

3 Evidence on blended finance in small-scale off-grid sanitation, wastewater collection and treatment

This chapter presents the results of the review of small-scale off-grid sanitation, wastewater collection and treatment, including: (i) an introduction into the subsector, (ii) a commercial investor perspective on the subsector, (iii) an overview of blended finance transactions, (iv) a typology of commercial investment that could be mobilised, (v) an assessment of the impact on the poor, and (vi) subsector-specific insights. The chapter finds that the early-stage nature of many sanitation enterprises evoke the need to integrate grants and technical assistance in blended finance models to create financially sound projects which may attract commercial finance.

3.1. An introduction to small-scale off-grid sanitation

Small-scale off-grid sanitation, wastewater collection and treatment solutions aim to deliver services for the safe disposal of human urine and faeces. Off-grid solutions can include traditional and improved latrines (various kinds of pits), container based sanitation (CBS), flush toilets connected to septic tanks and various wastewater collection and treatment facilities, such as faecal sludge management technologies (FSM) (World Bank, 2019^[1]).

Most developed economies in the world have water and sanitation systems that are seweraged or “on-grid”. That is, toilets and taps are connected to a network of pipes and pumps managed by utilities (see Chapter 2). Historically, seweraged systems have been seen as the “gold standard” solution for sanitation and wastewater treatment, with off-grid or onsite sanitation largely seen as a temporary solution (Bill & Melinda Gates Foundation, 2019^[2]). In addition, governments and development financiers have focused on and preferred large scale infrastructure to tackle sanitation, involving the construction of wastewater treatment plants and sewer systems. However, these systems require high capital and operating expenditures and large amounts of land, energy and water. There is an additional challenge of introducing infrastructure for sewers in dense urban settings (Strande, Ronteltap and Brdjanovic, 2014^[3]). Further, the expansion and development of functioning, conventional sewer networks is not likely to keep pace with the rapid urban expansion typical of low and middle-income countries. Over half of the world’s population now lives in urban areas and that number is increasing rapidly (UN DESA, 2018^[4]).

The urgent need for sanitation solutions and the impracticality of delivering seweraged sanitation coupled with technological developments has led to an increased focus on off-grid sanitation as a viable long term solution. The development of new technologies and improvements in human waste containment, transport, and decentralised treatment mean that small-scale off-grid sanitation can offer low cost solutions to meet sanitation needs (Bill & Melinda Gates Foundation, 2019^[2]). Indeed, many of the social enterprises in operation in the off-grid sanitation sector offer solutions at a fraction of the cost of developing a seweraged system (The Stone Family Foundation, 2014^[5]). Indeed, in urban areas, dependent upon local conditions, off-grid FSM technologies can be provided for 20% of conventional sanitation costs per household (Dodane et al., 2012^[6]).

At the same time, off-grid sanitation approaches can be viewed as complementary to traditional sewer systems rather than as an alternative. They can and should be designed and supported to deliver equivalent service levels to households. As such, actors in the field such as the Bill & Melinda Gates Foundation (BMGF) promote decentralised efforts alongside seweraged systems. In practice, this approach has been pursued in several countries. For example, FSM has been successfully delivered alongside seweraged sanitation in Japan (Gaulke, 2006^[7]). More recently, in 2017, the World Bank launched the second Ethiopia and Urban Water Supply Sanitation Project, which supports a mix of off-grid and seweraged sanitation solutions (World Bank, 2017^[8]). These developments highlight that there is often no single simple solution to urban sanitation problems and innovative and cohesive responses are needed that consider the whole sanitation service chain. However, the absence of institutional and regulatory arrangements for managing and monitoring the quality off-grid sanitation systems in many developing countries remains a challenge (Bernal et al., 2012^[9]).

3.2. Investment profile: an assessment of the risks, returns and project attributes

In order to facilitate commercial investment in the off-grid sanitation subsector, blended finance actors on the development side need to understand the perspective and concerns of commercial investors. Ultimately, any blended finance approach should be a temporary approach to build markets that promote sustainable financing arrangements, which may include appealing investment opportunities for commercial investment in the long-run. In the following section, relevant investment parameters such as revenue and

risks are assessed, as well as other relevant project attributes in order to better understand the potential role the commercial sector can play and how blended finance can facilitate such engagement. Table 3.1 summarises these investment attributes for the subsector.

Compared to other subsectors, off-grid sanitation service providers often deliver services for low-income households at an early or pioneer stage, operating on a small scale. Despite a number of social enterprises in operation for a number of years (World Bank, 2019), many businesses are employing innovative technologies that are at a nascent stage. For example, CBS solutions have been developed by social enterprises, including several variations of which have collectable waste which can be reused for other purposes. However, a recent World Bank report finds that none of the enterprises reviewed were able to fully recover costs from revenues. In addition, the report concludes that the situation was likely to persist despite efforts to reduce costs and increase revenues (World Bank, 2019^[10]). Similar cost recovery challenges are faced by FSM solutions.

Table 3.1. Summary of investment attributes

Feature	Description
Risk	
Macroeconomic and business risks	Currency risk (due to mismatch revenue and debt servicing currency), market risk (demand for service), operating risk (weak performance of sanitation service providers), liquidity risk (inability to exit/sell).
Regulatory and political risks	Regulatory risk (e.g. in many developing country contexts there is no regulatory environment for off-grid sanitation), political risk (in the case of government procurement contracts) and utilities may not have mandate to engage in non-sewered sanitation).
Technical risks	Performance risk and obsolescence of utilised technology as off-grid sanitation approaches are as CBS solutions and FSM technologies are relatively new.
Environmental/ social risk	Environmental risk (e.g. chances of spillages of excreta of CBS and onsite sanitation).
Return	
Cash-flow generation	Depending on off-grid sanitation model, cash flows are generated through the sale of toilets (usually paid monthly), collection fees for waste, from products sold after processing of waste, user fees for toilets and concession contracts from local governments.
Developmental return	Can reduce levels of open defecation and improve hygiene of households leading to reduced illness. Sanitation services also and improves menstrual hygiene management (which, in turn, can reduce drop-out rates of girls in schools). Properly managed waste reduces the environmental impact of poorly managed sanitation.
Project attributes	
Greenfield vs. brownfield	Greenfield projects face additional business or technical risk due to the construction.
Scalability	Off-grid sanitation models can be scaled in particular if they are seen complementary to sewer systems and as such can access a stable revenue source, e.g. a public off-taker. Any replication of project hence depends on the underlying jurisdiction and context.
Size	Small scale direct investment in enterprises.
Transaction costs	High, given the opacity of small business typically low level of expertise in financing this sector.
Tenor/ Longevity	Varies, with the need for long term patient capital to develop and scale business models.

