WASH Waste

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One-Page Summary

We Have a Waste problem

Solid and fecal wastes in places with poor infrastructure create unsanitary environmental conditions, increasing disease and obstructing water flows. Municipalities need help with the financial sustainability of waste-related services. Some municipalities recognize that successful fecal sludge management (FSM) and solid waste management (SWM) need complementary reforms, as they have parallel supply and value chains.

This paper was originally a blog building the case that SWM and FSM can be integrated. Well-integrated FSM and SWM systems improve both value chains' overall operational efficiency and financial sustainability. Sales of waste-based reuse products (e.g., briquettes, co-compost, biogas) and recyclables from both waste systems can be essential revenue streams and are strengthened when business processes are combined. The better the waste collection, the higher the quality and quantity of waste-based reuse products that can be generated and sold.

This series was on the challenges and opportunities of waste management and the intersection of fecal and solid waste. Based on learning experiences worldwide, solid waste management (SWM) and fecal sludge management (FSM) are closely linked. It aims to demonstrate the opportunities for integrating FSM and SWM to improve our world's operations and create financial value from these chains. The sections are a collaboration by FLUSH, DalO Systems (formerly Dechets a l'Or), and WASTE.

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We have a (waste) problem

Note: The WASH sector is the segment of the international development sector focused on water service delivery, fecal waste management, and personal hygiene - hence the acronym WASH.

The collaborating authors are a mix of consultants, experts, and operators. We came together for this series because we believe there needs to be more consideration in the world about what we do with what society calls “our waste.” We find the term “waste” a misconception - solid and fecal waste can be valuable resources. If harnessed correctly, these “wastes” can become useful and even vital for helping us address our ever-growing resource needs and concerns with climate resilience... if only we could get the rest of the world to agree and act on it. As a team, we discussed the problems - and opportunities - for figuring out the world’s “waste” challenges; this log series is a result of our discussions. Our log series will start with admitting that we have a problem and will quickly shuffle into where the solutions lie and how we can transform our waste into resources and create viable business models and essential environmental and social impacts. By the end of our series, we hope you'll join us in advocating for integrating fecal sludge management (FSM) and solid waste management (SWM), creating a prosperous future full of sustainable solutions.

In rapidly urbanizing cities, the quality of the living environment is under great strain. Cities in low and middle-income countries (LMICs) need help establishing well-functioning FSM and SWM systems. In many countries, only 50% of the household solid waste is collected, resulting in the other 50% ending up in the environment or openly burned, as a strategy that residents resort to that makes the problem disappear. Also, fecal sludge, when it is collected, is often disposed of directly in the environment and water bodies, jeopardizing public health. Plastic waste makes these problems severe: thrown in pit latrines, clogging drainage systems, and complicating collection and treatment. When burned, plastic releases furans and dioxins that are proven carcinogens. Even when waste is collected and transported to a designated dumpsite, these dumpsites are often unlined and insufficiently managed. When poorly managed dumpsites spark uncontrolled fires, they can contribute significantly to local air pollution, while landfill leachate can damage important groundwater resources, especially in water-trained areas. (UNEP, Africa Waste Management Outlook, 2018)

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We have a (waste) problem

Waste can complicate things, especially in urban environments. The WASH sector is all too familiar with the consequences of having raw fecal waste out in the open - from spreading disease, damaging waterways, and the overall unpleasantness of waste if uncontrolled. Similarly, uncontrolled solid waste dumping is the most common type of waste disposal in many parts of the world; waste is widely dispersed and decomposes in the streets, which, besides being unsanitary, releases greenhouse gases. Uncollected waste doubles the incidence of diarrhea. (UN-HABITAT Solid Waste Management in the World's Cities 2010) Uncollected waste may end up in storm drains - the same drains to which toilets are illegally connected, dumping raw sewage. During storms, obstructed flows can push fecal-contaminated flood water into homes. Or, solid waste may be disposed of into pit latrines - clogging the fecal waste management system and complicating service delivery. There needs to be effective solid waste management for effective fecal waste service delivery. Kampala is a great example of this - the World Bank's city-wide inclusive sanitation approach recognized that it needed to reform SWM in the city first to succeed in FSM. As part of the fecal sludge management program, the Kampala Capital City Authority worked to increase solid waste collection in informal (underserved) areas, made provisions for dealing with fecal-contaminated solid waste, and ran an awareness campaign directed at tenants to upgrade basic toilet slabs (with a big drain hole) to a system with a minimally sized drain hole that makes disposal of solid waste impossible. (Kampala Capital City Authority, 2020)

The National Sanitation Campaign in Ghana tackles open defecation and littering. (Photo credit: Kim Worsham, FLUSH)

1

We have a (waste) problem

As mentioned in an earlier blog post, the presence of solid waste (including plastic) significantly affects the efficiency of collecting and treating fecal sludge from pit latrines or septic tanks. Case studies from Burkina Faso, Zambia, and Uganda confirmed this and found that solid waste:

1. More than doubles the time it takes to empty pit latrines;
2. Increases the chance that innovative sludge-emptying technologies fail, as high-tech solutions tend to clog easily;
3. Increases the cost and time to treat received sludge. Solid waste must be sieved out and transported to a dump site, which again takes additional operational time and costs;
4. Affects the quality of final products, such as briquettes and biogas;
5. Increases public health risks when fecal-contaminated solid wastes are placed at dumpsites.

A river in Nairobi, Kenya, overrun with solid waste. (Photo credit: Kim Worsham, FLUSH)

Plastic is the fastest-growing segment of solid waste. Traditionally, plastic has been a relatively small component of waste generated in LMICs, but this is no longer the case and includes the "Sachet Economy" (No Time to Waste 2019). These single-portion plastic sachets are used for many household products, from coffee to washing powder, and are made from a non-recyclable multi-laminate material. Moreover, historically, it was believed that solid waste is an issue limited to urban and peri-urban areas, and the rural regions have consequently received less funding to provide solid waste management services. However, given that open disposal of plastic waste can have far-reaching consequences for the receiving environment, solid waste services must be extended to rural areas, particularly for the non-organic waste that cannot be reused or recycled at the source. Solid waste pollution remains worse and more complex in urban communities; however, rural areas cannot be overlooked and are aggravated by plastic. (For a reflection piece on the miracle and plastic problem, this National Geographic article is an excellent read).

1

We have a (waste) problem

Plastic waste is troubling the worlds of SWM and FSM. The COVID-19 pandemic has taken the year 2020 by storm. It will likely (re-)shape society and the composition of solid waste with the surge in medical waste and single-use plastic packaging. Oil prices have plummeted, making it cheaper than ever to manufacture plastic (Vox article) and lowering the economic feasibility of recycling. Our waste management systems worldwide cannot keep up, and there are examples of Western governments devising plans to dump plastic waste in LMICs (New York Times article). The absence/low capacity of solid waste management to manage the growing quantity of solid waste (and plastic) is/will substantially hamper the operational efficiency and financial sustainability of fecal sludge management.

