

Providing Sanitation Solutions Through Value Chain Management

A newly launched project in Sub-Saharan Africa will transpose faecal sludge from waste to a valuable product. Stefan Diener¹, Mbaye Mbéguéré^{1,2}, Linda Strande-Gaulke¹

Introduction

The prevailing conditions for faecal sludge (FS) management across Sub-Saharan Africa are dysfunctional on-site sanitation systems, poorly maintained FS collection facilities and frequent dumping of untreated FS directly into the environment. One reason for the current situation is the lack of economic incentives for stakeholders throughout the FS service chain. In Dakar, for example, sludge emptying and transport companies are frequently not profitable and must rely on tax benefits and other sources of revenue to maintain their business.

The recently launched Faecal Management Enterprises (FaME) project consists of an international consortium of researchers, consultants and practitioners (cf. box). The FaME project is based on the concept that FS management can be transformed from a disposal problem to the recovery of valuable end-products, thus providing a profit motive and financial driver for the ongoing collection, treatment and recovery of FS. To this end, the FaME project will:

- i) Conduct a market demand study in three countries (Senegal, Ghana and Uganda) to identify innovative industrial uses for FS end-products.
- ii) Demonstrate the technical and financial viability of using FS as a fuel in cement manufacturing.
- iii) Profile existing FS businesses and develop financial flow models to implement reuse-oriented FS management in Senegal, Ghana and Uganda.
- iv) Disseminate actively the knowledge and findings of research in and outside Sub-Saharan Africa.

Valorisation of FS end-products

An important focus of the FaME project is to evaluate the demand for profitable and beneficial end-uses of FS. A market demand study will identify stakeholders and functional groups of the value chain, appropriate technologies to ensure valorisation, adequate treatment and determination of the potential end-users willing to pay for end-products. In Dakar, most

of the FS collected and treated in drying beds is currently sold for use as an inexpensive soil amendment. Use of dried FS as a fuel source in cement production is a very promising and hopefully lucrative alternative that will be evaluated during the project (Photo 1). Many cement factories already use alternative fuel materials in their kilns, be it for public relation purposes or due to the increasing oil costs. In addition to waste products, such as plastic waste, tires and peanut shells, use of sludge generated by municipal activated sludge systems (biosolids) is increasingly being implemented. The lower heating value (LHV) of coal is 26 GJ/dry tonne, while the LHV of biosolids varies from 10 to 29 GJ/dry tonne. These values suggest that FS can also be used as an alternative to coal. However, the physico-chemical characteristics of FS vary depending on technology (e.g. pit latrine, septic tank, drying technology). It is not known yet to what degree values based on biosolids can be transferred to FS. One of the key outcomes of the FaME project will therefore be determination of the calorific value and physical characteristics of FS from the different aforementioned sources in Senegal, Ghana and Uganda. These results will be used to determine optimum methods for use of FS as a fuel on a large scale pilot implementation at a cement factory in Senegal. The waste heat recovery potential to increase the drying efficiency of FS and raising its value as a fuel will also be evaluated.

Value chain management

Even if a new technology is technically feasible and environmentally advantageous, it will not be adopted by industry unless it is financially viable. To successfully implement a new approach, its adjustment to existing policies and industrial practices must also be considered. Economic feasibility of new approaches in FS management will be assessed, as well as manner of integrating them into existing FS management and regulatory practice. A reuse-based financial flow model



Photo 1: Visiting a cement factory near Dakar, Senegal during project kick-off.

and methodology will be developed and implemented in Dakar and its applicability tested in Accra and Kampala. The project will also evaluate its potential as a standard model in Sub-Saharan Africa. It will identify the necessary managerial transactions in the value chain to establish a financially and economically viable market for FS reuse. The required incentives will be assessed, including non-financial barriers or incentives to trade (e.g. regulatory regime, administrative constraints, information sharing).

The overall goal of the FaME project is to offer innovative solutions to the entire FS management value chain to dramatically improve public and environmental health in urban areas of Sub-Saharan Africa by providing complete and reliable sanitation options.

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- Eawag/Sandec (www.sandec.ch)
- Hydrophil iC GmbH, Vienna, Austria (www.hydrophil.at)
- Waste Enterprisers Ltd, Accra Ghana (www.waste-enterprisers.com)
- Université Cheikh Anta Diop, Dakar, Senegal (www.ucad.sn)
- National Sanitation Utility of Senegal (ONAS), Dakar, Senegal (www.onas.sn)
- Makerere University, Kampala, Uganda (www.mak.ac.ug)

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