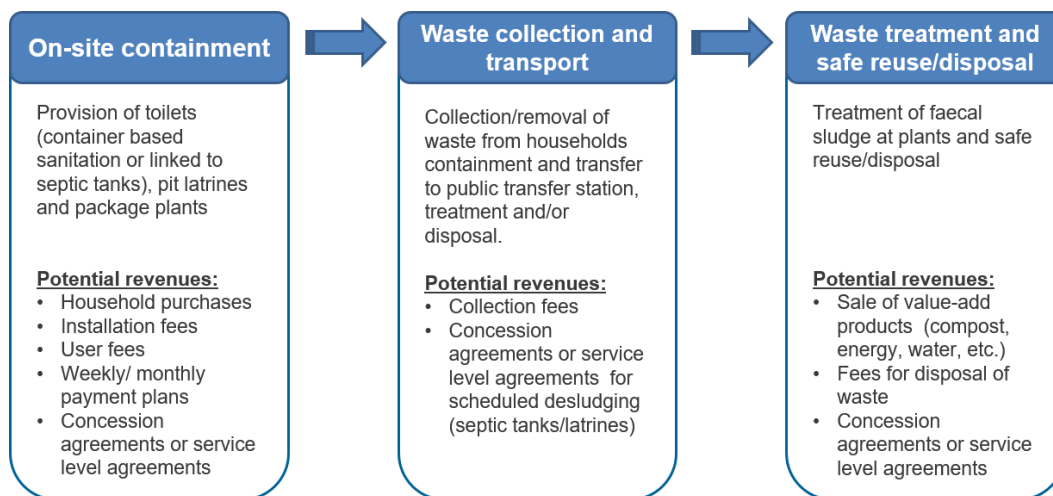
Source: Authors.

Revenue streams for off-grid sanitation are, as in any other sector, the key ingredient to financial sustainability. Specific to this sector, they are challenging to materialise. Blended finance can de-risk transactions and (re-)attribute cash flows but it cannot replace business models that do not have clear revenue proposition or that fail to capture economic value (Larrea, 2019^[11]).

A variety of business models operate along the off-grid sanitation service chain (Figure 3.1). As a result, enterprises that are providing services in this area generate revenue streams using a variety of approaches. At the upper end spectrum of stable and sizable revenues are service-level contracts with

local or national governments (e.g. utilities), which can contribute to financial sustainability. Municipal government procurement contracts can serve as a source of stable long-term revenue streams, but require a certain scale and level of profitability *ex ante*. These engagements are associated with political risk related to government payment. A recent example is Loowatt, a UK headquartered company that produces waterless sealable toilets, which reached sufficient scale to successfully bid for a procurement contract for bulk sale of toilets to a utility in the Philippines.

Figure 3.1. Potential revenues along the off-grid sanitation value chain



Source: Authors.

Other revenue models work bottom-up, by collecting user fees, as it is the case with CBS companies that provide container toilets to households. Toilets are provided to households and then costs are recovered through user fees charged for the operation of toilets. For example, Clean Team Toilets in Ghana provides in-home toilets to Ghanaians in Kumasi and charges a fee to households for the collection and disposal of waste (Clean Team Toilets, 2019^[12]). For a weekly fee (which is estimated to be substantially lower than the cost monthly use of public toilets), users are provided with a toilet with no *ex ante* capital expenditure. In addition, the toilet does not require water or electricity to operate. While these examples are promising, overall, the number of CBS companies in operation in developing countries seems to be limited.

A more traditional source of revenue for the water and sanitation sector, taxation, can also be used to fund off-grid sanitation, mobilise finance, and spur the involvement of local private sector actors. For example, in the towns of Wai and Sinnar in India, integrated faecal sludge collection and treatment systems were partially funded by revenues from a ring-fenced sanitation tax integrated as part of an existing property tax levied by the municipal governments. Revenues from the tax allowed the municipal government to offer a concession contract to a local company on a pay-for-success basis for scheduled desludging. In addition, FSM treatment plants in both towns have been developed.

The collection of faecal sludge and desludging of septic tanks are another area of business that can provide stable revenue streams. Research into the business case for faecal sludge in Sub-Saharan African and South-East Asia has indicated that the scale of operations and the size of collection trucks can have a large impact on the profitability of small businesses operating in the market (Chowdhry and Kone, 2012^[13]). Businesses have relatively high capital costs in the initial purchase of trucks, but can have regular revenue streams with scheduled desludging operations either with a service level agreement with a municipality or by charging collection fees from users. While the waste collection enterprises in the case studies reviewed in this report are currently reliant on a concession contract from municipal government, there are on-going

discussions exploring the potential of development impact bonds and private financing to scale up this model.