At this rate, solid waste pollution will undo any of the WASH sector's positive health impacts. What is the plan when plastic production almost doubles in the next decade (Guardian article)? How do we ensure plastic and other solid waste types are not increasingly present in pit latrines and septic tanks? How do we safeguard the quality of fecal sludge and organic solid waste from the presence of non-organics (incl. plastic) to optimize the quality and sales price of waste-based products (e.g., briquette, co-compost, biogas)? The next section will cover the potential solutions to establish a well-integrated FSM and SWM that improves FSM and SWM chains' overall operational efficiency and financial sustainability.

Dumpsite in Udaipur, India. Note the abundance of various types of plastic. (Photo credit: WASTE)

2

Source separation is waste's Achilles' heel

The term waste is given when something no longer has a purpose. Sure, waste can be burned for 'co-generation' of heat or electricity, which can be claimed to be a 'recovery of resources,' but this is a last resort. All resources, including rare earth elements, are lost during incineration - and landfilling is much the same (although there is talk of mining landfills for resources). Reuse and recycling of resources require separation of waste, perhaps better termed as 'materials' when there is value potential. When materials are separated where they are generated, there is usually the least contamination and the biggest opportunity for generating value at the source. However, source separation is really hard - it is the Achilles's heel - when done right, it opens doors and business opportunities; when messed up, it complicates reuse and recycling systems and can cause the collapse and failure of waste management systems - in particular, those waste management systems which rely on rebates/kick-backs from the sale of recyclables.

This section highlights that, to have an optimized, integrated system with SWM and FSM, the waste types must be segregated (wet from dry) and further separated (materials from each other).

Before we dig in, it is relevant to state that in this section, solid waste refers to municipal solid waste - the type of waste consisting of everyday items that are discarded by the public and, importantly, for the simplicity of this discussion, devoid of industrial wastes, medical waste, hazardous waste, or sewage sludge.

The two sides of waste separation

There are two types of waste separation that this section discusses - (1) solid waste from fecal sludge and (2) solid waste types from each other. Both are important for integrating SWM and FSM and ensuring successful business models.

Firstly, any effort to collect high-quality fecal sludge from latrine pits must be void of solid waste pieces. As discussed in the first section, solid waste significantly affects the efficiency and effectiveness of collecting and treating fecal sludge. Similarly, no waste management provider wants to deal with fecal-contaminated solid waste, whether that's solid waste content removed from pit latrines or flying toilets. Flying toilets are when people collect fecal matter in plastic (shopping) bags to dispose of fecal waste when functioning toilets are few.

The other separation of waste is within solid waste - recyclables (metals, glass, plastic, and paper), organic waste (food scraps), and residual waste (mixed plastic, diapers, etc.) should be separated to increase the value-add of recycled products that can be made from it. The composition of solid waste varies greatly by municipality and changes with time (and quickly, since plastic). There is not just one separation system because it also depends on the market potential of recyclables.

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Source separation is waste's Achilles' heel

The best results for quality organic municipal solid waste is separation at the source and involves preventing contamination of materials, including plastic, glass, metals, paper, and general waste. The first level of separation is 'waste segregation,' which divides waste into dry (non-organic) and wet (organic) streams. While waste managers can create additional income from selling recyclables, this section makes the case that the one thing of value to do right is to segregate the organics from non-organics. A clean organic stream creates opportunities for composting, co-composting, biogas digestion, briquettes, and much more. The art is in understanding society's trigger point for behavior change.

Losses from not segregating wet waste from dry

Unsegregated solid waste impacts many aspects of a waste business - solid waste and fecal sludge. Impacts include:

- **Quality**: Mixed, unsegregated solid and fecal waste lowers the quality of waste (because it's contaminated) for processing and further treatment, lowering the quality of the final product and making the final product less valuable in price.
- **Quantity**: Inefficient waste collection reduces the quantity and, thus, the amount of end-product and how much money can be generated through revenue.
- **Cost & time:** Mixed waste requires more time and labor for separation at waste facilities, which increases operational costs, lowers production, and ultimately decreases revenue.
- **Revenue**: Mixed solid waste contaminates recyclables with organic solid waste, either lowering or eliminating its market value.
- **Occupational health and safety:** In many countries, separating organic solid waste is hazardous by hand. As a start, few gloves are actually (needle) puncture-proof. Diseases like Hepatitis B and others are common among waste workers. This is in a blog about medical waste and the hazards to workers.
- **Environmental and human health:** Contamination of heavy metals, pharmaceuticals, and microplastic in either waste stream threatens not only the quality of the final product but also increases the risk of these contaminants entering the food chain. Food contamination hurts human health and can negatively impact people's well-being and public health.

Missing the opportunity for segregation or even further separation can waste valuable resources. Organic waste not segregated from non-organic waste ends up - at best - on a controlled dumpsite or is incinerated. At a dumpsite, it often degrades anaerobically (which means without oxygen) and can contribute to greenhouse gas emissions. Incineration isn't an energy-efficient solution either; given the wet nature of organic waste, it takes a lot of energy to burn and lose valuable nutrients. Segregation is the first step to diverting valuable resources from landfills and other final disposal mechanisms.

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Source separation is waste's Achilles' heel

Wins from waste segregation

Fecal sludge reuse initiatives require high-quality organic solid waste so that the waste-to-value end-products (e.g., co-compost, briquettes) have some market value. Separating solid and fecal waste at the beginning also reduces the contamination of potential recyclables - increasing their marketing possibility and value.

Segregation of solid waste at the source significantly improves localized solutions and how waste is efficiently collected and maximizes how well we can create recovery options for solid waste (both organic and non-organic) and, consequently, fecal sludge. (Ricci-Jungensen and Ramola, 2020).

Fecal sludge is often just a fraction of the total organics for co-treatment processes. For example, it is usually 3:1 for municipal organic waste to dry fecal sludge in co-composting systems. This presents an interesting value proportion: (1) fecal waste can be sold as an add-on to organic waste treatment processes, and (2) solid waste can be presented as a solution for the more efficient and nutrient-rich treatment of fecal waste. The cleaner the incoming material, the more efficient the operation, and the better the quality of the final product.

In the Nilgiris (India), waste management sites process both fecal sludge and solid waste to make a co-compost. The co-composting plants have been in operation for four years. On-site, there are constructed wetlands and solid waste separation piles. The plant employs approximately 11 people, primarily separating the non-organics from the organics, which is the most time-consuming and challenging step of the co-composting process. As such, the program's efforts have focused on rolling out source segregation awareness campaigns, with better results and quality organic food waste from markets, carrot processing factories, schools, restaurants, and hotels. (SWFF - WASTE Performance Evaluation Report, 2019)

A side note - co-compost is a compost enriched with nutrients from fecal waste - specifically nitrogen and phosphorus - which are important for plant and root growth. Co-compost is a really good fertilizer and soil conditioner. At the same time, co-compost uses nutrients that are often discarded and otherwise lost to the environment, where they can contribute to algae blooms.

A bag of co-compost for sale (Photo credit: WASTE)

2

Source separation is waste's Achilles' heel

Tips for successful waste segregation programs

Behavior change campaigns don't have to be costly to be effective but must be clear and easy to understand. In Udaipur, India, since 2018, households have segregated waste. The "My Waste, My Responsibility" campaign's success is attributed to its simplicity: household segregates dry and wet waste. The message was clear: wet refers to any food scraps, and its reference color is green; dry is everything else and is marked by blue. The waste gets collected daily with a strict schedule. The program relied on waste workers working with households to correct segregation mistakes in real time. (SEGREGATE: How to make it work for SWM, 2020). The message to segregate at source needs to be repeated through different channels. Furthermore, participants must understand the reasons behind segregation at source and what happens with the sorted materials.

