS CENTER FOR WATER AND SANITATION

CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION

CEPT UNIVERSITY

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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