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ADOPTION OF AFFORDABLE & EFFICIENT DOMESTIC FUEL BRIQUETTES TO AVERT DEGRADATION OF FOREST ECOSYSTEM : THE CASE OF UGANDA

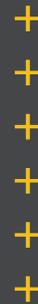
Uganda has set timeline to achieve several Nationally Determined Contributions (NDC) actions sooner. Uganda seeks to mainstream climate resilience across sectors and develop early warning systems and robust monitoring systems. Although Uganda's share of the total global GHG emissions is still insignificant, the country's sectors emission profile is growing with Agriculture as a leading source of GHG emissions and Land Use Change and Forestry (LUCF) as the second most significant source. It is envisaged that implementation of prioritized measures in energy supply, forestry and wetlands will result into cumulative impact of approximately 22% reduction of overall national emissions in 2030. It is against this backdrop that EBAFOSA Uganda Leveraged EBA and clean energy to create climate action enterprises.

A demonstration of the youth making briquettes from cassava wastes during one of the trainings undertaken by EBAFOSA Uganda to showcase the adoption of alternate source of energy that conforms to clean energy standards.

ADOPTION OF AFFORDABLE & EFFICIENT DOMESTIC FUEL BRIQUETTES AS AN ALTERNATIVE TO FOSSIL FUEL : UGANDA DRIVING CLIMATE ACTION



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An exhibition where women are using cassava wastes to make briquettes. The training was facilitated by EBAFOSA Uganda together with local women groups that volunteered to learn the new skills.

Uganda has set timeline to achieve several Nationally Determined Contributions (NDC) actions sooner. Uganda seeks to mainstream climate resilience across sectors and develop early warning systems and robust monitoring systems, much earlier than originally planned. Although Uganda's share of the total global GHG emissions is still insignificant, the country's sectors emission profile is growing with Agriculture as a leading source of GHG emissions and Land Use Change and Forestry (LUCF) as the second most significant source. However, the country is at risk of losing all its forests if deforestation in Uganda continues at its present rate there would be no forests left in 40 years . It is envisaged that implementation of prioritized measures in energy supply, forestry and wetlands will result into cumulative impact of approximately 22% reduction of overall national emissions in 2030.

It is against this backdrop that EBAFOSA Uganda Leveraged EBA and clean energy to create climate action enterprises. This work has leveraged complementarity between EBA-driven agriculture with clean energy to unlock enterprises

that scale both EBA and clean energy. In Uganda- Buganda Kingdom, cassava value chain is being enhanced by retooling urban youths and rural women skills to make quality briquettes which are dried using solar dryers, which are more efficient and effective than open sun-drying. EBAFOSA Uganda has linked cassava famers mainly women to solar drying centers, where women use the waste from cassava and other agricultural waste to make quality briquette for their home use and commercial purposes.

In particular, Sub-Sahara Africa and Uganda's energy sector is dominated by biomass, which contributes over 90% of the total expendable energy⁴ and herein firewood and charcoal contribute more than 85%. The main use of biomass energy is cooking and or heating either as firewood or charcoal majorly by local households. EBAFOSA is promoting briquettes use and clean cook stove in Buganda Kingdom to help develop and drastically reduce people's dependence on firewood for cooking and provide employment to urban youth. Scaling of solar solutions and climate action enterprises is essential. This is advocated in the Uganda NDCs to ensure durability.

There is a need to scale the use of solar solutions and promoting climate action emprises as called for in Uganda NDCs but from an enterprise dimension that ensures durability

Uganda is at risk of losing all its forests if deforestation in Uganda continues at its present rate there would be no forests left in 40 years due to deforestation .Uganda experiences high rates of forest cover loss. Other reasons of deforestation include: poor rural electrification and costly electricity which makes 90% of Ugandans to use firewood and charcoal as the main sources of fuel to cook . Large amounts of forests are also spent as trees are cut for timber and wood because the construction industry still greatly use timber rather than steel and other substitutes

Biomass is the predominant type of energy used in Uganda, accounting for 94% of the total energy consumption in the country . Charcoal is mainly used in the urban areas while firewood, agroresidues and wood wastes are widely used in the rural areas. Firewood is used mainly on threestone fires in rural households and in food preparation by commercial vendors in urban areas. Through the waste recovery to domestic energy, this work is directly implementing Uganda's NDCs objectives. Specifically, those on reversing deforestation towards increasing forest cover to 21% and increasing cooking energy efficiency to 40% over traditional cooking. This is being achieved through the increased investment in fuel briquettes – a key source of efficient & sustainable biomass highlighted in the NDCs.

