Energy Recovery with Faecal Sludge Fuels in Kampala, Uganda

Fuels from dried faecal sludge could generate larger revenues than soil conditioner. Market demand exists for crushed fuel and char briquettes; fuel pellets provide benefits for faecal sludge drying. M. Gold¹, D. Turyasimma², M. Cunningham¹, F. Studer³, S. Nantambi⁴, R. Arnheiter⁵, M. Bleuler⁵, W. Getkate⁶, A. Schönborn⁷, Ch. Niwagaba², M. Babu⁶, Ch. Kanyesigye⁶, L. Strande¹

Introduction
Faecal sludge (FS) treatment and its sustainable operation is often limited by available financial resources. Yet, the sale of FS treatment endproducts could offset these costs. With sufficient market demand, fuels and other treatment endproducts could generate revenue to pay for FS treatment [1, 2].

Pellets
Our research shows that dewatered FS can be turned into fuel pellets (Photo 1), which are homogenous in size and easy to transport, store and dry (see www.sandec.ch/seek). Passive drying of FS pellets from a moisture content of 40–60 % to 10 % required one week, much faster than the time required on drying beds. There is, however, no existing market currently for this product, but the potential to develop such a market in Uganda and elsewhere exists.

Char briquettes
FS char briquettes are made through carbonisation and briquetting with a binder. They can be produced with locally available equipment and skills, and look like other briquettes. CNN and the Daily Monitor recently reported that several businesses in Kampala are trying to tap into the existing charcoal market with FS briquettes and that FS briquettes compared to wood based charcoal and briquettes produced from agricultural waste, as well as the optimal operating conditions for FS pyrolysis.

Crushed fuel
Dried FS can be crushed and used as a fuel without pelletising, carbonisation or briquetting; this has been demonstrated in pilotscale experiments and industrial trials [2]. The advantages of crushed FS include an existing market and competitive energy content compared to solid biofuels [5]. Cement and clay companies in Uganda are interested in using dried FS as a crushed fuel, especially since it is compatible with their combustion technology and currently used fuels. The disadvantage is, however, that FS treatment capacities cannot yet meet industry demand (i.e. several tons per day).

Conclusion
Pilot tests by researchers and businesses have demonstrated that FS fuel pellets, briquettes and crushed fuel have a market and/or are technically feasible. Up-scaling is also possible if local FS characteristics (e.g. ash content) and quantities (i.e. amount of fuel produced per day) match market needs. Meeting market demand could benefit FS management because the revenue generated from the sale of FS endproducts could offset treatment costs.


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Photo 1: Pellets (top), briquettes (bottom) and crushed fuel produced from FS (right).