Don't waste all the behavior change efforts! One common recurring mistake is the failure to establish agreements with buyers of sorted materials. The result: sorted materials (whether organics or recyclables like plastic, glass, and metal) end up mixed at the dumpsite anyway - this is futile and wasteful. It also reduces the waste operation's ability to create recycling business models and erodes trust between the community, manufacturers, and governments.

Use regulations to enable change and sustainability of waste programs. The Commercial Organics Waste Ban in Massachusetts, USA, is a good example. Under this ban, businesses and institutions that generate one ton or more of food material per week for disposal must divert that material from disposal to other uses. Businesses include larger food-centered businesses like supermarkets, catering operations, universities, and food processors.

Design your waste management system to fit local needs and budgets. Technologies used in solid waste management must be affordable for the operator (public or private) to ensure system operations continuity. Revenue generated along the solid waste management chain (e.g., collection fees, contamination fines, sales of products) should be able to cover the operational costs. (We'll share more about sustainable business models in the upcoming section).

LEFT: Workers sorting household solid waste at a co-composting plant in Nilgiris, India.
RIGHT: Door-to-door waste collection truck with two compartments in Udaipur, India (wet and dry waste). (Photo credits: WASTE)

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Source separation is waste's Achilles' heel

Tips for successful waste segregation programs

Hold manufacturers and brand owners accountable for consumer waste. Waste management's social, environmental, and financial burden has fallen to the public. Municipalities often need help to cover the operational costs of waste management systems, public campaigns, and cleanup efforts. When discussing household or consumer behavior change, it is important to design user-friendly systems so consumers can participate. Still, it is equally important (if not more prudent) that manufacturers do their part to reduce and manage consumer waste. The Extended Producer Responsibility approach is one such mechanism with brand owners and manufacturers covering collection costs, transport and treatment, cleanup of litter, and awareness-raising campaigns.

Integrate informal workers and value their rights and safety. Integrating self-help groups into waste management models - when done right - can be cost-effective and an opportunity to value waste pickers with fair wages and workers' rights. In Pune, India, waste pickers can be a member of a Trade Union, which means they have recognized rights and a body of many members to advocate for improved workplace practices. In the Nilgiris and Udaipur, self-help women groups were integrated into the operation of waste treatment plants.

Solid waste segregation (wet from dry) should be mandatory; public, private, and government participation must make this happen. How do we ensure plastic and other solid waste types are not increasingly present in pit latrines and septic tanks? How do we safeguard the quality of fecal sludge and organic solid waste from the presence of non-organics (incl. plastic) to optimize the quality and sales price of waste-based products (e.g., briquette, co-compost, biogas)? The next section will cover circular economy business models that can establish a well-integrated FSM and SWM that improves FSM and SWM chains' overall operational efficiency and financial sustainability.

Read more about the source separation of household waste in Udaipur, India, on WASTE's site.

Workers at the zero waste center in Udaipur, where a self-help group was integrated into plant operations, and workers receive a waged salary. (Photo credit: FINISH society)

3

How to Build an Integrated Circular Economy Business Model

Many municipalities need help to ensure the financial sustainability of public services, like FSM and SWM. Even with Public-Private Partnerships (PPPs), getting the contract and financial structure right can take several iterations. Sales of waste-based products (e.g., briquette, co-compost, biogas) and recyclables (glass, metal, paper, plastic) can be an essential revenue stream for financial sustainability. This section makes a case for a reuse and recycling business model and service integration. This section is particularly long - the longest in this series - but detailing the business model of integrating waste reuse and recycling services is critical to showing the WASH and solid waste sectors its value.

For this series, we focus most of the discussion on areas that may still need full sewer coverage and have fecal waste stored on-site (either in pits or container-based toilets), and treatment facilities still need to be made available. Similarly, concerning solid waste, we focus on places where solid waste management needs to be more robust - both in terms of collection and treatment. These may be areas where uncollected waste piles up on the street, and the local dumpsite disturbs the community through smell and smoke from uncontrolled fires and contaminated runoff. Fecal waste collection can happen in tandem with solid waste. Developing a similar business that works in sewered communities may be possible.

The fecal sludge reuse aspect of the business would likely need to be based on a partnership with the local wastewater treatment plant to collect the biosolids for further reuse, making the customer base both a household and a treatment plant. Similarly, the solid waste business's reuse aspect likely needs to partner directly with local fertilizer companies or farmers to sell compost or go-betweens accumulating recyclables. Businesses can tailor models better based on the general one we share.

Value Proposition & Activities

By integrating FSM and SWM services for customers at the household level, businesses can create a fundamental value proposition for customers - their living environment becomes suddenly filth-free and more hygienic, keeping them healthier and improving their quality of life. While many assume that households will not pay for the services that improve their quality of life, the experience at *Dechets a l'Or* and with numerous waste operators proves this false. Most customers speak of the importance of cleanliness and comfort because they are willing to pay for waste services. In this series, previous section discuss how these two waste streams cause community problems and the similarities between the value chains for solid waste and fecal waste. A business's value proposition can be customized to include innovations and special focuses on customer service, performance, efficiencies, and convenience - you get the idea - depending on what the business and its customers value the most.

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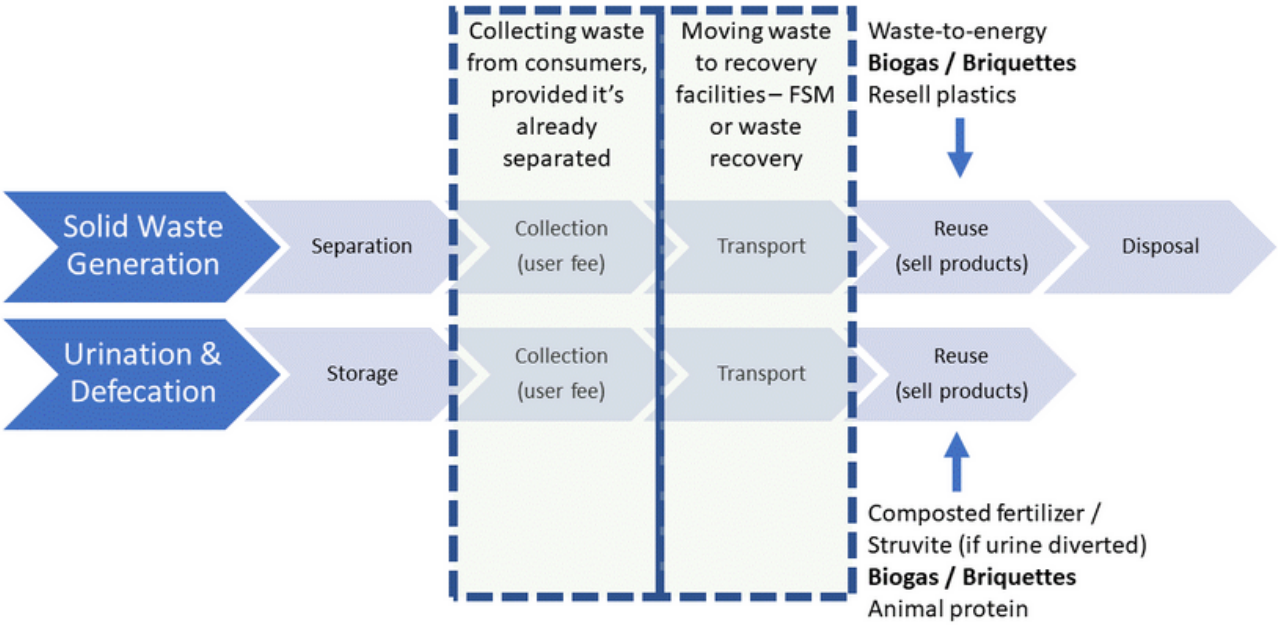
Also, from a municipal level, providing a bundled, unified effort to clean up waste allows local governments to address two public issues with one partner. For customers, one service provider collecting fecal and solid wastes clarifies service and enables planning. Fecal waste removal is a costly activity once every two or three years. Prepayment models exist, such as a portion of property taxes (an example exists in Wat, India). As the operator can collect and transport waste to their centralized recovery facilities, it would enable cost savings and flexibility in planning. See the graphic below.