This work also enhances achievement of Uganda's Renewable Energy policy by providing affordable, efficient domestic fuel briquettes as alternatives to charcoal and firewood use. Specifically, the policy aims to reduce consumption of both wood and charcoal as strategic to combat both indoor pollution as well as deforestation. Economically, waste recovery to briquettes not only taps into a ready market with over 80% to 90% of Uganda's population dependent on biomass, but stands to create up to 20,000 alternative jobs and over \$60 million contribution to GDP by creative viable and affordable alternatives to fossil fuels.



Youth using briquettes making machine to cut them into shape so that they are easy to transport and carry. The machine does all the work of shaping the briquettes into more manageable form.

“ This work also enhances achievement of Uganda's Renewable Energy policy by providing affordable, efficient domestic fuel briquettes as alternatives to charcoal and firewood use. ”



Display of the final product of fuel briquettes which are left to dry in an open ground, this is to make the briquettes more solid.



The innovativeness of using alternate fuel briquettes which is made from wastes not only does it provide a climate solution but also creates an income generating opportunity for the women of Nakisunga in Uganda. The women were trained under the EBAFOSA initiative to drive briquettes using the solar drying climate action solutions.

The briquettes made in a system thinking approach – where the waste feed-stock material is sourced directly from the by-product of cassava value addition, and final drying done efficiently using solar dryers, means reduced raw material costs and high quality briquettes at the end of the drying process. This coupled with local labour and expertise makes these briquettes cheaper or equivalent priced to charcoal. In addition, their longevity of burn, higher energy values and enhanced burning efficiency means less of the briquettes are used compared to charcoal and firewood for an equivalent cookery event.

The approach used to implement these actions was Innovative Volunteerism. Where actors of diverse skills were convened and guided to improve and refine their diverse skills and adapt them to collaborate mutually in developing the fuel briquettes among other solutions. They were then guided to deploy those skills by working directly with communities to ensure impact at the community level. UNEP provided the overall technical backstopping from a knowledge dimension of also ensuring work aligns with Uganda national development and climate change priorities.

Intervention

- Youth Skills Retooling; this work trained youth to make charcoal briquettes. 10 youth in Kayanja village were trained. These trainings were undertaken under the EBAFOSA

Uganda Innovations centre called the Africa Youth Agro industrialization Academy (AYAI Academy). 21 women and 3 men in Nakisunga and Ggera farmers cluster in Kyaggwe county respectively received training. This is critical towards substituting the use of three stone fuelwood stoves, currently at 90% in rural areas. This work has managed to conduct mass awareness among women in villages. Manual machines were used to enable youth train properly and produce quality briquettes.

Training youth to fabricate briquettes machines for both commercial and rural use; this work managed to train youth to fabricate an extruder which can produce 200 briquettes at a go. This ongoing work is still investing in redesigning and innovating those machines and 10 simple briquettes machines for rural women have been innovated and fabricated for women to use¹³, however the commercial extruder which produces 200 briquettes at once is still under development through Innovative Volunteerism.

Training women groups to make Fuel briquettes; this work has train two women groups consisting of 12 women in Nakisunga and 12 in Ggera farmers cluster respectively to make quality briquettes using cassava waste, clay, ash, and cassava porridge. This work has mapped and created awareness to start using modern cooking stoves and EBA-briquettes which are non-smoking.

Using solar drying technology to fasten the drying of charcoal briquettes; this work trained the youth to fabricate solar dryers which are used to dry briquettes. Women in Nakisunga sub county farming cluster received training of making briquettes.

Impacts of UNEP EBAFOSA intervention in the Uganda briquettes project through climate action solutions

Adoption of Fuel briquettes usage; trainees have started to use clean fuel briquettes for both domestic and commercial use. Since most rural areas are mushrooming into small urban centre, they no longer have firewood or it is expensive to prepare a meal, most of the families have resorted to use of charcoal briquettes for cooking and baking..