At the end of the sanitation value chain, transported sludge must be safely disposed of. Faecal sludge treatment plants (FSTPs) can generate revenues from fees for the disposal of waste from government procurement contracts for treatment services, or from the sale of waste reuse by-products. FSTPs and the innovative technologies in operation to process waste usually consist of two processes: (1) the separation of solid and liquids and (2) the treatment of the sludge generated from the initial treatment (Singh et al., 2017^[14]). Additionally, the process to treat liquids should be taken into account. The appropriate technology to process faecal sludge after primary treatment and ultimately the end products sold for reuse are determined by a number of factors, including the characteristics of sludge. These characteristics can significantly vary depending on storage and location, feasible markets for reuse products and the frequency of sludge collection (Singh et al., 2017^[14]). The products derived from treated faecal sludge (dependent on the technology) can include, for example: animal feed, biogas from anaerobic digestion, and compost. Different technologies often have different land requirements, capital expenditure (CAPEX) and operational expenditure (OPEX) costs. A high level of technical skill is required to develop and operate these technologies. To date, revenue streams from FSTPs have often generated only sufficient revenue to cover operating costs. However, once these technologies have been proven and have a more established performance track record, there is the potential for these models to be scaled, though reaching profitability may not be a consequence.

Implicit benefits (see also Chapter 4 on landscape-based approaches) have the potential to unlock funding from commercial actors. For example, the Hindustan Zinc Limited (HZL), a subsidiary of Verdanta, owns and operates a zinc mine in Udaipur. It funded 95% (approximately USD 4 million) of the project cost of a FSTP in the city. The remaining 5% was provided by the municipal government in form of land acquired for the project. HZL implicitly benefits as a local stakeholder from the effective treatment of faecal sludge in the area, as HZL headquarters are situated within the region alongside other extensive resources.

Cross-subsidisation between revenue-generating treatment services and cash-flow limited off-grid sanitation models can serve as a pathway to overall financial sustainability. For example, Sanergy, takes a full value chain approach to sanitation (Sanergy, 2019^[15]). The company, headquartered in Kenya, builds toilets with waste cartridges that are collected on a regular basis and then processed to produce fertilizer and animal feed (World Bank, 2019^[10]). The toilets are provided to franchisees for an installation fee in addition to an annual renewal fee as well as a monthly collection fee charged to landlords. At the same time, the enterprise is processing waste into fertiliser and animal feed. Sanergy divides its business into two arms: the non-profit sanitation provision service and the for-profit waste treatment and reuse business. This is in part because the company views sanitation as a public good and the financial reality that they currently do not envision a sustainable way to provide CBS solutions at scale. This non-profit sanitation provision service arm of Sanergy pays a fee to waste treatment arm for every kilogram of faeces removed. This fee is set below market rate (World Bank, 2019^[10]). As the business scales and profitability improves, a fully integrated model across the full value chain could have the potential to lead towards financial sustainability for the full range of activities (Box 3.1 provides further details on the profitability of a current sanitation business model).

Moreover, enterprises operating in the sanitation sector often face the dual challenge of the serving underdeveloped markets and also creating revenue-generating demand for their products and services (The Stone Family Foundation, 2014^[5]). Beyond financial solutions, this requires advocacy in behavioural changes to build long term demand and sustainable business models.

Box 3.1. An analysis of the profit and loss factors for an exemplary sanitation business

An analysis of the profit and loss (P&L) factors for an exemplary sanitation business clearly shows the challenges to attract commercial finance, and at the same time underlines the need for blended structures to scale grant-based business models.

Sanergy have developed a toilet that captures waste in cartridges and has been in operation since 2010. These cartridges are regularly collected and sent to processing facilities to produce fertilizer and animal feed. The toilet and waste collection services provided by Sanergy are used by approximately 90 000 residents per day, with over 2 250 toilets in 2019 (Sanergy, 2019_[15]). The estimated total annual cost of both the for-profit and non-profit business was estimated to be approximately USD 1.5 million in 2017. Only 19% of total costs or USD 290 000 were recovered via fees from operators or the sale of reuse product. In terms of the for-profit arm, from March 2016-17 Sanergy has sold approximately 550 tons of soil fertiliser equivalent to about USD 220 000 (World Bank, 2019_[16]). The cost of waste collection from January to April 2017 was between USD 0.06 to USD 0.07 per kilogram – approximately double the amount charged to the non-profit arm for collection. An average of 13 tons of faeces and urine combined was collected per day in the first quarter of 2017 and revenues were equivalent to 40% the cost of processing (World Bank, 2019_[16]). Sanergy is currently developing the use of black soldier fly larvae to produce animal feed on an industrial scale. The enterprise intends to expand its operations significantly to over 13 000 toilets in 2023. It is estimated this expansion will take 7 years and with increasing cost recovery will reduce the per person subsidy for the toilets from USD 19 to USD 2 in 2020.

Source: (World Bank, 2019_[16]), Evaluating the Potential of Container-Based Sanitation: Sanergy in Nairobi, Kenya, <http://documents.worldbank.org/curated/en/661201550180019891/Evaluating-the-Potential-of-Container-Based-Sanitation-Sanergy-in-Nairobi-Kenya> & (Sanergy, 2019_[15]), <http://www.sanergy.com>

3.3. Blended finance instruments and mechanisms for financing small scale off-grid sanitation

Research, interviews and case studies undertaken for this report indicate that opportunities for blended finance transactions are often limited at this stage, with many development actors focusing on helping enterprises scale and become investable.

Grant funding dominates the development finance approaches in the subsector. Philanthropic organisations like the Stone Family Foundation (SFF) provide risk capital to enterprises providing off-grid sanitation services. For example, SFF has provided USD 2 million of grant funding for the non-profit arm of Sanergy from 2016-19 (The Stone Family Foundation, 2019_[17]). Indeed, the majority of funding for the non-profit business arm which provides and installs toilets comes from 15 family and corporate foundations (World Bank, 2019_[16]).

Grant funding can indeed support the scaling of new and innovative business models. Loowatt received funding to pilot and scale the operation of its waterless toilet from the Bill & Melinda Gates Foundation (BMGF), initially as part of the “Reinvent the Toilet” initiative in 2011 and received a further grant from the foundation of over USD 1.2 million in 2013 (Bill and Melinda Gates Foundation, 2018_[18]). This provided the company with funding to develop the technology, attract further funding and undertake a successful pilot of the waterless public toilets. An important part of Loowatt’s growth has been through working with utilities to deliver whole value chain CBS. In 2016, Loowatt began co-operating with utilities in both the UK and Madagascar. The success in Madagascar and London allowed Loowatt to participate in the pilot scheme

for Laguna Water in Manila funded through the Urban Sanitation Challenge (see Box 3.2). Loowatt was subsequently tendered to provide bulk toilets to the utility.