Operators can select end-products tailored to the local area for cost-effectiveness and market potential. The buyers of waste-based products (e.g., co-compost, briquette, biogas) can benefit from either cost savings for products they need, improved revenue from more energy-efficient products, or both. For example, co-compost is a nitrogen-rich compost made from fecal sludge and solid waste that can be applied to improve agricultural soil for farmers. Based on Nilgiris, India's experience, the farmers save money by buying less chemical fertilizers and irrigation fuel while increasing revenue from improved crop yields (SWFF - WASTE Performance Evaluation Report, 2019). Reuse products have some market risks, which we describe further below.

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How to Build an Integrated Circular Economy Business Model

Value Proposition & Activities

The business needs several resources to manage this kind of work. A list of essential primary resources for both solid and fecal waste would include:

- **A fleet of collection vehicles.** Large trucks can carry segregated solid waste from communities to facilities, including a materials recovery facility (MRF). Smaller, more agile vehicles can pick up waste from places with narrow and unpaved roads and bring them to bigger transfer points, where larger trucks can safely collect the aggregated waste. For the collection of fecal sludge, specialized vehicles can move it around.
- **Human labor.** Here is an opportunity to increase employment as a waste collection is a labor-intensive sector. The three most critical roles: are collection, transport, and sorting for the waste from households to facilities, with employment opportunities at every step. Treatment and processing for managing the waste at the reuse facilities. Both groups would need PPE for safer working environments and protect them from potentially hazardous waste and conditions. (Eline wrote about sanitation workers' exposure to hazardous conditions). There would also need to be customer service representatives and administrative support to monitor service, engage with customers, and collect a payment, all necessary to keep the operation running.
- **Land.** The reuse and recycling facilities would need land for operation. A promising option would be to have the local authority provide land (perhaps through a PPP) to lease an operator. The campus can hold different reuse types based on the fecal or solid waste collected and chosen technologies for reuse.
- **MRF.** The solid waste's actual sorting into recyclable fractions (glass, metal, paper, plastic) and processing of the organic waste with the fecal sludge occurs in an MRF on the operating land. The processes can be manual or semi-mechanical.
- **Finance.** The reuse facilities will, of course, need finance. This could come through partner organizations' investments - whether the government or an angel investor - or through commercial loans and grants. Most finance partners and resources will likely cover capital projects, but there may also be a need to get finance to support the facility's running for the first few years before it breaks even.

A key partner for any business dealing with the movement and treatment of waste would be the government, preferably the local one. The government can help regulate the work, and provide the needed licenses and permits for collection and transport. It can offer designated space for the reuse activities that would be part of this business. The ideal model would be a PPP where the government provides the land and permits in-kind for the business to manage the municipality's public works or provide service-level agreements with service providers for their jurisdiction.

3

How to Build an Integrated Circular Economy Business Model

Customers

The integrated reuse and recycling business must consider two types of customers - the waste generators from whom the company collects and reuse, and recyclables buyers who want the new value-added end-products.

Some businesses may focus on higher-income communities that can pay more money. Others may target low-income communities that can have their services subsidized by higher-income groups or government support. Others may even focus on businesses and commercial entities like hotels and hospitality groups. Perhaps a company targets a mix of different customer segments, providing various services for its customer groups' diverse needs. Social enterprises like Sanergy currently have two customer bases for their fecal waste and solid waste collection services - low-income informal settlement households pay for fecal waste collection services. In contrast, larger commercial businesses pay for solid waste collection, particularly organic waste used within the fecal sludge reuse process.

The end-product customers would vary depending on the products developed in the reuse and sorting process. For co-composted fertilizer, farmers and farmer cooperatives would be the key customers. For biogas and briquettes, perhaps industrial producers may want the products for their energy. For plastic and other recyclables, resellers who wish to refine the waste for making new products like sneakers, roofing tiles, and toilet slabs, would be key.

ECOPOST and ECOTYLE in Kenya produce beams, poles and roofing tiles out of plastic waste. (Photo source: WASTE)

3

How to Build an Integrated Circular Economy Business Model

Revenue Streams

Two revenue opportunities exist for a reuse and recycling business model for FSM and SWM - collecting waste and reusing reused products and recyclables. Businesses can charge twice for the same pile of waste and two different customer segments. The beauty of integrating reuse for fecal sludge and solid waste is that there are ways to package the collection services together to develop multiple revenue streams. Depending on the business, customers can pay in some different structures, where their waste collection services are in the one fee they pay.

With generating revenues from collection fees, the business can also make money by selling reused products and recyclables (glass, metal, paper, plastic). The rule for this revenue stream is - the cleaner the different recyclable waste streams are, the higher the price buyers are willing to pay. This process can generate more revenue if the business processes secondary raw materials (flakes, lumps, pellets) sold to the plastic manufacturing industry. A caveat about this revenue stream is that it can be complicated to manage and tricky to make financially viable in many settings. In particular, businesses may need help finding demand and customers for the kinds of plastics collected from households. While recycling buyers exist in West Africa, only some are sourcing recycled plastic because other, better choices are available.

Revenue models for solid and fecal waste operations are very similar, making bundling these services with one fee model for customers using both services easier. Some revenue options could be:

- **A subscription fee:** Customers pay the same recurring charge for services.
- **A pay-as-you-go fee:** Customers pay once they call and receive services. This model could be further broken down - do customers want to pay based on the volume of waste collected or the collection frequency? Is there a hybrid model that could work to manage how many services people get?
- **A group fee:** Customers living nearby can pay discounted rates if they coordinate their collections. This could lower logistics costs for the company, which could also help customers pool money and make the services more affordable.
- **A sliding scale fee:** Customers pay based on their income and type of customer (e.g., individual households versus hotels). This way, companies can build a customer segment pricing structure that can let lower-income customers have subsidized fees, allowing them to get the same services.
- **A hybrid payment model:** A single operator collecting solid and fecal waste would allow customers to pay installments to collect fecal waste. As some customers would need fecal waste collected less frequently than solid waste (e.g., every twelve months), clients could pay a regular solid waste fee separate from a less-regular installment of fecal waste collection payments. This system would offer the operators access to greater monthly recurring revenue that isn't reliant on the actual provision of fecal waste emptying services.

