

TERMS OF REFERENCE:

WORLD WATER CORPS PROGRAM | OPTIMIZATION OF FECAL SLUDGE BRIQUETTE PRODUCTION PROCESS

PROJECT BACKGROUND AND CONTEXT

Water For People Uganda has been actively involved in research and production of fecal sludge briquettes for over two years now. Fecal sludge briquettes started with the setting up of a DEFAST plant in Kole District and engaging SaWa as the entrepreneur to produce these as a reuse option along the sanitation value chain with hope of developing a financially viable business. Following the successful setup of a briquette production plant in Kole district, it was agreed to produce fecal sludge briquettes and supply to Kampala, as the biggest fuel market in Uganda. However, with challenges in transportation and having indications of the market demand, it was further agreed to setup a briquette production plant in Kampala with hopes that the profits from the sales would subsidize pit emptying in Kampala.

The briquette production plant has been set up in Nyanama, south of Kampala City with both stick and honey comb briquettes totaling to a production capacity on 2 tonnes per week. Initial tests were carried out on the briquettes for the optimal composition that would provide a competitive product on the market and we zeroed down to 60% charcoal dust and 40% fecal sludge. With the increasing crackdown on deforestation in Uganda, we will soon run out of charcoal dust which is a big component of the briquettes hence the need to consider alternative sources of carbon to combine with the fecal sludge. There is also need to continue with research into optimization of the briquette production process understanding the timings and production volumes under different conditions and compositions.

Briquettes in Uganda are not a new area however we are ploughing new ground with the fecal sludge component and trying to develop it to scale all under a strict timeline. We therefore need an expert in production and optimization of briquette production whose local capacity is currently not available in the country.

OBJECTIVE(S) OF THE FIELD and DESK STUDY

The objectives for this field assignment include but are not limited to;

- Continued research on briquette composition specifically with agricultural and market waste to replace the amount of charcoal dust
 - Understand factors impacting timings and production volumes for briquette process under different conditions and compositions. Propose ways in which production could be scaled-up without compromising the quality and competitiveness.
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DATES FOR THE ASSIGNMENT

Specific dates will be agreed to after initiation of the work. The preferred time frame is from January through March 2019 with a two-week trip to Uganda in late January or early February.

REGION AND COMMUNITIES TO BE VISITED

The volunteer will spend all their time in Kampala between the Nyanama Briquette Production Plant and the Carbonization unit site at National Water and Sewerage Corporation FS Treatment Plant in Lubigi.

METHODOLOGY

The Volunteer will work with the Sanitation Engineer on this assignment to achieve the set-out objectives. All materials and equipment needed for the assignment will be provided by Water for people Uganda.

The field sites will be Nyanama Production Plant and the FS treatment site at Lubigi. Tests will be carried out with the partner labs as well as the mini-lab set up at Water For People Offices. Production of briquettes will be at the Nyanama Production site where the volunteer will interact with the operators and support staff to understand the timings and production volumes under different conditions.

Carbonized sludge will be collected from the carbonization unit set out at NWSC Lubigi while market waste will be collected from KCCA. Agricultural waste will be bought from farmers or markets around the city.

INFORMATION FOR PREPARATION

- Concept note for the Kampala Briquette Production Plan
 - Briquette Production Factsheet
 - Briquette testing results and reports
 - Design layouts for the briquette production and carbonization unit plants
 - Phase 1 monitoring reports
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PARTNERS INVOLVED IN THE ASSIGNMENT

Partner	Role
Cate Zziwa Nimanya	Country Director, Water For People Uganda
Brenda Achiro	Programs Manager, Water For People Uganda
Yvonne Lugali	Sanitation Engineer, staff assigned to work with volunteer
National Water and Sewerage Corporation	Entity responsible for provision of faecal sludge and provision of land for carbonization unit
Kampala Capital City Authority	Entity responsible for provision of market waste

TOOLS FOR THE ASSIGNMENT

- Laptop
- Drawing and Design software
- Optimization and modelling software

DELIVERABLE(S) AND AUDIENCE

Deliverable	Requirements	Intended Audience
Tests Results report on physical fuel properties for FS briquettes with agricultural and market waste compositions	Mini-Lab tests reports Briquette composition mixtures	Kampala Sanitation Program- Core Team
Briquette production process optimization report	Indicators on timings, volumes produced under changing conditions Ways on achieving maximum output at production sites for scale	Kampala Sanitation Program- Core team

TIMELINE FOR DELIBERABLE(S)

Deliverable	Dates for Submission
Tests Results report on physical fuel properties for FS briquettes with agricultural and market waste compositions	Final day of the field trip
Briquette production process optimization report	Draft report within 2 weeks of return from the trip and a final report within 4 weeks of the trip

PROFILE OF THE VOLUNTEER(S)

The number of volunteers required for this assignment: 1 to 2

The following professional experts are needed in this assignment:

- Knowledge in fuel production especially with a background in fecal sludge as a re-use product
- Knowledge in design and optimization of process systems
- Engineering background with specific experience in municipal wastewater treatment solids handling, biosolids management, and biofuels
- Knowledge in biofuel production, especially with a background in fecal sludge as a re-use product
- Experience in design, optimization, and scale-up of solids processing systems for biosolids reuse, especially in low-income countries

ESTIMATED COST OF THE ASSIGNMENT

Description of Item	Unit	Number of units	Frequency	Unit Cost (USD)	Total Cost (USD)
Accommodation	day	14	1	70.00	980.00
Visa Costs, Airport Transport	consolidated	1	1	50.00	50.00
Per Diems	day	14	1	30.00	420.00
Air Ticket Costs	Person	1	1	2000.00	2000.00

Volunteers are expected to pay all travel expenses. The costs in this table are reasonable estimates for travel from the U.S. to Uganda.