Portable Metal Kiln

Why to choose this solution?
These portable metal kilns (PMKs) operate on the principle of reverse draught: carbonisation starts from the top and moves downwards, aided by chimneys situated around the base of the kiln. They provide better control and a greater average yield (about 30%) of charcoal with shorter production cycles (16-24 hours) than traditional earth kilns.

Savings per day or production:
Saves on kilograms of wood used to produce charcoal (the kiln will reduce wastage of wood), as it produces more kg of charcoal (250 kg) for every 1000 kg of wood used. The traditional earth kiln only produces 120-180 kg of charcoal from the same amount of wood.

Cost in money and in own time to construct:
Not specified.

Lifetime:
2-3 years.

Maintenance needed:
Not specified.

Resources needed in use:
The kiln requires dried tree branches systematically arranged vertically inside the drum. The fire is lit from the top once the drum is full.

Problems and limits:
PMKs have a higher capital cost compared with an equal production capacity of either improved basic earth-mound kilns or masonry kilns; they are limited in production capacity (about 3-4 bags); and biomass must be cut and/ split to fit into the kiln. Putting the lid on a flaming drum can also be dicey.

Where and how can you get it or make it?
These kilns are available at Kenya Forestry Research Institute (KEFRI). They are made from ordinary oil drums, modified by welding on short metal pipes that act as chimneys.

Skills needed to produce, install. maintenance, use:
Skills needed to produce and maintain the metal kilns are welding and metal crafts training. The charcoal

producers are trained on how to use this technology. An easy-to-use training manual is also available at KEFRI to guide the users.

How to use it:
To be added.

How to maintain it:
To be added.

Climate effect (if any):
The kiln uses tree branches and thus there is less need to cut down trees. This technology therefore reduces some of the deforestation that contributes to climate change.

Where it is used and how many users are there?
This technology is used in Msambweni in Kwale county and other charcoal producing counties in Kenya.

Why is it successful?
It succeeds because PMKs are easily moved to sites near the required raw materials. Further, the production cycle is short (16-24 hours), they are sturdy and thus last for two to three years, and being weather-resistant, they can be operated throughout the wet season.

If you can make it, a short description, typical problems, materials needed:
The kilns are made of 2-mm-thick stainless or mild steel, consisting of three interlocking cylindrical sectors and a conical cover. The bottom cylinder has eight air inlet/outlet channels arranged radially at the base, chimneys are situated around the base of the kiln.

How to make it (if possible):
To be added.

How is it delivered and by whom?
The PMK is produced by skilled metal craftsmen. Charcoal producers in charcoal-producing counties (men and women) are trained to produce charcoal with this technology, and such training propagates further through the Charcoal Producer Association (CPA). Main actors include charcoal producers and KEFRI as well as charcoal research and development organisations.

Successful financial model
Training charcoal producers and supporting the development of a charcoal framework could be developed further by the Government into a full- fledged Nationally Appropriate Mitigation Action priority. Successful partnerships support the technology, e.g., with Kenya Forest Service (KFS) and with organisations involved in charcoal-related research and development like the United Nations Development Program (UNDP).

What policies and strategies helped the success?
Successful partnerships, training of charcoal producers, and charcoal rules and regulations of Kenya, 2015.

More info:
https://www.fornis.net/node/272 and at
https://www.ke.undp.org/content/kenya/en/home/presscenter/articles/2016/sustainable-charcoal-production-using-improved-technologies.html

Sources:
Kenya Forest Service, Tel: 020-2689882.

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