3 How to Build an Integrated Circular Economy Business Model

The question is - how will the collection customers pay? We'll look into that more in the next section. Some customers may be unable to afford the fees to make their service financially viable for the company (see graphic below); having bigger customers like industries can help cross-subsidize the revenue. Businesses can also work with municipalities to receive operating cost contributions from municipal taxes.

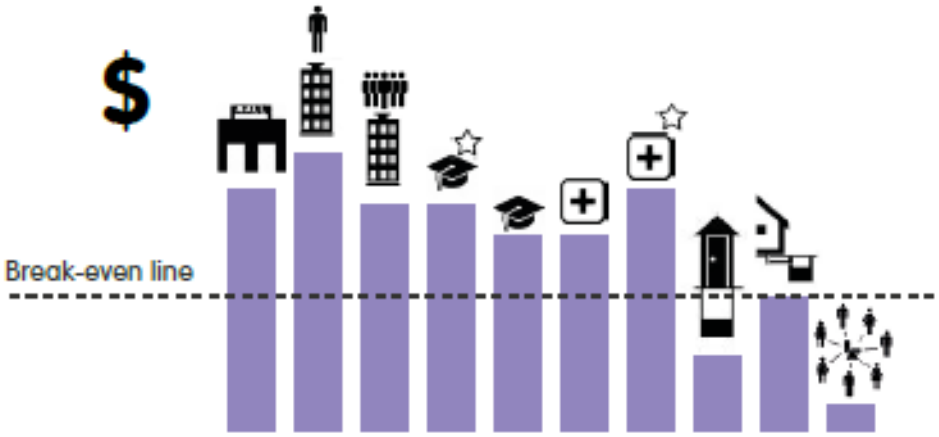


Figure 14 Sample pricing differentiated by property and sanitation type
Source: SNV, 2016b.

Once the waste is collected and treated for reuse, the other revenue stream(s) can be about selling the reuse products, including recyclables, co-compost, briquettes, and biogas recyclables. Again, depending on the type of product(s) created, the customer segment wanting these products, and the dynamics between the supply and demand of these end products will help dictate the pricing structures that make sense. For example, having compost fertilizer during harvest season may be worthless to farmers compared to during the sowing season. Otherwise, a volume-based pricing structure may be the ideal way to price out the end products for customers and make the revenue stream simpler to manage than the collection revenue.

3 How to Build an Integrated Circular Economy Business Model

Key Operating Costs

A good business model also keeps its operating costs as low as possible. Once capital costs are spent, how much will it cost to run the business over time? We know that the business would need to cover many costs no matter what the nuances are, and we have listed them below:

- **Personnel & labor costs:** What would be the labor cost needed to run the business? For the Devanahalli co-treatment plant, the fecal sludge treatment part is gravity-based does not require electricity, and only one operator can run it. Solid waste collection is more labor-intensive: the business needs people to collect the waste, transport it, refine and process it for reuse, and then manage operations. Labor is likely the largest expense. Operators must weigh a lean team with minimal staff and sufficient hands to ensure output quality. S2 briefly talks about the importance of fair wages and worker rights and iterates that fair wages and safe working conditions often ensure worker engagement and reduce turnover.
- **Skip points & transportation:** Transportation costs will also be a key regular variable- including fuel and maintenance. Skip points would also cost money to maintain but, if strategically placed, could reduce transportation costs, especially if the skip points can aggregate waste manually.
- **Processing & cleaning:** Once the waste gets to the reuse facility, there are waste processing costs before the reuse process begins, including cleaning and checking the quality of products. Where municipal solid waste segregation is incorporated into the business model, it is often the most costly activity, like in Kumasi, Ghana, where it is 30% of operation and maintenance (O&M) costs.
- **O&M:** Let's not forget that whatever reuse business is running, there will always be some costs for O&M. This could include facility capital repairs, buying of replacement parts, laboratory testing, and other larger things that need to happen over time in any facility.
- **Administration:** A reuse business has administrative costs to consider - from controlling the finances to operations management to procurement. Key administration costs worth noting are those needed to manage marketing and sales (the nonprofit world may call "sales" awareness building and outreach). Marketing and sales take up about 5-10% of a company's budget and are critical to getting more customers.
- **Refining:** The reuse process may require technologies and techniques to succeed. Think conveyor belts, greenhouses, industrial ovens, and climate controllers—the more sophisticated the reused product, the more complicated and costly technology. For example, Waste-to-Energy facilities are cost-intensive, but they may make the most business sense for investments. The question then, too, is how much it would be to maintain these costs.

3

How to Build an Integrated Circular Economy Business Model

Risks

Congratulations - we're almost ready to have a business! Let's talk about financing for a second, though, since financing is critical to running any business, no matter where you work. Financing comes in myriad forms - government grants, commercial loans, andbriefly equity financiers. Which ones make sense for an integrated business that includes FSM and SWM?

It depends on the risks in and around the business from its unique risk factor that financial institutions assess to determine what funding they're willing to give. The riskier the business model and its environment is, the less likely private finance (e.g., debt and equity) will offer support.

A few critical aspects that can influence the business's risk should be considered:

- **Finance:** Do you have the financial resources or support to start this business and keep it running while it loses money for the first few years? Many businesses start and fail quickly because there isn't enough capital to pay for the running operations' upfront costs while growing.
- **Management:** Do you have the right leadership team to run a business and push it forward from the beginning? Like it or not, the business leaders' makeup and capacity are critical to the business risk.
- **Economies of Scale:** What is the potential to scale the business to hit economies of scale and accelerate its financial viability and profitability? Companies that are too niche for a specific geography or an unusually small cohort are risky for investors. One pain point articulated by a retired accelerator called Hatch CoLab is that many businesses in the social impact scene - particularly in water and sanitation - tend to be hyper-focused on a particular geography. This limits the opportunities for scale and high risks for investors keen to see profit growth. Integrating FSM and SWM can offer scalable business models, but the leadership must apply them in different places.
- **Market**: The market for reuse and recycled products may be a large barrier to entry. Recent research has highlighted that fecal-based compost has a low-value product, with revenue of only $5/person/year for collected fecal waste. Will the revenue potential be higher for co-compost? We think so, but it remains a risk. Some reuse products like briquettes may also compete with more cost-efficient competitors like diesel fuel. Though diesel is not as environmentally optimal, it may be perceived as the best economic choice in some places if the environmental and health values are not realized (Mallory et al., 2020).
- **Demographics & Consumer Willingness To Pay:** Your consumers' background, willingness, and ability to pay for your products and services are also vital for the business's risk assessment. Targeting consumers who are in or near poverty will naturally have a high risk because there could come a point where they can no longer support themselves enough to pay for your services or a time when you may be forced to price them out.

