Annex C. Case Studies: Off-grid sanitation Water and Sanitation

Sanitation taxes for waste treatment plants and pay-for-success in desludging

Development finance

The Bill & Melinda Gates Foundation (BMGF) provides grant funding to the Centre for Environmental Planning and Technology (CEPT) University to develop research on the benefits and sustainable delivery modalities of integrated faecal sludge management and wastewater treatment. As a part of this, technical assistance provided by CEPT enabled municipal governments in Wai and Sinnar in the India State of Maharashtra to establish a sanitation tax as part of existing property taxes and introduce city-wide faecal sludge and septage management services. The approach uses a public-private partnership (PPP) to deliver scheduled emptying and establish faecal sludge treatment plants (FSTPs). The team is working with the State Government of Maharashtra to replicate and strengthen this model for application in cities state wide.

The local municipal government provided land to build the plants. In Wai, BMGF contributed grant funding towards the construction of a FSTP. In Sannar, the municipality used local resources to construct a plant. Revenues from the sanitation tax are used to pay for scheduled desludging contracts in both cities.

Commercial finance

In Wai and Sinnar, private sector operators for scheduled desludging were selected through a PPP tender. The company contracted to undertake scheduled desludging services used its own financing to provide the services city-wide in both urban areas.

In Wai, TIDE Technocrats, a domestic private company, was funded by BMGF to design, build, operate, transfer (DBOT) an innovative treatment facility as part of an effort to demonstrate the performance of new treatment approaches, ideally de-risking future procurement opportunities. In Sinnar, the private sector operator selected through a DBOT tender installed a more conventional facility.

The company contracted to undertake scheduled desludging services, once it had secured the government contract, independently pursued the necessary private financing to expand into these two new markets and establish city-wide services.

Challenge

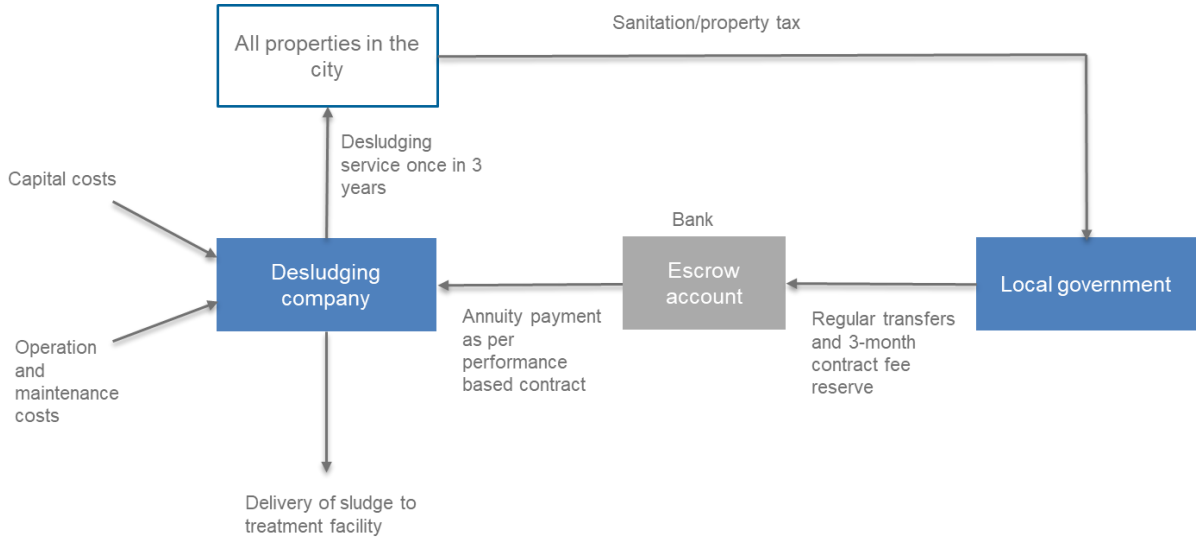
As part of the 5-year Swachh Bharat Mission, the Government of India vowed to make its population Open Defecation Free (ODF) by October 2019. Maharashtra declared itself ODF in 2018. While this represented substantial progress, a lack of universal access to high quality sanitation services remains a major issue. In particular, systems for effective faecal sludge management need to be developed in small and medium-sized towns across the region.

