

Title: Business model development through sludge characterisation in Kabwe, Zambia

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Tract 4 – Applied research

Summary (97 words):

Low awareness of and capacity to deliver services, coupled with high population density and limited land plots hamper Kabwe town's ambition to improve faecal sludge management services. Transitioning from a system where full pits are abandoned on site to the transport of waste to an approved off-site location is one of the main objectives of the SNV WASH SDG programme. This abstract highlights SNV's development of a business model for Kabwe based on outcomes of a sludge characterisation study, coupled with other practical research works such as a baseline study, rapid technical assessment and informed choice processes.

Introduction (461 words)

The poor state of sanitation facilities in Zambia has become a source of ill health and deaths during the 2017/18 cholera epidemic, which resulted in 5,900 cases and 114 deaths (Sinyange N, Brunkard JM, Kapata N, et.al, 2018). Because of rapid and uncoordinated urbanisation processes, urban sanitation services – specifically onsite sanitation services (OSS) – have become more urgent than ever. Increasing coverage and access to safe, accessible and improved sanitation facilities require designing effective business models along the entire sanitation service delivery chain that are based on comprehensive research offering quantitative and qualitative evidence. The failure to do so, as in the case of Kabwe town in Zambia, is likely to lead to most faecal sludge not reaching designated treatment plants (illegal dumping), private operators charging high services fees (as these are not regulated), unhealthy emptying methods that pose risks to public health, and groundwater pollution.

Through the multi-country WASH SDG programme of SNV in Zambia, sludge characterisation and other process outcomes from a baseline study, a rapid technical assessment and stakeholders informed choice engagements, helped in the formulation of FSM business model for Kabwe town. Mixed methods in the research design were applied to: 1) examine real-life contextual understanding, multi-level perspectives, and cultural influences around sanitation services ; 2) deliver quantitative data on the magnitude and frequency of constructs, complemented by qualitative data on perceptions of these constructs; and, 3) draw on the strengths of quantitative and qualitative data gathering techniques to formulate a holistic framework that offers business solutions or new understandings of the sanitation challenge.

Research results found that most containments were at least 40% filled, and 50% of sanitation facilities that are less than two years old were built using frail low-cost materials. Those able to afford to have their toilets emptied did not know how to manage emptying safely, apart from practising onsite entrenchments or spending more money to build new facilities. More than 97% of residents expressed willingness to subscribe to toilet emptying services due to limited space to continue digging of new pits, non-durability of existing sanitation structures, and/or lack of appropriate sanitation services within the community.

Considering the quality and quantity of sludge, willingness and affordability to pay, emptying revenue streams and other factors, it was estimated that at least 8,000m³/year of sludge would be available for emptying. With an average scheduled tariff of US\$ 1/household per month or US\$ 7/m³ per on call

emptying interval, the business can offset a startup capital cost of up to US\$ 25,000 in the first year of operations. These projections are of course possible with minimal overhead and personnel costs. The advantage for Kabwe is that minimal utility owned start up infrastructure is already available even though it would need attention as the business starts breaking even.

Conclusions and implications (113 words):

Comprehensive and accurate knowledge in faecal Sludge characterisation is not only required for the proper design of treatment plants. As well, it contributes to the identification of potential reuse pathways, which could enhance business modelling processes. Results of a sludge characterisation study combined with outcomes of other research studies show that a comprehensive faecal sludge management service and business model – built around the mandated utility company in collaboration with local private sector companies – is paramount for the sanitation situation to improve. Alongside business implementation, training of plumbers who provide on-site sanitation repair and upgrade of services, sanitation planning, promotional activities, as well as regulatory reforms are all pertinent in improving FSM in Kabwe.

References:

1. Sinyange N, Brunkard JM, Kapata N, et al. Cholera Epidemic — Lusaka, Zambia, October 2017–May 2018. *MMWR Morb Mortal Wkly Rep* 2018; 67:556–559. DOI: <http://dx.doi.org/10.15585/mmwr.mm6719a5>.

3 Key words:

Sanitation facilities, faecal sludge, business model