Grant funding is also relevant for project design, research and feasibility studies. For example, a USD 1 million grant from BMGF was influential in helping the Centre for Policy Research in India to provide reports and technical assistance to the state and local government in Maharashtra. This ultimately led to the development of a USD 30 million sewerage treatment plant project in Udaipur, funded by the private company Vedanta and built on government land.

In addition, USD 1 million grant funding from BMGF along with technical advice and research from the Centre for Environmental Planning and Technology (CEPT) University Centre for Water and Sanitation were critical to the municipal government agreeing to implement integrated faecal sludge management pilots. The grant enabled CEPT to undertake the prerequisite research and provide assistance to the municipalities on the implementation of the sanitation tax as well as the development of faecal sludge treatment plants.

Technical assistance is playing a critical role in the development of early stage of social enterprises in the subsector. For example, Sanivation, a social enterprise operating in Kenya, developed a faecal waste disposal system that transforms waste into fuel briquettes with technical assistance and grants from USAID and the US Centre for Disease Control (CDC) (USAID, 2019^[19]). The fuel briquettes produced by the technology provide a cleaner alternative to charcoal and other fuels. The CDC supported the pilot of the project in 2013 and the project received additional grant funding and technical assistance from USAID to develop and scale up operations of the FSTP.

Concessional financing is currently targeting the treatment dimension in this subsector. Sanivation is a good example of how grant funding and technical assistance can spur and develop innovative ideas so that concessional financing can be attracted. This financing can take the form of patient capital that has a long-term horizon and requires a social return in addition to a financial return (see also (OECD, 2019^[20])). In 2017, USAID's Development Innovation Ventures program provided additional funding to Sanivation to help mobilise additional finance for project growth. This funding is projected to continue until 2020 (USAID Water Team, 2018^[21]). FINCA Ventures invested patient capital in Sanivation in 2018 (FINCA Ventures, 2018^[22]). Also, Acumen patient capital to the for-profit arm of Sanergy to scale up its operations for excrement management and the production of fertiliser and animal feed (Acumen, 2019^[23]). In addition, Sanergy has attracted *non-concessional* development finance from OPIC in the form of a USD 5 million loan for a new animal feed production facility (OPIC, 2017^[24]).

Microfinance can serve as a tool to provide access to finance to access off-grid sanitation assets. An example of the use of grant funding to scale an organisation and mobilise commercial finance is the USD 240 000 grant to Gramalaya by Water.org to pilot WASH microfinancing in 2007 (Water.org, 2013^[25]) (for more information on Water.org's sanitation microfinance programme see Box 3.3). This allowed Gramalaya to develop a WASH-focused microfinance institution (MFI), Gramalaya Urban and Rural Development Initiatives and Network (GUARDIAN). At inception, GUARDIAN was the only MFI in India that focused solely on water and sanitation engaging in micro-lending to households to support the purchase of water and sanitation assets at a household level such as toilet construction, rainwater harvesting equipment and household water purifiers. As a result of grant funding, GUARDIAN was able to mobilise commercial financing from a local public-sector bank, the Indian Overseas Bank and social investors Acumen and Milaap (Share, 2012^[26]). The risk-return relationship of microfinance exposures in this area strictly depends on the project the loan proceeds are used for. As described before, the loan-financed projects are not necessarily productive investments. A study of three case studies by the World Bank in 2015 indicates that the default risk for micro-loans targeted at WASH is comparable to micro-loans for other sectors (Ikeda and Arney, 2015^[27]).

Box 3.2. Water.org's WaterCredit initiative

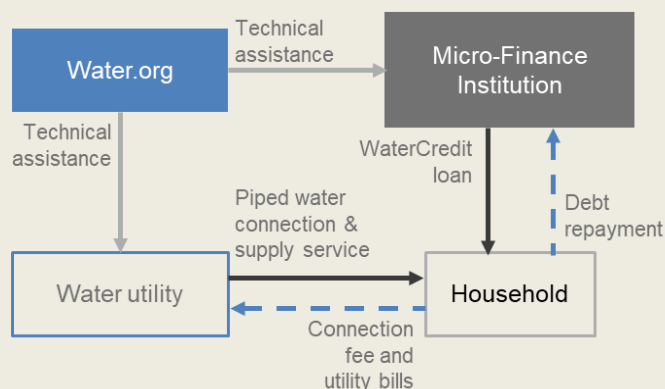
Mainstreaming micro-lending for water and sanitation

WaterCredit works with local financial institutions. 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.

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, marketing collateral, etc. – aims increasing 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 being developed. The institution is responsible for sourcing its capital for on-lending. The MFIs provide borrowers with educational materials alongside their loans. The clients then use the loan proceeds to purchase or construct the water or sanitation asset.

Institutions report to Water.org on progress against the agreed-upon targets. Verification checks that the structure was built are done on an interval basis by third parties, and Water.org staff also conduct regular monitoring visits to assess progress and provide guidance.

Figure 3.2. The WaterCredit Financing Structure



Source: Authors.

Given the small scale of most off-grid sanitation enterprises and financiers and their relatively small, tailor-made needs for external financing, *portfolio approaches* to financing a variety of such enterprises may serve as a means to mobilise commercial investment in the future. For example, WaterEquity is a fund manager conceived of and incubated by Water.org. It is now a separate entity with the purpose of mobilising commercial capital for water and sanitation financiers and enterprises in emerging markets. WaterEquity disburses loans to MFIs and, increasingly, small and medium enterprises, for water and sanitation lending. While participation in Water.org's WaterCredit programme helps to identify MFIs with demonstrable track records of operating in the water and sanitation sector (see also Chapter 2), WaterEquity investments extend beyond the WaterCredit network. As of April 2019, WaterEquity manages two funds: the USD 33 million WaterCredit Investment Fund 3 and the USD 50 million Flagship Fund

(WaterEquity, 2018^[28]). Concessional capital providers include Bank of America, providing an USD 5 million loan with zero interest rate (America, 2017^[29]), OPIC providing in total USD 20 million, as well as the Conrad N. Hilton, Skoll Foundation and Osprey Foundation (OPIC, 2019^[30]).