3 How to Build an Integrated Circular Economy Business Model

- **The Environment:** Climate in a region can help or hinder reuse processes - particularly those that require biological processes like composting and biogas generation. When looking at your business areas, you must understand what the climate changes and averages look like and how the technology you've chosen benefits or struggles in those environments. Also, climate change is real and hits certain regions more than others - make sure you understand the projections and how they could alter your business operations.
- **Regulations**: The regulatory environment might already have appropriate regulations ensuring proper business conduct and pollution control. Where this does not yet exist, your business should work with the local government to establish these. Regulation might include proper containment at households, licensing and regulation of private operators, and plant operating licenses. In Balikpapan, Indonesia, each service provided to households receives a unique barcode scanned again at the treatment plant to ensure safe delivery. Devanahalli desludging trucks have GPS and cameras to monitor safe delivery.
- **Government Restrictions:** The enabling environment also impacts your business risk. How easy is it for your business to work where you are? The World Bank scores countries on these things, guiding investors in understanding the risk of investments in certain regions. The same business model applied in Somalia will be far riskier than in Ghana because the environment and government capacity to support and regulate industries are different. Governments must create institutional arrangements that foster private sector engagement - that means they need to have the policies to support business and the structure to facilitate business relationships. The regulations make sure businesses know their frameworks for working. In FSM and SWM, governments can also be key in guiding tariff structures and developing PPPs to support better the private work you endeavor to start.

The ultimate goal with revenue and costs is to ensure that simple math is applied to determine profitability and positivity. The business also has to ensure its best to maximize its financial bottom line without sacrificing its other bottom lines - namely, its positive social and environmental impacts. Sanitation businesses also need to build models that can thrive in the locales where they work and be seen as supportive of public needs.

Admittedly, many public works have historically struggled to generate enough profit without subsidies and government support. Innovating the model and integrating similar waste streams could help improve profitability. Still, it will be essential to know that returns on investments (ROIs) may be lower than other industries with higher yields, such as medical services and food production. This is where financiers will consider the social return on top of the longer ROIs than other, more common business models.

4 Business Model in Practice

The previous section in this series focused on the business model for integrating FSM and SWM; this section will focus on the operations of an integrated fecal sludge & solid waste business. An operational model describes the day-to-day workings of a business and is often more detailed than a business model. Not only is it possible to integrate these two business operations, but an integrated model can be successful, given the modality of fecal and solid waste collection. This section aims to highlight the potential benefits of incorporating SWM operators as part of the broader WASH strategy and increase rates of proper disposal of both solid waste and fecal sludge based on experiences and insights from DalO Systems and WASTE.

Separated Operations by Definition

Before we dig into what the integration of operations could look like, we acknowledge that a key bottleneck to integration will be that municipal departments for solid waste and wastewater/fecal waste/sanitation are likely to be different departments which likely rarely (or never) interact. The same level of interaction - or lack thereof - will probably also be found at state and national level. What also doesn't help is the confusion around what sanitation includes. To many of us, including authorities, the Sanitation Department handles solid waste and street cleanliness, while the niche WASH sector uses a very narrow definition for sanitation, and one that does not include solid waste. In the words of WHO, sanitation also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal. This broader definition of sanitation is testament that departments dealing maintenance of hygienic conditions should integrate and at minimum talk to each other. So how do we do that? How do we integrate SWM and FSM operations?

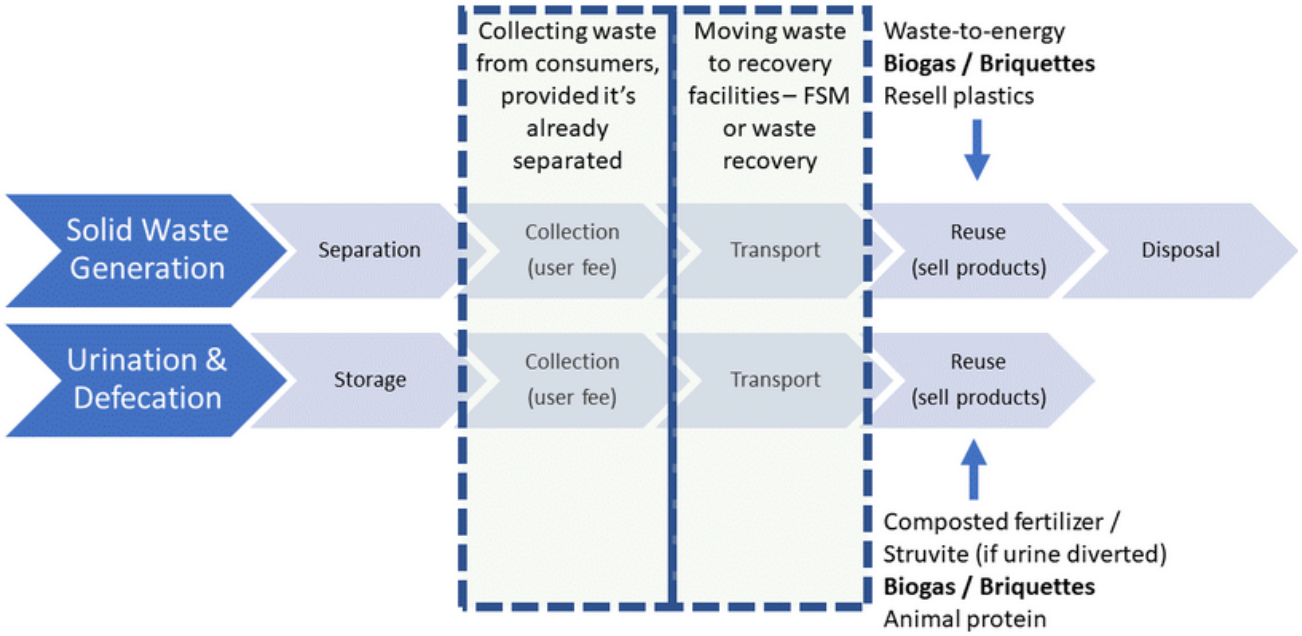
We believe that getting these departments to talk, align practices and possibly unite is a worthwhile investment that leads to operational efficiency and greater health and environmental benefits.

Integrating Operational Waste Models

In Section 3, we talk about different business models, including municipal contracts or service level agreements. Agreements where a municipal authority contracts a solid waste operator (SWO) by directly paying them, or the SWOs are expected to collect their fees directly from their customers are common. Regulation of the actual functioning of the SWOs depends on the governance strength of the municipality. A municipality may contract or permit a fecal waste operator (FWO) in similar fashions. However, the FWOs have an additional challenge as they need to identify customers and track demand. Unlike SWOs who interact with their customers at least once a week and in some countries even daily. FWOs interact with their customers only when their pit is full, which can be once every two to three years.

4

Business Model in Practice



Integration of collection and transport

The challenge and main distinction between the two operations starts with frequency of service. The figure above # highlights the similarities, and clearly shows why we believe integration on the collection part is possible. A fortunate overlap is that the problem faced by FWOs in monitoring and communicating with customers could be solved by waste operators who for several reasons already interact with those same customers. Many waste operators and municipalities spend a significant amount of time and resources on awareness creation: reminding customers of the need for separation of waste. Contamination or mixing of waste streams is a constant battle for SWM and FSM systems. The fact that SWOs have regular contact with this customer base, opens up opportunities to manage and maintain dialogue and discussions around fecal waste services.