Solution

CEPT's Centre for Water and Sanitation - in co-ordination with the state and the local government, as well as BMGF - have piloted integrated faecal sludge management and wastewater treatment systems in Wai and Sinnar. The pilot included the development of a ring-fenced sanitation tax, the establishment of PPP-based scheduled desludging services and grant funding to build a faecal sludge treatment plant (in Wai).

Technical assistance provided by CEPT funded by BMGF enabled both towns to establish a municipal sanitation tax as a part of its property tax system, which provides a predictable source of revenue. As a result, both municipal governments opened tender for a scheduled desludging service to all residential and non-residential properties. A private company won the desludging contract. The company is contracted for a three-year period to empty the septic tanks. The private company was not present in these town prior to the contract and invested its own capital to expand operations into the two new markets. The concession will be tendered after the three-year cycle. The scheduled emptying contracts in both cities use a performance-linked annuity model with a pay-for-results contract in place between the desludging company and local government. Payment is based on the number of septic tanks desludged, with an annual target specified in the contract. Figure A C.1 depicts the performance-linked annuity model for desludging services.

Figure A C.1. Performance linked annuity model for scheduled desludging services



Source: Authors' elaboration based on (Bhavsar et al., 2019[8]).

In Wai, a FSTP was built by a local Indian company – TIDE Technocrats with funding from BMGF to demonstrate a new pyrolysis technology for the processing and reuse of waste. The land for the treatment plant was provided by the local government. The private company will operate the plant for two years with funding from BMGF. After this period, ownership of the plant will be transferred to Wai Council.

The town of Sinnar was able to fund the construction of waste treatment plant entirely from its own funds using grants received from the State Government. The private contractor for the FSTP in Sinnar was selected through a Design-Build-Operate (DBO) tender, with an operational period of three years.

Impact

The sanitation tax is structured to be progressive and payments are made incrementally. As a result, smaller properties pay less. The incremental payments and scheduled desludging has made the service more affordable to households (with some households paying approximately one-fifth of what they had previously paid). Wai was the first town in India to introduce a scheduled desludging system. Previously in both towns desludging was infrequent and usually done when septic tanks overflowed.

In Wai, over the past 12 months, 1 500 properties have received desludging services and over 4.8 million litres of septage has been delivered and treated at the FSTP. There is an acceptance rate of more than 93% by households for the scheduled service.

This project demonstrates an approach for small and medium towns in India to achieve universal sanitation. The success of the pilots in the two towns will inform state-level efforts in the development of regulatory frameworks and policies to overcome barriers to sanitation service provision. The success of pay-for-results scheduled desludging approach has led to discussions about how to scale up the provision of the service.

Currently, discussions with impact investors are ongoing about the potential of a development impact bond to demonstrate the possibility of attracting impact investments for such activities. The State Government plans to scale operations across more than 300 cities in Maharashtra. In the future, there is possibility to consider integrated contracts that combine scheduled emptying and FSTP construction and operations.

Funding waste water and faecal sludge treatment and reuse in Udaipur

Development finance

The Bill & Melinda Gates Foundation (BMGF) provided USD 1 million in grant funding to the Centre for Policy Research (CPR), for research and technical assistance in various geographies. This support influenced the decision of Udaipur Municipal Corporation to invest in faecal sludge management services and treatment plants instead of just sewerage systems. CPRs research played an important role in the development of the initial public private partnership for one faecal sludge treatment plant (FSTP) and a planned second plant.

Udaipur Municipal Corporation and Udaipur Improvement Trust rented the land to the private sector operator for the FSTP.

Commercial finance

Hindustan Zinc Ltd ([HZL], a Vedanta Group Company) provided 95% of financing for the original FSTP and committed to covering 100% of the operating costs for 5 years. In addition, they will finance 20% of the second planned faecal sludge treatment plant and 100% of the operating costs.

Challenge

Udaipur city is a municipal corporation in North Western region of India covering a total area of 64 km² and population of 451 735 as per the 2011 census. As of 2019, the city has high prevalence of septic tanks covering about 77.5% of households and low sewer network coverage, showing large deviation from the City Development Plan. Table A C.1 summarises the goals for sewerage services, which guide the construction of treatment facilities. As of 2014, only 20% of the city's population was covered by the network in place to dispose of, recycle and effectively treat waste.