Further pay-for-success instruments are such as *Development Impact Bonds (DIBs)* are being explored. In 2018, the first sanitation impact bond was launched in India. Initially the bond started with a pilot phase of EUR 5 million but aims to raise EUR 100 million from institutional investors in three years (Dutch Water Sector, 2018^[31]). The funds raised from the bond will be on-lent to Indian MFIs that will then disburse sanitation loans to households for the construction of toilets. The partners of the bond include Dutch institutional investors, Actiam a Dutch impact investor, KMPG, Waste and Indian MFIs. MFIs will repay investors, including a small a financial return provided by Actiam (Dutch Water Sector, 2018^[31]). A result-based financing element is incorporated: if the targeted level of 1.5 million toilets is reached, the MFIs will be rewarded with lower interest rates. It is, however, important that increases in household toilet provision is linked to complimentary interventions such as faecal sludge treatment systems.

Projects exploring the potential of other pay-for-success instruments in water and sanitation such as social impact incentives (SIINCs), which directly reward high-impact enterprises with premium payments for achieving social results, are also currently being explored by the Swiss Development and Cooperation (SDC) Agency and Roots of Impact (Waterpreneurs, 2018^[32]). However, currently the use of pay-for-success instruments in the water and sanitation sector are for the most part in the project development stage.

Social Finance is currently undertaking feasibility studies into the potential use of the DIBs to fund non-networked sanitation treatment of faecal sludge (Social Finance, 2018^[33]). There still often remains a challenge that poorer households in developing countries cannot afford collections and fees, and as a result only sludge that is created by households who can afford to pay for it is treated. The creation of DIBs creates an opportunity to change incentives to ensure that poorer households also have access to faecal sludge services while it also remains profitable for businesses that operate faecal sludge treatment processes. Similarly, the success of pay-for-results contracts for small companies to undertake scheduled desludging in the Indian towns Wai and Sinnar has led to research and discussion with CEPT University, Social Finance and impact investors about the potential for DIBs to be used to scale up services. Research and discussions into the potential of DIBs in this area is ongoing.

3.4. A typology of investors in small-scale off-grid sanitation

Foundation and venture philanthropy are providing grants, technical assistance and concessional finance to help service providers reach scale and transition towards a sustainable business model that attracts the private sector. The major philanthropic funders of the water sector primarily focus efforts into subsectors that address drinking water supply, sanitation services and related research. But, they also fund water projects that relate to livelihoods, conservation, disaster relief, policy and administration and health education. BMGF is a frequent outlier in terms of funding, supporting only urban sanitation-related efforts. In comparison, the Coca-Cola Foundation places a larger focus on environmental elements with funding for river basin development and water resources conservation.

Non-governmental organisations like Water.org also active in the subsector. Water.org provides technical assistance and grants to MFIs to enable them to expand existing sanitation loan portfolios or develop new sanitation loan products to low income households. For example the WaterCredit initiative (explored in greater detail in Box 3.2) encourages the disbursement of microloans earmarked for water and sanitation projects by covering the costs of the project preparation phase.

Development agencies as USAID or the Swiss SDC provide grant funding for innovative business models in the sanitation sector.

Social and impact investors who aim to achieve a social as well as a financial return are a source of finance that could potentially be mobilised further. Many impact investors already have investments in the WASH sector. Examples of impact investors active in the subsector include FINCA Ventures and Acumen. According to the Global Impact Investing Network's (GIIN) Annual Impact Investor Survey 2018, a quarter of impact investors surveyed invest in water and sanitation. However, in terms of volume, this represents only 4% of total assets under management – an equivalent to USD 9.12 billion. In addition, a group of impact investors and entrepreneurs have convened to form Waterpreneurs and have created a platform, Innovate4Water, to bring together social enterprises, entrepreneurs and small and large scale investors to invest in water and sanitation. Innovate4Water is working as part of the Accelerate2030: Access to Clean Water and Sanitation formed by the UNDP and Impact hub. Accelerate2030 works to scale up the impact of social enterprises working to address the SDGs 6 (Accelerate2030, 2019^[34]).

Development Finance Institutions (DFIs) such as OPIC provide non-concessional development finance to mobilise private capital. Thus far, DFIs have focused on the business models or areas that have clearer revenue streams such as wastewater treatment that leads to the production of energy or animal feed that can be sold, as in the case of Sanergy, for instance, as highlighted the previous section. This is in line with DFIs' ambition and mandate to be profitable and financially sustainable. At the same time, DFIs could explore blended concessional finance models that aim at scaling holistic business models that integrate activities across the sanitation value chain. Scaling inputs – the non-profitable sanitation services – to ultimately achieve higher revenues from the fertiliser/animal feed production could be financed by blended models that combine different return expectations.

Corporates can contribute to the development and scaling up of off-grid sanitation and whole value chain approaches to sanitation, though not necessarily by investing at commercial rates. Indeed, Unilever, Veolia, Kimberly Clark, and Firmenich are part of the Toilet Board Coalition (TBC) launched in 2014 alongside the World Bank, USAID, the Department for International Development (DFID), AFD, Water.org and others (Toilet Board Coalition, 2019^[35]). TBC is a business-led platform that seeks to enable private sector engagement in the sanitation sector by connecting large and small companies. TBC launched an accelerator in 2016 to scale up innovative solutions to sanitation and whole value chain approaches to sanitation. Thus far, the accelerator has helped over ten social enterprises including Sanivation and Sanergy. Beyond this, commercial finance from actors such as banks or institutional investors is largely absent for off-grid sanitation services thus far.