Integration of treatment and reuse

In short it can be stated that fecal sludge treatment profits more from including organic solid waste than organic solid waste needs fecal sludge. Co-treatment of organic solid waste with fecal sludge is especially interesting to FWOs: organic solid waste can contribute to improved treatment mechanisms. A good example is that the use of black soldier flies for treating fecal sludge get hugely better results when the black soldier flies feed off of a mixture of organic material with one-third or less fecal sludge (Sarpong et al., 2019). The same is the case when using fecal sludge for biogas production,, adding organic waste, gets the anaerobic process running with higher turn out of energy. (Resource recovery from waste.)

4 Business Model in Practice

For SWOs, the interest in co-treatment with fecal sludge is slightly less, as adding fecal sludge to operations is perceived to add a layer of complexity (think regulations, hygiene and reuse). That said, but in the case of composting, adding fecal waste gives a co-compost product rich in nitrogen and phosphorus and a really good fertilizer and soil conditioner. Thus the end product is more interesting for the market and has a higher value than common compost.

Examples of functioning co-treatment systems exist in low-middle-income countries from India to Bangladesh, Ghana, Kenya, South Africa, and Haiti. In Ooty, India, under the Securing Water for Food (SWFF) program, WASTE Foundation has implemented an innovation linking the sanitation-water-agriculture nexus by producing and applying co-compost for vegetables cultivation in the Nilgiris over the course of three years (2017-2020). This co-compost is produced by women self-help groups through mixing domestic organic waste with dried fecal sludge. The co-compost sites are owned by local governments. 98% of farmers have experienced improved survival rate of crops and are able to improve their profit by 142% by reducing their expenses with reduced chemical fertilizer and improved revenue with higher yield and market price.

As for how to integrate the two sectors on treatment level depends on what is present in the city. Existing FS treatment facilities, if well constructed and managed, already have implemented processes and procedures to minimize risk from fecal sludge. (Fecal sludge can contain pathogens from a sick person that could re-infect for example). It may be seemingly easier to add-on organic waste to the production chain. However, the controls for minimizing risk from fecal sludge are not superior or overly technical and focus on minimizing contact between plant operator and the fecal waste.

Integration allows for increased value of the final product. For energy generation, co-treatment allows for higher energy output (e.g. biogas, briquettes) and for fertilizers and animal protein, co-treatment raises the nutritional content.

Recyclables such as metal and plastic won from the separation process, could bring additional revenue depending on local market conditions and availability of buyers.

4 Business Model in Practice

Integration and disposal

When using organics in the treatment of fecal sludge, whether in co-composting, biogas production, or other treatments, the number of organics ending up on the disposal site will diminish. Any waste diverted from final disposal extends the lifespan of the final disposal site. - ultimately saving money for the governmental entity responsible for the disposal site or landfill. At the same time, mechanisms might be needed to ensure safe disposal at local treatment facilities. In Balikpapan, Indonesia, each pit emptying service provided to households receives a unique barcode scanned again at the treatment plant to ensure safe delivery. Devanahalli desludging trucks have GPS and cameras to monitor safe delivery. GPS and cameras on solid waste trucks are common practices in some countries as well - often used to capture the evidence of contamination and additional charges for removal of goods and materials banned from disposal in the regular waste collection stream.

Governance and integration

The successful integration of an FSM + SWM operation might be easiest to accomplish under a structured partnership with the local municipality. Businesses can also work with municipalities to receive operating cost contributions from municipal taxes. In Kushtia, Bangladesh, the municipality raised taxes to cover the cost of fecal sludge collection and treatment and is considering further increasing and linking it with the monthly water bill. There are other examples where municipal contribution to a waste business came as a zero-cost contract to use a plot of land for operations for several years (often 10+ years). The co-treatment plant in Devanahalli has an interesting, diversified revenue portfolio, generating revenue from municipal (property) taxes, tipping fees, advertising, and the sale of compost. Interestingly, in both Kushtia and Devanahalli, the local Solid Waste Departments prepare the organic solid waste and provide this to the co-treatment plant at no cost. While free composting might be perceived as a zero-cost win, it also often means that agreements over delivery and quality of organic material need to be standardized and can have significant consequences on the nutritional value and quality of the final compost. Not integrating the cost of organic material is an error in the business model that could threaten the overall financial sustainability of the business. We discourage non-binding service-level agreements.

Many arrangements for integration are possible, including a single waste service operator that manages both solid and fecal waste services. For this kind of responsibility, the local government must have a clear sanitation plan, and service level agreements need to be clear on integrating the two activities. Communication around sanitation, hygiene, and waste segregation would fall under one department, which could create more consistency in the output of the local government.

4 Business Model in Practice

Integration and clients

Déchets a l'Or had clients who wanted to empty their septic system but had no disposal option asking him: "Why won't you take it? Waste is waste." For the clients that might seem so, but the collecting business knows that the collection methods and disposal methods differ largely. Customers do not understand collecting fecal waste when a business is only equipped for solid waste. Without the right equipment, SWOs would struggle to load waste onto a garbage truck, transport it, and dispose of it.

For the sake of the clients, the goal of integrating services would be for streamlined service and increased efficiency. As long as the day-to-day operations work, i.e., the different waste streams are serviced and customer engagement aspects are seamlessly working together, it doesn't matter how many companies are working together to make that work behind the scenes. Section 3 aims to demonstrate the many different business models for this type of circular economy.

However, such a contract can also be complex. The leading contracted company could use a customer relations management (CRM) system to support customers with waste collection services and pit latrine emptying all in one.

Take for example, Déchets a l'Or. The founder of Déchets a l'Or, Ayo, created DalO Systems to address the lack of a CRM system by SWOs in Kankan, Guinea, and Kudoti in South Africa. Initially, Ayo founded Déchets a l'Or to address solid waste collection challenges in secondary cities of West Africa. SWOs such as like Déchets a l'Or created in cities with limited municipal support or engagement need to identify customers, which typically means they have to visit households and businesses and ask if they are interested in waste collection services. This step is time and labour intensive.

In 2016, Ayo started working on a project with a software developer to manage better customer payments, which led to the creation of DalO Systems; since then, DalO Systems has become Ayo's full-time focus to create value for SWOs struggling with CRM. DalO systems aim to reduce the amount of time needed to go from initial contact with a potential customer to provide services.

Using a platform like DalO Systems, SWO agents can visit potential customers, gather household information, and localize them to their smaller accepted area. In some countries, this may be the sector in a neighborhood, while in others it may just be a neighborhood. Lastly, the agent drops a GPS pin where the household is. This data gives the SWO a detailed, organized map of all the households within a given area.

4 Business Model in Practice

This map also shows SWOs households that are ready to pay for services, interested in services but are not yet ready to commit to them, and those who are not interested. With one outreach, an SWO builds a map of customers for both solid or fecal waste collection and a map of potential customers for future outreach, removing what was previously a black box of information hindering communications between agents, collectors, and customers.

A CRM system also makes payment tracking much easier, which would really help SWOs in many LMICs that are still transitioning to mobile money payments for services. Easily tracking payments would let SWOs create prepayment programs for households who wish to pay in installments for fecal waste removal and as part of the regular payment for solid waste removal. An additional benefit of this customer database could be as a tool for the local municipality to understand their residential clusters and inform decisions on the placement of waste transfer stations or potential support provided to waste operators.