Table A C.1. Sewerage service level goals

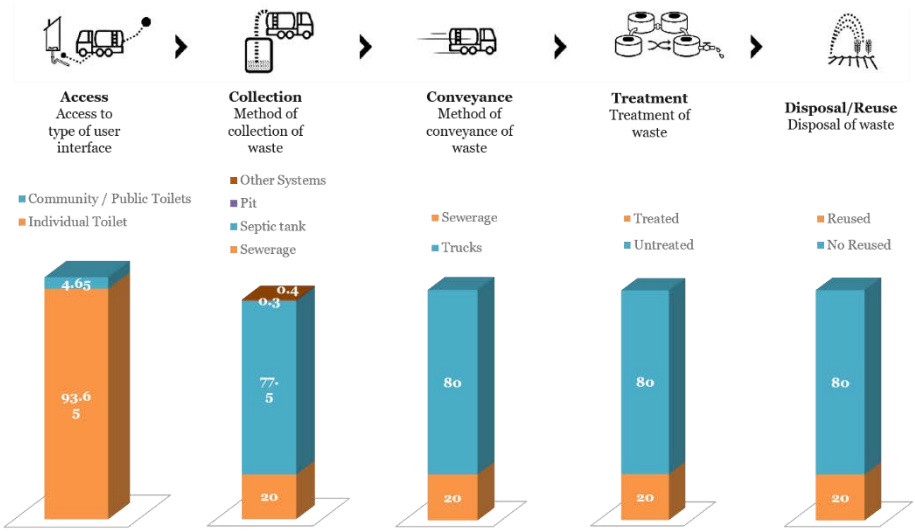
Components	Situation in 2014	Target for 2021	Target for 2031
Network coverage	20%	60%	100%
Treatment and disposal	20%	60%	100%
Recycle and reuse	20%	60%	100%
Operation & maintenance recovery	0%	60%	100%

Source: Undisclosed project documentation.

As per the City Development Plan, 22% of the city's total additional capital expenditure requirements would need to be allocated to investments in sewerage in order to meet the desired service level goal of universal sewerage coverage. In 2018, this amount was estimated to be 1 508 Rs Crore (approx. USD 250 million). This would equate to the highest share of the municipal capital expenditure needs, after water services. However, in spite of efforts to in source finance, thus far, sewers still serve only an estimated 20% of households in the city (approximately 91 322 inhabitants). Two new sewerage projects are under construction, to be operationalised in 2022. This would increase coverage up to 50% of the population.

Figure A C.2 further details gaps in the sanitation value chain in Udaipur. Notably, while access to toilets is above 90%, over 80% of waste produced in the city is not treated or reused.

Figure A C.2. Gaps in the sanitation value chain in Udaipur



Source: Undisclosed project documentation.

Solution

In this context, the project "Partnering for MEWAR: Managing Environment through Waste Reuse" was conceptualised by the research centre CPR in partnership with local partners to introduce a specific system of improved faecal sludge and septage management in Udaipur. BMGF supported the CPR to help undertake research, a situational analysis, generate interest and participation of stakeholders and to support the project through technical advice. USD 300 000 was set aside for this research and stakeholder engagement. The project aims to build on an existing partnership between the public and private sectors to provide faecal sludge treatment and reuse.

Based on research, documentation and outreach under the project, the city is now implementing a comprehensive faecal sludge management improvement exercise with the support of stakeholders. In addition to financing and building the FSTP through a PPP arrangement, public investments are being made to ensure adequate/meaningful levels of collection and conveyance of sludge to the FSTP by investing in (a) procuring vacuum trucks, (b) the installation of GPS and licensing operators, (c) health and safety training to operators, (d) establishing FSM regulations in the city and (e) undertaking community awareness programs on the safe collection and treatment of faecal sludge.

