



Waste Biomass to Charcoal Briquettes in Tanzania

Phase 2 mid-term project factsheet (see www.ef-co.org for more information)

Overview

Tanzania is dependent on wood-based energy. Charcoal tops the list as a effective, cheap and flexible fuel and is used by over 60% of urban households (over 90% in Dar es Salaam)¹. The impacts on Tanzania's forests are devastating. Over 90'000 ha of forest are cleared annually for charcoal². The project "Waste Biomass to Charcoal Briquettes in Tanzania" aims to change this. From September 2016 to December 2018, the project aims to promote charcoal production based on waste agricultural and forestry biomass as a substitute for conventional wood charcoal. The project has three phases:

1. **Demonstrating proof of operational concept (2016):** Establish a pre-commercial start-up enterprise. Begin production of charcoal dust (char dust) and charcoal briquettes. Test cooking performance and conduct marketing trails.
2. **Demonstrating proof of economic concept (2017/2018):** Achieve economic proof of concept by upscaling and optimizing production to achieve a targetted selling price that rivals conventional charcoal. Develop a tracking and certification system to ensure transparent and environmentally sustainable production.
3. **Impact assessment and business plan development (2018):** Model and assess the environmental and socio-economic impacts of upscaling using scenario analysis. Investigate potential income and employment effects for rural landowners and youths. Model the regional availability (supply) of biomass. Consolidate findings into a business plan to be disseminated to investors, donors and entrepreneurs.

Activities of Phase 2 (Jan 2017 – Dec 2018)

To demonstrate *economic proof of concept* in phase 2, the project aims to (1) increase the char dust production team to 18 local youths achieving production cost of TSH 5000 per 20 kg barrel of char dust; (2) produce 100 tonnes of char dust and establish long-term business relationships with biomass owners (i.e. private land owners); (3) develop a monitoring and tracking system to verify the origin of biomass as agricultural waste and not from native forests; and (4) market 60 tonnes of briquettes through a local marketing network.



Project location(s):
Magunguli
(Mafinga–Iringa)

Duration:
2016 – 2018

Budget:
CHF 138'387

Main funders:
REPIC, Farip,
EFCO

Achievements thus far (November 2017)

The project has catalysed a rapid uptake in char dust production with 44 youths employing simple "Top-Lit Up-Draft" kilns made from locally available barrels (see picture above) and the "flame-curtain" method (rapidly piling biomass on a fire in a funnel-shaped hole to catalyse pyrolysis). An experienced producer now earns about 50% more than the local agricultural wage.

Char dust production reached 40 tons by July 2017 and is on track to reach the goal of 100 tons by the end of the year. Agricultural biomass is now recognized as a valuable resource and is no longer burned on the field but given/sold to production teams. A verification system is being developed through written biomass contracts that are checked by a third party with biomass volumes harvested from fields/forestry compared to reference values based on scientific surveys conducted in end of 2017 and 2018.

Briquette production has been established using a simple but effective briquette press designed and fabricated in Switzerland. With a potential output of 350 kg briquettes per hour, production will achieve the goals set out by the end of the project. Marketing tests are planned for early 2018 with initial cooking tests showing favourable burning characteristics.

¹ Zah, R.; Ehrensperger, A., *SDC Tanzania Coordination Office*, Dar es Salam, 2014.

² Felix, M. *Renewable and Sustainable Energy Reviews* 2015, 51, 856–862.