3.5. An assessment of the sustainable development impact

Projects and enterprises providing off-grid sanitation services can have a direct impact on improving water and sanitation outcomes in areas or for people who do not have access to sewered sanitation. Social enterprises that provide CBS solutions can have a positive impact on the health and hygiene of the households and communities they serve by safely sealing excreta and removing it for treatment. Improved sanitation delivers multiple benefits such as lower disease burden, healthier living environments and social and economic gains more broadly (World Bank, 2019^[16]). CBS solutions can provide safe services comparable to flush toilets and the products of whole sanitation value chain models were also found to be safe (World Bank, 2019^[16]). In addition, the Container Based Alliance is working to adopt the World Health Organisation's Sanitation Safety Plan. In contrast to pit latrines, CBS solutions can still be used during floods.

While the current scale of CBS solutions is small, they are an elementary part of a portfolio of solutions in urban areas to provide city-wide inclusive sanitation. In particular, in water scarce areas and areas where little space is available, CBS can offer relatively affordable sanitation solutions. That is, revenue models that charge a fee for toilet use or collection offer more flexible repayment plans, with monthly repayment

schemes that can smooth costs out overtime for users and hence increase accessibility (World Bank, 2019^[16]).

The introduction of an integrated faecal sludge collection and treatment systems produces tangible benefits for households, the community and the environment. For instance, in the case of the municipalities Wai and Sinnar in India interventions resulted in increased access to such desludging services for 1 500 properties. There was an acceptance rate of over 93% from households for the scheduled service. The funding of the system was sourced via a sanitation tax implemented as part of the property tax. To mitigate the impact on poorer households, the tax is designed to be progressive. As a result, smaller properties pay less. Indeed, the incremental payments and scheduled desludging has made the service more affordable to households, with some paying one-fifth of what they paid previously. The success of the Wai and Sinnar pilots has the potential to have a broader impacts across Maharashtra. Findings from the pilots will inform state-wide efforts to develop regulatory frameworks and policies to overcome barriers to sanitation service provision.

Microfinance loans to households for the purchase of onsite sanitation have potential to both increase access to finance and to water and sanitation services for low income households. Research undertaken, including randomised control trials, indicates that there is demand amongst households for sanitation products provided they can meet affordability constraints and spread the cost of investments overtime (Trémolet, Goufrane and Muruka, 2015^[36]). For example, the majority of WaterCredit's borrowers in Bangladesh have per capita income below USD 6 dollars (Water.org, 2018^[37]). Indeed, MFIs that provide sanitation loans report strong demand (Trémolet and Kumar, 2013^[38]). However, there is some concern about affordability for households to pay loans back for investments that are not productive. MFI sanitation loans can be income enhancing by potentially reducing medical expenses and days lost to illness, time saved through convenience contributing towards increase productivity. At the same time, there is no causal link to increased income, so borrowers are reliant on existing income to repay loans (Trémolet, Goufrane and Muruka, 2015^[36]). Indeed, a recent 2018 evaluation of the WaterCredit's programmes operations in Bangladesh found that of the 58% of loans used for sanitation improvements 94% of sanitation facilities were in good condition (Water.org, 2018^[37]). In conclusion, access to finance for sanitation may not be suitable for the poorest of the poor who may need to be served by traditional aid and philanthropy.

While the use and implementation of pay-for-success instruments is still at a fledgling stage, DIBs and SIINCs can provide a mechanism to increase sanitation services provided to the households at base of the pyramid. For example, currently many of the lowest income households in developing countries are unable to afford collection and tipping fees for excreta and subsequently their waste is not effectively treated. A DIB or SIINC could realign incentives by making payments dependent on increased collections or provision of services to the base of pyramid – in effect subsidising the coverage of the poorest households unable to afford sanitation services.

3.6. Subsector-specific insights

Improving access to sanitation is crucial for sustainable development. The off-grid sanitation subsector is driven by small scale businesses that are associated with relatively high risk due to rather new technologies and their need for long-term capital. At this stage, these characteristics are not matching commercial investors' preferences.

- The commercial investment perspective on small-scale off-grid sanitation is not appealing at this stage. Small, early-stage enterprises with innovative but nascent business models operating in the subsector present (1) limited capital absorption capacity and hence require commercial investment at small scale, (2) present higher risk due to partially unproven technologies, (3) underline the importance of long-term equity investment or even venture capital in order to prove and scale the business models.

- Blended finance models to unlock commercial investment have not yet emerged. Commercial finance from banks or investments from asset managers is largely absent from the subsector at present due to the aforementioned investment characteristics. Philanthropic actors such as BMGF or the Stone Family Foundation and social impact investors play a major role in providing grant funding or concessional finance in this subsector. At the same time, innovative financing models such as DIBs are increasingly explored to attract additional finance, for instance by Social Value UK.
- Grant funding appears to go to a handful of sanitation enterprises. The good practice examples of innovative business models examined in this publication are receiving funding often from a variety of different international actors. The typical innovative business model is the provision of CBS solutions that seek to address the whole sanitation value chain (e.g. have collectable waste cartridges that are processed and the resulting products sold). Thus far, CBS models have not reached scale even with grant funding.
- An observed pathway to sustainable revenue for the off-grid sanitation subsector is to collaborate with water utilities and governments at a local and national level. Procurement contracts offer the opportunity for enterprises to scale operations and provide a stable revenue source. For example, Loowatt, through its co-operation with the utility Laguna Water in Manila, is expected to receive a procurement contract for bulk sale of toilets, with the potential for sales on a larger scale in the future. Another example of a potential pathway to scale off-grid sanitation is the implementation of the ring-fenced sanitation tax in the towns of Wai and Sinnar. The partnership with state and local governments and revenues from the tax helped increase access to sanitation services by funding faecal sludge collection and treatment systems. The State Government plans to scale operations across more than 300 cities in Maharashtra.
- Another approach is to focus on end-users. Microfinance can increase access to sanitation by providing low income households access to finance. Blended loans and credit lines to MFIs can work to increase the demand for sanitation services and assets and hence indirectly support scaling of sanitation enterprises.
- Blended concessional finance can offer a pathway into beyond-grant models and help build local markets. Blended finance aims to ultimately mobilise commercial investment to increase the volumes of finance available for sustainable development. Guarantees, loan syndications or equity investment priced at market rates can be effective. A concessional element is not a conditional requirement to that respect. From a commercial perspective, what matters is whether an investment opportunity meets the commercial investor's investment criteria, regardless of concessional finance involved. In the sanitation subsector, a concessional element may work towards building the market and to help enterprises achieve scale and ultimately attract commercial finance. That is, government or philanthropic grant facilities could be blended with development or commercial actors' resources to generate investment opportunities in the long run.
- Developing holistic financing approaches for integrated business models that link the provision of sanitation services with complementary wastewater collection and treatment service could help to scale the delivery of off-grid sanitation services by attracting more commercial finance. Blended finance models may play a role in strategically valuing business models across the supply chain. This may include grants or soft term loans blended with loans at commercial rates. For example, the enterprise Sanergy operates across the sanitation value chain by providing sanitation services as well as faecal sludge treatment services. While philanthropic actors are providing grant funding for the sanitation non-profit pillar, DFIs are providing loans to the for-profit sludge treatment and reuse department. Holistic blended financing models could bring the two sides together by using philanthropic or government grant funding in blended models to support the underlying sanitation business.

