



Accessorizing the Chitetezo Mbaula


- a simple firewood stove -
to become a high-performing multifuel stove
building on what people know and like

Pathways to Clean Cooking 2050 - Cleaner Cooking for All in Malawi by 2030

Presentation by Christa-roth@foodandfuel.info, Director of Cleaner Cooking Coalition, Food and Fuel Consultants

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Chitetezo Mbaula



A Malawian success story
based on over 15 years of R&D
to reduce fuel consumption



Portable stove for outside
cooking to replace open fires

CLEANER



Convenient = fast, portable to cook anywhere

Less emissions = only 60% of an open fire

Efficient = can save over 40% fuel

Affordable = retails at less than 2 USD

Not harmful = safety rating 'good'

Easy to use = cooks all local dishes easily

Robust = average lifespan ca. 4 years



A Simple CLEANER Stove



4 year old still in use



Performance of Chitetezo Mbaula: Fuel use

- At least 30% less fuel than open fire
- Ideal for small twigs and agricultural residues
- Can take any length of fuel
- Less burden for fuel collection and preparation
- Some users replace up to '100 % of the firewood' from trees outside their farms with agriculture residues from their fields e.g. maize cobs and stalks from pigeon peas, sorghum, etc.
 - > Maximising protection of natural forests

Portable – freedom to cook anywhere
Ideal for agricultural residues

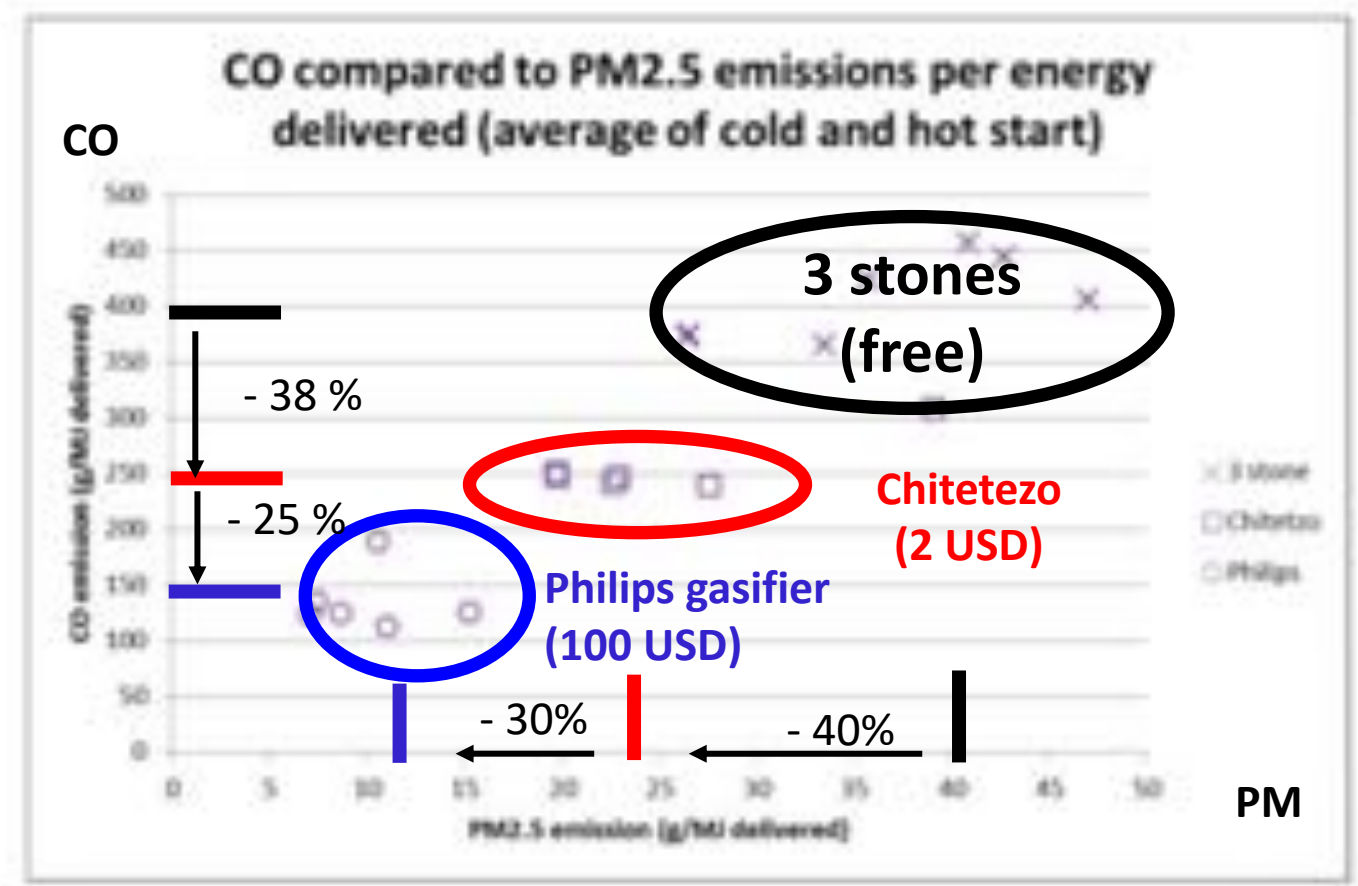


Performance: Emission reductions

Reduction of emissions compared to an open 3-stone fire: 0 cost

Chitetezo Mbaula	38-40%	add local equivalent of USD 2
Gasifier	additional 25-30%	add FOREX USD 98

Data from research on household energy in Malawi in 2013-2015 led by Dr. Pam Jagger, FUEL Lab at the University of North Carolina, Carolina Population Centre



Why accessorize instead of promoting a new stove?

Never change a winning team:
build on what people bought
1.4 Million times since 2013



- Accepted
- Affordable (retailing under 2 USD)
- Available with local production and commercial distribution network



- Main concern in Malawi is fuel efficiency
- 'CLEAN' cooking not a priority in Malawi as over 80% of people cook outdoors, CLEANER stove is 'good enough'
- Accessories offered as add-ons only for those where&when needed and wanted to improve the stack of cooking solutions
- Accessories offering **fuel flexibility** where&when fuels are available, shock-proofing against ruptures in fuel supplies
