Assessing a business model for faecal sludge management

Piloting scheduled desludging in Kabwe

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Ministry of Foreign Affairs of the Netherlands

About SNV

SNV is a global development partner, deeply rooted in the countries where we operate. Driven by a vision of a better world where all people live with dignity and have equitable opportunities to thrive sustainably, SNV strengthens capacities and catalyses partnerships that transform agri-food, energy, and water systems. We help strengthen institutions and effective governance, reduce gender inequalities and barriers to social inclusion, and enable adaptation and mitigation to the climate and biodiversity crises. With 60 years of experience and a team of approximately 1,600 people, we support our partners in more than 20 countries in Africa and Asia, tailoring our approaches to different contexts to achieve large-scale impact and create more equitable lives for all.

About the WASH SDG programme

The WASH SDG Programme is a manifestation of the Dutch commitment and contribution to realising the Sustainable Development Goals, particularly SDG 6. It is a seven year consortium programme (2017-2024) implemented in 7 countries, financed by the Netherlands' Ministry of Foreign Affairs whose members - SNV, WAI, and Plan International - aim to increase access to and use of safe drinking water for at least 450,000 people; and to improve access to and use of sanitation facilities, and good hygiene behaviours for at least 2 million people.

In Zambia, SNV's sub-programme is named the Chambeshi Lukanga Sanitation Project and is implemented in collaboration with the Ministry of Water Development and Sanitation and the sector regulator NWASCO, in partnership with Chambeshi and Lukanga Water and Sanitation Companies as well as the Local Authorities of Kabwe, Kasama, Mbala, Nakonde and Mpulungu.

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Onsite sanitation systems are prevalent in Zambia

Faecal sludge management (FSM) services are essential in ensuring the safe storage, emptying, transport, and disposal of human waste for onsite systems. In the absence of proper management, the potential for disease outbreaks, environmental contamination, and water source pollution is significantly heightened.

The vast majority of Zambians rely on onsite sanitation systems. In Kabwe, capital of Central Province of Zambia, a substantial 79% of the town's population is not connected to the sewer system. Instead, they rely on pit toilets, cesspools, and septic tanks. The frequency of emptying these sanitation systems varies depending on the size of the containment and the number of users, and it may extend over several years.

A septic tank can be efficiently emptied by a vacutug due to its size and robust containment. However, pit toilets commonly utilised in peri-urban areas, particularly by the lowest income segments of the population, often lack lining and a bottom. As a result, they lead to continuous leakage of human waste into the surrounding soil. When these pit toilets reach capacity, individuals typically abandon them, as they tend to collapse if emptied, choosing instead to dig new ones.

Kabwe is home to a population of 188,878 residing across 27 wards within 22,546 households. Merely 21% of the town is linked to the sewer system, while the remaining areas depend on onsite sanitation, necessitating essential emptying services. Managing both the sewer system and water supply for this provincial capital is a responsibility of Lukanga Water and Sanitation Company (LgWSC).

79% of the population in Kabwe is not connected to the sewer system

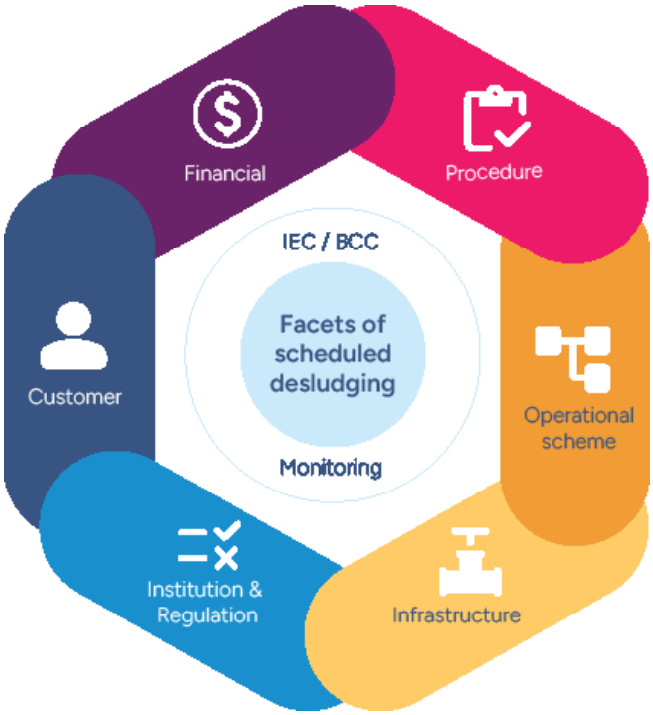

Figure 1. Eight-factor approach to implement scheduled desludging in Kabwe

The set up of scheduled desludging

The risk associated with on-demand emptying of containment systems is that it typically occurs only when full or overflowing. Introducing a scheduled desludging model means emptying occurs based on a pre-agreed schedule, preventing overflows.