User Acceptability: families have started using briquettes instead of firewood, right now briquettes are cheaper and durable when cooking. In Kayanja village- Mukono district families have restored to use of fuel briquettes to enable saving and good health because they produce no smoke when cooking.

Alternative source of fuel. Briquettes have substituted wood fuel in some of families we have sold to the EBA-Briquettes, families are now able to invest in clean energy willingly. Although almost Over 90% of the households in Uganda use wood fuel for cooking according to the 2016/2017 Uganda National Household Survey.

Employment opportunity for women and youth; this work trained youth and women during COVID-19 pandemic to make charcoal briquettes, to fabricate machines which are used in making briquettes awareness training on the importance of briquettes, why we should reduce using wood fuel to cook.

Next steps for the EBA-briquettes initiative

- This work had to involve external independent experts from Makerere University to conduct a test to know the right physical properties of briquettes in terms of density, elemental composition/carbon content, brittleness, ability to stain and contrast briquettes and charcoal and the calorific values, volatile matter content, heating value and ash content of briquettes and compare them with charcoal. This work is still innovating and developing techniques of get quality raw materials to produce quality briquettes which can pass all test for export and the report stated that the briquettes produced would be environmentally friendly due to the low sulphur (0.05%) contents.
- Embark on expanding this fuel briquettes production and decentralize this to households to replace the dependence on wood biomass.
- Start mapping out households, eateries, and supply chains of raw material for making briquettes. This mapping will be continuous process.
- Expand on the clean cooking value chain by venturing into clean cook stoves production. This will create further demand

for the produced fuel briquettes as households can leverage these clean cookstoves to not only ensure efficiency in cooking but further reduce the indoor pollution which helps ensure achievement of other social aspects as health and cost savings which is an economic opportunity.

- Scaling up the youth and women briquettes training to different counties in Buganda Kingdom.
- Increase awareness of indoor pollution and associated health risks related to use of traditional stoves especially in rural areas and drive to eliminate indoor pollution related health hazards.
- Applying for the Q-mark from Uganda National Bureau of Standards (UNBS) for the briquettes to be export to other countries.
- Promote end user training programmes. Increase awareness of benefits in the energy (including overall cost) savings related to fuel and appliance (stove and cooking appliance) choice in urban areas.
- Promote adoption of improved institutional kilns, oven, and stoves in all educational institutions, hospitals, and prisons
- Promotion and wider solar uptake of solar drying technology.
- Promote energy saving technologies in wood deficient areas and high population centres.

Motivation by UNEP-EBAFOSA to spearhead the clean energy initiative in Uganda

It is estimated that dependency on fuel wood and charcoal is on the increase in sub-Saharan Africa, with 2 – 3 times higher per-capita consumption than any other region. This dependency also fuels degradation of forest ecosystems resulting in loss of critical forest goods such as fruits, medicines etc., and services such as erosion control, water quality, etc. The cumulative effect is large scale resource depletion that threatens sustainability, with up to 50% degrading of forest ecosystems in some countries.

This is part of the \$68billion lost annually in Africa due to land degradation. The urgency for remedial measures through enterprises that offer alternative clean cooking options is therefore critical to preserve not only human health but also health of ecosystems. Waste recovery to fuel briquettes offers a non-capital-intensive area, that youth can be engaged in, to co-operate around offering viable clean cooking solutions to the community. But the first step to engage these youth is re-tooling their skills. This means, that youth of diverse areas of training are structurally guided and inspired to systematically improve, refine and adapt their skills, regardless of area of training, and to engage in converting agro-waste to fuel briquettes and trading in these briquettes. It is against this backdrop that EBAFOSA Uganda Leveraged EBA and clean energy to create climate action enterprises.



Strengthening the institutional capacities for the delivery of clean energy increases the mobilization, access and utilization of innovative energy adoption. Increase better health and welfare of our environment using ecosystem based adaptation approaches and awareness campaigns using various available channels. UNEP-EBAFOSA has enhanced capacity building of insitutions necessary to spearhead sustainable production and climate action enterprises in Uganda.

[Register to become an Innovative volunteerism actor at : Registration link \(Click\)](#)

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