- Sum of accessories cheaper than a stack of several dedicated single-fuel stoves

What next? Chitetezo 2.0 – with Accessories



Illustration by Henderson Mawera

to give people more options to stack fuels with the same basic stove

- Enhance performance with the same firewood (faster cooking with less fuel, less smoke)
- Flexibility to use refined 'clean' fuels in the same stove when available, affordable and appropriate
 - Pellets
 - Solid Ethanol briquettes (e.g. 'FireDragon' from BCB)
 - Biogas

Embrace fuel stacking with the same stove structure + Accessories

Same structure to hold the pot

Firewood



Faster, less smoke, higher efficiency with firewood



Pellets (refined biomass)



No pellets - no problem, use firewood



Solidified Ethanol tablets



Ethanol Tablets



Biogas



pipe from digester into stove filled with pebbles and flared on top





Investment priorities to maximise impact

Stove supply

- Impact = adoption x performance
 - Maximise adoption of basic stepping-stone technologies to phase out open fires
 - Target performance (efficiency of devices) for those that want and can afford
- Investment along the stove value chain from local production to last-mile distribution to achieve universal access to basic stoves for all
- To Leave No One Behind incentivise innovative approaches to reach disadvantaged people (geographically and economically) with result-based financing mechanisms, integration into Social Protection Programmes etc.



Investment priorities to maximise impact

Fuel supply

- Investment in sustainable fuel supply for firewood and other refined biomass fuels
- Treat biomass as stored solar power and create infrastructure to grow, process and distribute biomass energy as a pathway towards net-zero cooking energy
- Involve communities and private sector as co-creators of future energy sources



Chitetezo Mbaula + Jetflame

- With firewood – potential to reach highest tiers for thermal efficiency and emissions (reported by Aprovecho Research Institute), equal to high-end 100 USD stoves
- Simple Accessory can burn pellets with instant heat after ignition – but:
 - No pellets, no problem – use firewood

Biogas On Chitetezo Mbaula



Proof-of-concept

- Technically feasible - filling gravel in stove to mix gas and air before combustion on top of gravel
- Proper set-up and tests to come