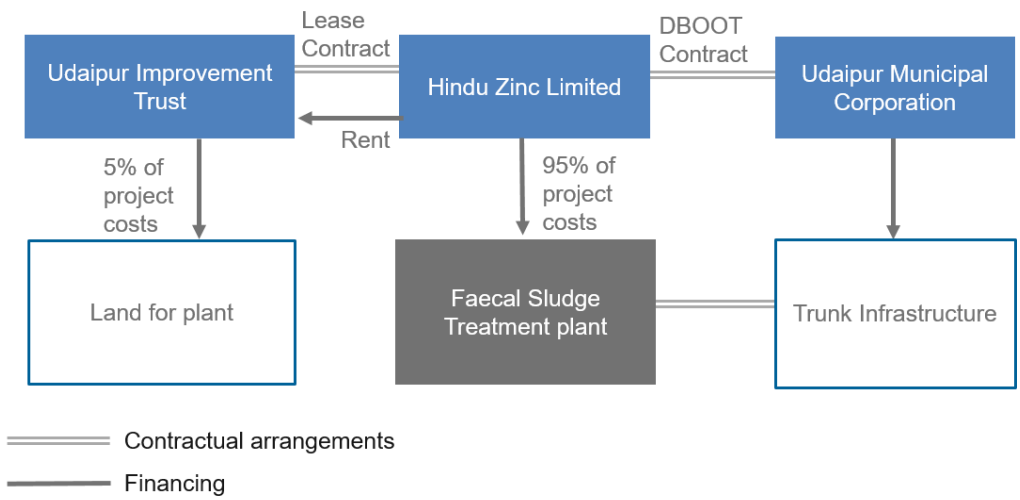
Original public-private partnership

In 2014, a 20 million litre per day sludge treatment plant was commissioned with Udaipur Municipal Corporation and Urban Improvement Trust as parastatal agencies and Hindustan Zinc Limited (HZL) (a private mining and resources company operating in the region and headquartered in Udaipur) as concessionaire.

The plant was constructed on a design, build, own, operate and transfer (DBOOT) contract with a 25 year term period. The Urban Improvement Trust owns the land the plant was built on and gave HZL a lease to occupy it. The total project cost is INR 275 million with 95% of the cost borne by HZL for plant construction and 5% of the cost borne by Udaipur Improvement Trust for the land which was acquired for the project. The concessionaire operates the plant at its own cost and retains the right to reuse the treated wastewater for the duration of the project. To ensure sewerage supply to the plant from the city, Udaipur Municipal Corporation built a network including a 45 km trunk line with a cost of close to Rs 56 crores (approx. USD 9.5 million) connecting the sewered area of the city to the plant.

The contractual arrangement between the parties is illustrated in Figure A C.3 below.

Figure A C.3. Contractual and blended finance model of the Faecal Sludge Treatment Plant at Udaipur



Source: Undisclosed project documentation.

Second faecal sludge treatment plant planned

Given the lag in the provision of sewerage services, a FSTP of 15 kilolitres per day (KLD) capacity is being developed to cover the requirements of the non-sewered parts of the city. This FSTP, based on thermo-chemical processes for treatment of faecal sludge, is under open bid process. Eighty percent of CAPEX is

to be provided by the municipal government while 20% of CAPEX is provided by the concessionaire. The concessionaire, likely HZL, will be responsible for five years of OPEX for the faecal sludge treatment plant. The plant is expected to produce fly ash for soil conditioner and distilled water as by-products that can generate some revenue. The plant will also produce electricity, which will be used within the plant. The operator will have the rights to sell the treated by-products from the plant. A specific market study is currently ongoing, which will determine the extent of revenues that these by-products will generate (although they are not expected to cover operating costs). The project is structured as a design, build, own, operate and transfer (DBOT) project for a five-year initial term. The overall CAPEX will be around 0.85 million USD. This project will ensure that the current level of demand for faecal sludge treatment from across the city is met.

Impact

The MEWAR project is helping the local government and existing stakeholders in the sanitation sector in Udaipur to adopt alternative approaches for the safe treatment and reuse of sewerage to meet the service level targets for the city. It increased the understanding that almost 80% of households in the city do not have a planned, structured, formal access to safely managed sanitation. Furthermore, it educated stakeholders regarding the health risks citizens are exposed to due to the uncontrolled dumping of faecal sludge in open lands, drains and sometime water bodies.

This public funding of formalising, regulating, and monitoring safe collection, conveyance, and treatment of faecal sludge is strengthening and expanding private sector players' investments. In doing so, growth in service demand can be met. Also, facilitating investments in infrastructure—sewered and non-sewered—results in improved sanitation services.

BMGF's funding of the CPR's partnership with the city is supporting the city to learn how to engage in faecal sludge system management, establish meaningful incentives for continued operation of infrastructure, and most importantly, how to set and pursue meaningful expectations about improving sanitation service levels city-wide.

Water Credit and Water Equity: microfinance sanitation loans to expand access to sanitation in India

Development finance

Water.org provides grants and technical assistance and educational resources to microfinance institutions operating in the area in order for them to scale up sanitation loans

Commercial finance

Microfinance institutions disburse loans to households and, with the assistance and attention gained from involvement in the WaterCredit programme, attract investment from private investors. For example, KPMG in the case of the sanitation impact bond launched in 2018.