Operating Challenges

Emptying pit latrines, is often seen as a household or house owner responsibility and there are challenges around getting governments to invest in infrastructure to manage fecal waste. If the fecal sludge does not end up dumped somewhere, it often ends up in waste water treatment plants which were not designed to treat this matter. However more and more examples can be found, where governments recognize that unmanaged fecal waste poses a major threat to public health, and are making outstanding investments. Fecal waste treatment plants are rapidly being scaled in many countries, with 400 under construction in India, and 30 in Uganda (Eawag, 2019).

On the other hand, solid waste has benefited from the fact that it is grossly visible and the problems from unmanaged waste are obvious, from floods caused by clogged storm drains, and unpleasantries like vermin and rats in the city limits. It is very prominent when it piles up on street corners, river banks or other vacant spaces in an under-serviced city. As such, funding has generally been made available for the government to manage solid waste. That said, funding has generally focused on urban areas as solid waste has long been seen as an issue limited to urban and peri-urban areas. Due to the use and consumption of plastic, however, this notion has changed, and rural environments now also demand effective waste collection (Africa Waste Management Outlook, 2018). Again, it is more likely that rural governments receive funding for solid waste services than for fecal waste.

4 Business Model in Practice

To make the integration from the municipal level obtainable, it might be beneficial that municipal departments such as Health and Water Resources, who already understand the public health threat that untreated sewage in the environment presents, support the integration of SWM & FSM on an operational level.

Concluding remarks

Based on the above mentioned practical learning experiences, it is found that SWM and FSM can be closely linked with each other. A well-integrated FSM and SWM improves the overall operational efficiency and financial sustainability of both the FSM and SWM chain. The better the segregation and collection of solid waste, the higher quality and quantity of faecal sludge and solid waste-based products that can be generated (compost, co-compost, biogas, briquettes and segregated plastics for recycling).

Such circular economy model of sanitation and solid waste advances cross-sectoral impacts such as integrated soil fertility management, climate mitigation (incl. carbon sequestration in soil, creating alternative energy source) and adaptation measures (incl. improved soil water holding capacity, less reliance to centralised energy source such as fossil fuel).

5

Increasing Integrated Waste Impact: bringing it to practice

In this series, we guided readers in learning about sanitation opportunities by combining FSM and SWM in business and building more sustainable futures for our environment. In this final section in the series, we will share some of the series' key takeaways and some final ideas on where we can go from here.

A recap

From our first bloseg in the series, we learned that the world has a waste problem with both solid and fecal waste. Across the world today, 4.5 billion people lack access to safely managed sanitation and in low-income countries, only 50% of the waste is collected. Mixing the two streams hampers collection and treatment: the lack of source segregation in both FSM and SWM affects waste treatment plants' operational efficiencies, costs, and the quality and quality of produced co-compost and recyclable waste streams. We acknowledge that segregation at source is not easy, and it is difficult to achieve the participation of all residents in source segregation programs. However, we've shown in previous posts that good examples exist.

We discussed the opportunity to integrate SWM and FSM to create effective waste business models. New business models are coming up that create more value in the waste. Part of the sticking points to ensure the businesses that model integrated FSM and SWM are successful will be government policy interventions that support the work. Lastly, we shared how the day-to-day operations of an integrated waste management system would work.

Main takeaways

During our discussions on thisseries, several takeaways became evident:

- SWM and FSM are already entangled in their production and the circular economy. Integrating the business models and operations to deal with both simultaneously may improve overall waste management and financial sustainability.
- Operators have to take out plastics from both waste streams (organic and fecal sludge) to enable reuse and recycling.
- Both waste streams can enforce each other. Mixing organics with fecal matter improves the quality of recycled products (biogas or co-compost) and saves in necessary other treatment costs or disposal fees.
- The presence of plastic waste influences the efficiency of FSM and organic SWM and is therefore needed to be included in the integration as well.

5

Increasing Integrated Waste Impact: bringing it to practice

Pre-Conditions to Waste Integration

In collaboration with RWA and 3RWASTE India, WASTE Foundation conducted a study on the opportunities for integrating FSM & organic waste in municipalities called CLUES (Collaborative Local Urban Environmental Services).

Based on the results, WASTE formulated the following set of criteria as being important to set up an integrated system for FSM and SWM successfully:

- **Local Buy-In:** Known actors (local champions and decision makers) must be committed to SWM and FSM and favor the combination.
- **Sufficient Capacity:** Both sectors must have institutional and technical capacity for service delivery. For technical capacity, segregating waste into wet and dry (at the minimum) by SWM is essential for financial viability of the integrated FSM and SWM system.
- **Cooperation and Coordination:** There must be effective cooperation between the two value chains (in principle, organic waste & fecal sludge). Additionally, the municipality's existing SWM and FSM systems must function well enough to enable coordination.
- **Model Viability:** The business model has the potential for providing service delivery and selling reuse products is viable.
- **Market Viability:** This market must be financially viable The integration of both sectors will benefit the financial viability of actors of both service delivery systems.

How can you determine if your environment has these preconditions met before working on integrating SWM and FSM? WASTE developed assessment tools to measure and score the above criteria. The tool depicts the overall SWM and FSM sector in a spider web graph, measuring the state of the two sectors along each other, indicating which criteria need improvement before implementing a successful integrated approach through color coding. The total score in the spider web indicates the potential for success; if the score is below 50 (e.g., red), there is little chance for success, requiring special attention. This tool is currently being used to assess possible integrated activities in ten cities in Bangladesh via WASTE's FINISH Mondial program.

5

Increasing Integrated Waste Impact: bringing it to practice

Where Do We Go from Here?

The potential to revolutionize waste management is great. New business models and ways of integrating services open opportunities for cities and the workforce. The potential of combining FSM and SWM into integrative businesses that support circular economies provides ways for businesses to employ more people in their regions. Integrated waste management can bring in young people interested in tech, innovations, and the environment, who can take charge and become job creators while making the world more sustainable and resilient to climate change. For those who have read through this blog series, we encourage you to send us feedback and ask us questions. With your insights and support, we'd like to develop a concise report encapsulating the parts from this series that resonated most.

A few organizations are already working in the integrated waste management space, and have been for a while! We recommend checking out the great work being done in Kenya through Sanergy, WASTE's multi-country programs, and the Securing Water For Food program producing co-compost in India, Safi Sana Ashaiman Factory (Ghana), and The Biocycle (South Africa).

Are you looking for tangible action? We encourage those who are interested in the possibility of integrating waste management to look forward to the next steps.

For Exploring Investors: Contact Take-A-Stake, which helps finance small, growing businesses in WASH and plastics.

For Interested Implementing Ogs: Contact WASTE, who is leading a circular economy waste management initiative called FINISH Mondial.

For Entrepreneurs: Hire FLUSH to help with your story and about this work.

For Growing Operators: Hire DalO Systems to help with your CRM needs.

About FLUSH

FLUSH creates sanitation superheroes.

We support water and sanitation service providers to build trusting relationships and buy-in with customers and increase investments. We do this by

1. clarifying audience engagement goals,
2. generating market-responsive data,
3. developing compelling stories for audiences, and
4. designing and implementing practical marketing strategies.

Through this work, FLUSH's unique approach creates fun, uplifting, and locally-tailored educational, and awareness-building events and experiences to build buzz, spark curiosity, and destigmatize sanitation conversations.

More information available on our website at www.flushwash.org