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Charcoal briquettes; clean energy for cooking in Uganda

Godfrey Korinako Atuheire*

Department of Global Health Economics, Makerere University, Kampala, Uganda

Introduction

Situation analysis

Charcoal briquettes are a solid and convenient fuel source made from densification of agricultural waste. A briquette is a compressed block of coal dust or other combustible biomass material (e.g. charcoal, sawdust, wood chips, [peat, or paper) used for fuel and kindling to start a fire. The term derives from the French word break, meaning brick. Densification involves conversion of combustible, low density materials and compressing them into solid fuel of a convenient shape. As such, briquettes have a high bulk density compared to fire wood and loose biomass, giving a longer burning time and thus cost savings for the user. In addition, briquettes offer other advantages such as burning with negligible smoke and no odor, producing less residual ash, being dust free and can be formed into uniform sizes and shapes which eases packing and are easy to use.

There is a lot of research on 'briquetting' and a lot of inventions have been made to enhance production and efficient use of briquettes. For example, a paper by Dr. Nandini Shekhar of University of Mysore, "analyses the issues connected with the production and use of briquettes and highlights the huge untapped potential of its possible wide spread use."

Unfortunately, most rural communities, and people living in peri-urban areas, continue to depend on firewood and crudely made charcoal for their energy needs. This has led to significant deforestation and abuse of our fragile environment. Official figures show that Uganda loses 80,000 ha of forests cover per annum which led to the loss of 2.0m hectares of forest cover from 1990 to 2015 (NFA). It is projected that if this trend continues, Uganda will be left with less than 25% of forest cover by 2050 (GIZ).

UIRI has made progress towards mitigating this problem through valorization and popularization of briquettes, albeit using basic technologies. A well-equipped demonstration plant for production of briquettes would thus go a long way towards providing a model briquette-making facility for ameliorating problems of deforestation and environmental abuse. This is one of the best methods.

Description

Project rationale

Biomass provides about 93% of Uganda's energy as firewood and charcoal, while electricity and petroleum provide 1% and 5% respectively. Biomass is plant or creature material utilized for vitality creation (power or heat), or in different modern procedures as crude substance for a scope of products. It can be deliberately developed vitality crops (for example miscanthus, switchgrass), wood or timberland buildups, squander from food crops (wheat straw, bagasse), agriculture (yard squander), food handling (corn cobs), animal cultivating (compost, wealthy in nitrogen and phosphorus), or human waste from sewage plants. According to the 2012 population census, the proportion of people using firewood decreased from 88.2% to 81.8%. During the same period, the percentage of those using charcoal rose from 10.2% to 15.2%. The reason for this shift is that more people were looking for cleaner, more convenient and affordable cooking fuel. Briquettes offer these benefits, and hence bear great potential for revolutionizing the energy sector in Uganda.

Additionally, the project will have a positive impact in preservation of Uganda's forests and endangered biodiversity, as well as protecting the environment through reduced agro-waste in dump fills and lower emissions as compared to firewood and conventional charcoal. Lastly, communities can engage in briquette production as an income generating activity, particularly women, youth and people living with disabilities.

Project objectives

The project objectives are:

- Establish briquette making process for production and training of operators and entrepreneurs.
- Promote product and enterprise diversification among briquettes making industries in Uganda and the region. Engage in prudent technology transfer vis-à-vis conversion of agro-waste to energy.
- Formulate guidelines for production and quality assurance of briquettes. Create a regional Centre of Excellence in 'briquetting'.

***Address to correspondence:** Dr Godfrey Korinako Atuheire, Department of Global Health Economics, Makerere University, Kampala, Uganda, Tel: 2568376456278; E-mail: gkorinako@gmail.com

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Project description and projections

The briquettes are to be made from dry agricultural wastes including cotton stalks, sugarcane bagasse and maize cobs. The agricultural waste is burned in a carbonizing unit to form char/carbon. The char is then crushed, sieved, mixed, molded and dried into a final product for. Finally, the briquettes are packaged in various quantities suitable for sale. Improved technology will be utilized to give a product with enhanced desirable physical properties and the resulting competitive market advantage.

Initial production capacity is estimated at 720 tons per year. This translates into an average of 2.4 tons per day. Production during the second year of operation will increase by 15% to a level of 828 tons of briquettes. It is our considered opinion that with such a start prospects for the multiplier effect are very good.

Conclusion

Schools, Communities (Households), Restaurants and Hotels, especially those not on the national grid. Under this highly oxidizing environment, organic pollutants are removed by oxidation with the hydroxyl radical and by coagulation with iron hydroxide Fe(OH)3.

Indicative cost: The envisaged production facility will cost approximately $175,000. This cost is for both machinery and working capital.

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