Challenge

As part of its 5-year sanitation campaign, the Government of India aims to make its population Open Defecation Free (ODF) by October 2019 and enacted a strategy that included a budget, state-level targets and awareness raising. A component of this budget is provided as an incentive to eligible households for toilet construction. These funds are typically offered after construction. As a result, cash reserves for up-front construction costs are needed.

Solution

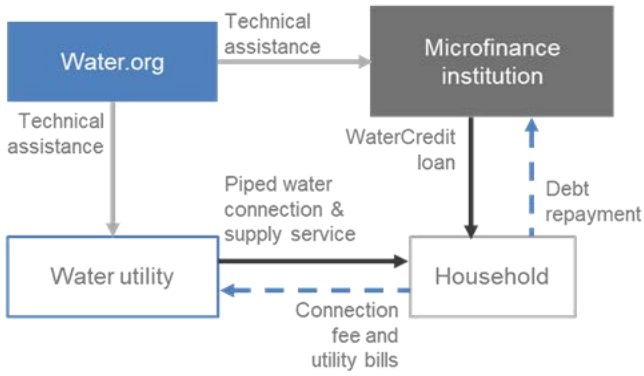
Water.org's WaterCredit initiative facilitates household sanitation acquisition through partnership with local financial institutions. It provides technical assistance and project preparation funds to financial institutions to set up dedicated water and sanitation loan products for low-income borrowers. Under most circumstances, these institutions already lend to low-income people but are reluctant to lend specifically for water and/or sanitation due to perceptions of high repayment risk. The WaterCredit structure is designed to encourage these institutions to pilot water and sanitation lending, with the assumption that after confidence in the loan product's viability is built, they will mainstream it into their portfolios

The strategic use of technical assistance and/or a small grant from Water.org's philanthropic donors for project preparation – market assessment, loan product development, borrower education materials, etc. – aims to increase the outreach of sanitation services by mobilising household and commercial finance. In exchange for this assistance, the institution commits to loan targets within a given timeframe. During project preparation, tailored water and/or sanitation loan products are developed. The institution is responsible for sourcing its capital for on-lending. Approved clients receive the water and/or sanitation loan and repay it at market rates. The clients then use their loan to purchase and construct the water and/or sanitation asset.

Microfinance institutions report to Water.org on progress against the agreed-upon targets. Verification checks that the loan programme is active are done on an interval basis by third parties, and Water.org staff also conduct regular monitoring visits to assess progress and provide guidance.

As of 31 December 2018, Water.org has provided a total of USD 13 million in technical assistance and project preparation funds across its financial partners in India.

Figure A C.4. The WaterCredit Financing Structure



Source: Authors.

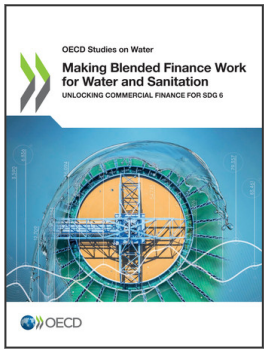
Impact

In turn, those partners have disbursed 2 089 887 locally-sourced loans totalling USD 429 million which have led to 9.4 million people accessing water (34%) and sanitation (66%). Products include toilets connected to septic tanks, bore wells and the installation of water connections. Repayment rates are 99%, even though (80%) of borrowers report incomes of less than USD 3.10 per day.

Cashpor Micro Credit, for example, started implementing WaterCredit in 2017. While they had been offering water and sanitation loans since 2012, the support from Water.org enabled them to improve collateral and training materials for staff. These efforts paid off: while Cashpor disbursed 80 000 water and sanitation loans in the five years before working with Water.org, within two years under the WaterCredit

programme they disbursed 85 000 such loans and have expanded the water and sanitation lending across all five states where they have a presence.

At the same time, the programme has impacted the ability of some MFIs to attract additional sources of capital. Cashpor for example has been able to engage WaterEquity as an investor as well as attract capital via a Sanitation Impact Bond that was launched in 2018 by the Dutch partnership Finish Mondial (comprised of Actiam, Finish Society, KPMG, and WASTE). Finish Mondial's investment was strongly connected to Cashpor's activity with Water.org and WaterEquity.



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