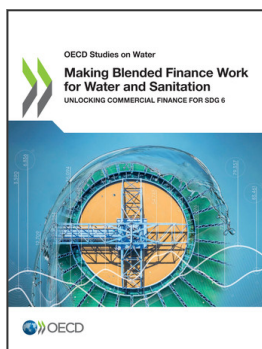
- Developing a portfolio of projects can address unfavourable project attributes. Providing commercial investors the access to a variety of different transactions in the sanitation sector can mitigate concerns around small ticket size, risk exposure as well as high transaction cost. Pooling mechanisms such as blended finance funds tailor different risk and return profiles for individual investors, with development financiers often taking first loss and junior tranches buffering the risk for more commercial investors in the senior tranches. Moreover, guarantees can strategically mitigate portfolio risk. In the sanitation market, private equity funds providing early stage capital or expansion financing could address a seemingly “missing middle” between grant funding and concessional debt financing.
- A conducive policy and regulatory framework is needed in order for small-scale off-grid sanitation approaches to achieve scale and provide clarity for investors. Unclear and underdeveloped legal frameworks can hinder the development of the market. As a result, in some cases enterprises are unable to sell reuse produce of faecal sludge (compost, fertiliser, etc.) on open markets because the necessary legal framework does not exist.

References

- Accelerate2030 (2019), *Accelerate2030 | Scaling Impact Globally*, <https://accelerate2030.net/> (accessed on 14 June 2019). [34]
- Acumen (2019), *Acumen | Sanergy*, <https://acumen.org/investment/sanergy/> (accessed on 14 June 2019). [23]
- America, B. (2017), *Investing in clean water and sanitation to address needs among world's poor*, <https://about.bankofamerica.com/en-us/what-guides-us/water-equity.html#fbid=2NfjPwAcmmU> (accessed on 14 June 2019). [29]
- Bernal, D. et al. (2012), *Key issues for decentralization in municipal wastewater treatment*, <https://hal-enpc.archives-ouvertes.fr/hal-00731140> (accessed on 29 July 2019). [9]
- Bill & Melinda Gates Foundation (2019), *Water, Sanitation & Hygiene - Strategy Overview*, <https://www.gatesfoundation.org/What-We-Do/Global-Growth-and-Opportunity/Water-Sanitation-and-Hygiene> (accessed on 11 April 2019). [2]
- Bill and Melinda Gates Foundation (2018), *Loowatt Ltd. - Bill & Melinda Gates Foundation*, <https://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database/Grants/2013/07/OPP1083134> (accessed on 25 April 2019). [18]
- Chowdhry, S. and D. Kone (2012), *Business Analysis of Fecal Sludge Management: Emptying and Transportation Services in Africa and Asia Draft Final Report Sangeeta Chowdhry and Doulaye Kone*, Bill and Melinda Gates Foundation, http://www.susana.org/_resources/documents/default/2-1662-chowdhury-2012-business.pdf (accessed on 13 June 2019). [13]
- Clean Team Toilets (2019), *Clean Team Toilet -Home Page*, <https://www.cleanteamtoilets.com/> (accessed on 25 April 2019). [12]
- Dodane, P. et al. (2012), "Capital and operating costs of full-scale fecal sludge management and wastewater treatment systems in Dakar, Senegal.", *Environmental science & technology*, Vol. 46/7, pp. 3705-11, <http://dx.doi.org/10.1021/es2045234>. [6]
- Dutch Water Sector (2018), *Three Dutch NGOs sign mondial agreement to scale up sanitation projects*, <https://www.dutchwatersector.com/news-events/news/31666-three-dutch-ngos-sign-mondial-agreement-to-scale-up-sanitation-projects.html> (accessed on 14 May 2019). [31]
- FINCA Ventures (2018), *Why We Invested: Sanivation – FINCA Ventures – Medium*, <https://medium.com/finca-ventures/why-we-invested-sanivation-cde4fc7cba9c> (accessed on 25 April 2019). [22]
- Gaulke, L. (2006), "On-site wastewater treatment and reuses in Japan", *Proceedings of the Institution of Civil Engineers - Water Management*, Vol. 159/2, pp. 103-109, <http://dx.doi.org/10.1680/wama.2006.159.2.103>. [7]
- Ikeda, J. and H. Arney (2015), *Financing Water and Sanitation for the Poor: The role of microfinance institutions in addressing the water and sanitation gap*, World Bank, <https://www.wsp.org/sites/wsp.org/files/publications/WSP-Waterdotorg-Financing-WASH-for-the-Poor-Microfinance.pdf> (accessed on 25 April 2019). [27]