A plan to implement scheduled desludging in Kabwe was collaboratively designed by SNV and Lukanga Water and Sanitation Company (LgWSC) using eight factors [See figure]. These factors aimed to ensure a systematic and sustainable scheduled desludging programme. An additional feature of the model is that it replaces the traditional lump sum payment for emptying services with a more affordable monthly payment scheme.

This change made it accessible to all income groups, with an agreed upon two-year emptying cycle and a monthly fee of ZMW15 (EUR 0.67) that fully covers the service cost, and that replaces the lump sum of ZMW550 (EUR 24) previously in place.

With the assistance of SNV, Lukanga Water and Sanitation Company (LgWSC) undertook the rehabilitation of a section of the existing Faecal Sludge Treatment Plant (FSTP) at pumping station number 2. This station was identified as the designated location for effectively treating the escalating quantities of sludge.

How scheduled desludging benefits customers

With scheduled desludging implemented in the peri-urban area of Kamushanga, the uptake of scheduled emptying subscriptions experienced rapid growth, with 92% of the population subscribing to the service. This widespread acceptance serves as a compelling demonstration that, when suitable and economical solutions are made available, there exists a significant demand for safe emptying services. The pivotal factor contributing to this success is the increased affordability of the service, combined with the availability of reliable and professional service providers.

How scheduled desludging benefits service providers

The use of a scheduled desludging model in Kabwe, can contribute in ensuring the financial sustainability of the utility. This results from the expansion of the customer base, and increased efficiency of running costs, as the service becomes predictable and is strategically outsourced to private sector operators.

Lukanga Water and Sanitation Company partnered with local operator Twikatane that had received support from SNV to formalize, equip and train its members. This collaborative initiative not only expanded service coverage but also guaranteed adherence to strict occupational health and safety standards throughout the entire sanitation chain from household collection to the disposal process at the treatment site. Moreover, a pre-defined schedule also benefits the private operator Twikatane that can now anticipate its revenue, as opposed to the random nature of its work and related income under an on-demand model.

The introduction of a scheduled desludging plan in Kabwe has set a benchmark for professional and reliable service. By emphasising the need for maintaining high standards, both by the utility and its contractors, this scheduled approach has significantly increased accountability, as subscribed users come to demand that the Utility delivers in its commitment to the pre-defined schedule, and to the emptiers that they provide a quality service.

'To the customer, it offers the advantage of being able to pay the emptying fee in small instalments over a prolonged period of time. To the utility, it offers the possibility of engaging private sector operators because we collect that revenue and can cover the costs.'

Nyonge Phiri
Director of Engineering, LGWSC

Opportunities driven by a scheduled desludging model

1. Allows the CU to better plan and manage its resources – performance gains
2. Enables the CU to anticipate sludge volumes at the treatment end - treatment efficiency and re-use potential gains
3. Supports the CU to better know & service its customers – credibility and expanded customer base gains
4. Facilitates the CU to better differentiate/zone its customer base – pro-poor/equity gains
5. Facilitates the replacement of lump sum payments by small monthly instalments by households – affordability gains
6. At scale and over time, it increases revenue for the CU (also by reducing marketing efforts) – business sustainability gains
7. Attracts private operators and enables their businesses to grow – increased business and employment gains
8. Reduces the use of informal/unsafe emptying services – public health gains
9. Prevents toilets/containments overflowing – public health gains
10. Enables pre-emptive emptying in flood prone areas – climate change adaptation gains
11. Prevents sludge from sitting too long in containments – climate change mitigation gains

Leveraging technology

- Geographic Information System (GIS) mapping has facilitated the creation of a dependable and current customer database, serving as the foundation for planning, delivery, and billing of the service.
- By mapping existing sanitation facilities, the utility can proactively schedule emptying in flood-prone areas, enhancing overall efficiency.
- The integration of digital tools, such as mWater, has proven instrumental in capturing information at the emptiers' level and cross-referencing it with the available database, streamlining operations.

Limitations and challenges of a scheduled desludging model

1 **Investment limitations:** scaling up the scheduled emptying model requires a level of investment that the Utilities may be challenged to face, as more transport vehicles, emptying equipment and operators are required. Further, treatment capacity must be expanded to manage the increased loads of sludge collected.

2 **Consumers behaviour:** households tend to dispose of solid waste in their toilet pits, making the emptying process arduous and time consuming, while further creating constraints at the treatment end, as the sludge is laced with all sorts of non decomposable materials. The quality of the toilets constitutes another limitation, as households often opt to build unlined toilets that frequently collapse during emptying.

3 **Perception of onsite sanitation business potential:** as sanitation has been typically driven by large scale public investments in the form of sewers, onsite systems also get perceived as demanding large investments with little to no return. Assessing different business models – including scheduled desludging amongst other – to decide which one is more beneficial and sustainable is not yet a common practice for service providers. limitation, as households often opt to build unlined toilets that frequently collapse during emptying.

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