- Larrea, J. (2019), *Key ingredient in the blended-finance blend: revenues*, [11]
<https://impactalpha.com/key-ingredient-in-the-blended-finance-blend-revenues/> (accessed on 25 April 2019).
- OECD (2019), *Social Impact Investment 2019: The Impact Imperative for Sustainable Development*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264311299-en>. [20]
- OPIC (2019), *OPIC Supports Two Projects to Expand Access to Safe Drinking Water | OPIC : Overseas Private Investment Corporation*, <https://www.opic.gov/press-releases/2019/opic-supports-two-projects-expand-access-safe-drinking-water> (accessed on 14 June 2019). [30]
- OPIC (2017), *Sanergy Investment Overview*, [24]
<https://www.opic.gov/sites/default/files/files/9000032207.pdf> (accessed on 14 June 2019).
- Sanergy (2019), *Home - Sanergy*, <http://www.sanergy.com/> (accessed on 25 April 2019). [15]
- Share (2012), *Small-scale finance for water and sanitation*, [26]
https://assets.publishing.service.gov.uk/media/57a08aa3e5274a27b20006cb/EUWI_and_SHARE_report_on_small_scale_finance_in_WATSAN_April_2012.pdf (accessed on 14 June 2019).
- Singh, S. et al. (2017), “Technology options for faecal sludge management in developing countries: Benefits and revenue from reuse”, *Environmental Technology & Innovation*, Vol. 7, pp. 203-218, <http://dx.doi.org/10.1016/j.eti.2017.02.004>. [14]
- Social Finance (2018), *WASH in Rwanda and Senegal*, [33]
<https://www.socialfinance.org.uk/projects/wash-rwanda-and-senegal> (accessed on 25 April 2019).
- Strande, L., M. Ronteltap and D. Brdjanovic (2014), *Systems Approach for Implementation and Operation Faecal Sludge Management*, https://www.un-ihc.org/sites/default/files/fsm_book_lr.pdf (accessed on 11 April 2019). [3]
- The Stone Family Foundation (2019), *Sanergy – The Stone Family Foundation*, [17]
<http://www.thesff.com/water-and-sanitation/urban-sanitation-services/sanergy/> (accessed on 25 April 2019).
- The Stone Family Foundation (2014), *How to Spend a Penny: 10 lessons from funding market-based approaches in water, sanitation and hygiene*, <http://www.thinknpc.org/publications/a-funder-journey/> (accessed on 12 April 2019). [5]
- Toilet Board Coalition (2019), *About | Toilet Board*, <http://www.toiletboard.org/about> (accessed on 25 April 2019). [35]
- Trémolet, S., M. Goufrane and G. Muruka (2015), “Microfinance for sanitation: what is needed to move to scale?”, Vol. 34, pp. 1756-3488, <http://dx.doi.org/10.3362/1756-3488.2015.022>. [36]
- Trémolet, S. and T. Kumar (2013), *Evaluating the potential of microfinance for sanitation in India*, [38]
https://assets.publishing.service.gov.uk/media/57a08a40ed915d3cfd00067a/microfinance_for_sanitation_in_india_may_2013.pdf (accessed on 7 May 2019).
- UN DESA (2018), *68% of the world population projected to live in urban areas by 2050*, [4]
<https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html> (accessed on 25 April 2019).

- USAID (2019), *Turning Waste into Power*, Global Waters, <https://www.globalwaters.org/GWS-Stories/turning-waste-power> (accessed on 25 April 2019). [19]
- USAID Water Team (2018), *Trying to Solve Sanitation and Energy Problems at the Same Time*, <https://medium.com/usaid-global-waters/trying-to-solve-sanitation-and-energy-problems-at-the-same-time-55e56d4e41d2> (accessed on 31 July 2019). [21]
- Water.org (2018), *WaterCredit: Catalyzing access to safe drinking water and sanitation in Bangladesh*, http://www.findevgateway.org/sites/default/files/publication_files/2019-2-11_water.org_ikea_evaluation_brief.pdf (accessed on 7 May 2019). [37]
- Water.org (2013), *Water, Sanitation and Microfinance Toolkits: Introduction to Opportunities in Water, Sanitation and Hygiene Finance*, https://water.org/documents/53/Water.org_Toolkit_1_-_Intro_to_Opportunities_in_WASH_Microfinance.pdf (accessed on 14 June 2019). [25]
- WaterEquity (2018), *WaterEquity announces the first closing of its US \$50 million impact investment fund*, <https://www.prnewswire.com/news-releases/waterequity-announces-the-first-closing-of-its-us-50-million-impact-investment-fund-300716450.html> (accessed on 7 May 2019). [28]
- Waterpreneurs (2018), *Impact Investing for Water: Innovative Finance for Scaling-up WASH Market-Based Solutions*, https://docs.wixstatic.com/ugd/2c9167_0eed97e0992c4996b1067582bb425ca0.pdf (accessed on 25 April 2019). [32]
- World Bank (2019), *Evaluating the Potential of Container-Based Sanitation: Sanergy in Nairobi, Kenya*, <http://www.worldbank.org/gwsp> (accessed on 23 April 2019). [10]
- World Bank (2019), *Evaluating the Potential of Container-Based Sanitation: Sanergy in Nairobi, Kenya*, World Bank Water Global Practice, <http://documents.worldbank.org/curated/en/661201550180019891/Evaluating-the-Potential-of-Container-Based-Sanitation-Sanergy-in-Nairobi-Kenya> (accessed on 25 April 2019). [16]
- World Bank (2019), *OBA Sanitation Microfinance Program*, <http://documents.worldbank.org/curated/en/735481552555207449/pdf/Implementation-Completion-and-Results-Report-ICR-Document-OBA-SANITATION-MICROFINANCE-PROGRAM-P157958.pdf> (accessed on 21 March 2019). [1]
- World Bank (2017), *Not All Toilets Look the Same: A Peek into Citywide Inclusive Sanitation on World Toilet Day*, <https://www.worldbank.org/en/news/feature/2017/11/17/world-toilet-day-2017> (accessed on 25 April 2019). [8]



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