

Rocket mud stoves in Kenya

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Background information

The former GTZ Special Energy Project in Kenya was one of the pioneers in research and development of improved cook stoves in the 1980s. These initiatives resulted in the Kenya Ceramic Jiko (KCJ), a charcoal stove, and the Maendeleo liner which showed a 35% reduction in firewood for the Maendeleo liner and a 50% reduction in charcoal for the KCJ (Figures 1 & 2).

A second outcome was the establishment of stove production centres, the majority of which were owned by women groups (sometimes with men as members). Most of these centres were significantly subsidized by the project until 1995, when the project was phased out. A post-evaluation in 1999 showed that only a small number

of these centres had survived and a few new ones started on their own. These centres are all now commercial and the annual sustainable production rate is between 12 000 and 15 000 stoves. This figure did not include production in the refugee camps, which amounted to several thousand as well.

After the closure of the project in 1995, the production and marketing of the KCJ charcoal stove took a different direction, as its production and marketing became more commercial. To date in Kenya the charcoal stove can be commonly seen for sale in any of the urban centres.

However, the Maendeleo firewood stove has encountered several difficulties in the move from the production centers to the market for a number of reasons. Firstly, there is no monetary value attached to the firewood collected by people living in rural areas, and hence little incentive or need to reduce firewood consumption. A second reason is that the stove is a semi-finished product, and requires skilled personnel to install the stove once bought. Stove production is also limited to clay deposits areas, and once produced and transported, the price of the stove can increase so that it becomes too expensive for some to afford. In Kenya today, the KCJ costs between Ksh. 280 to 600, depending on the size (about \$4 – \$8); and the maendeleo stove costs between Ksh. 250 to 300, including installation (about \$3.50 – \$4.20).

Therefore, the continued, commercial, firewood stove production has been determined by market forces. Whilst some centres had to close or reduce production substantially due to the lack of a supply chain, other businesses were joined by private entrepreneurs.

New Initiatives

Since January 2006, GTZ – Private Sector Development in Agriculture (PSDA) has promoted the utilization of fuel saving stoves in Kenya at household and institutional level with

support from BMZ (German)/DGIS (Dutch). This has principally involved the promotion of the Maendeleo stove (Figures 3, 4 & 5).

In the early stages of the project the reasons limiting the Maendeleo stove producers achieving their full potential in production and marketing, were assessed. A survey of 29 stove production centers (10 of these had been supported by GTZ in the 80s), in 16 districts was carried out in August 2005, and the results formed the basis for the intervention by the new project.

A second survey conducted in February 2006 showed that:

- 96.8 % of the population use firewood for cooking.
- 87.5 % of the population use traditional three-stones cooking.
- 4.8% of the households used maendeleo stoves (improved firewood stove), which corroborated the findings of the Ministry of Energy study, 2002, in which the results showed that 4% of the population used the improved stoves.
- The average firewood consumption is 1.2 kg per person per day (ppd), while the national figure stands at 1.5 kg per ppd.

The project has focused on addressing the problems identified during the assessment in August 2005; namely to scale up the production and sales of the maendeleo stove (branded Jiko Kisasa). The following targets were set:

Targets

At household level: 225,000 people
At institutional level: 9,000 people
Private entrepreneurs: 1,000 people

To achieve these targets, the project has been:

- Stimulating private sector and community-based organizations (CBOs) to participate on all levels of the stove development chain.



Figure 1 Maendeleo liner "Kuni mbili" (metal clad) firewood stove (photo: Anna Ingwe)



Figure 2 Kenya Ceramic Jiko (KCJ), a charcoal stove with the Maendeleo liner, centre. (photo: Anna Ingwe)



Figure 3 Single maendeleo liner installed (photo: Anna Ingwe)



Figure 4 Using local pots for cooking (photo: Anna Ingwe)



Figure 5 Two maendeleo liner installed (photo: Anna Ingwe)

- Promoting a commercial approach to all stove activities, by persuading households to invest in buying stoves, and setting up private business ventures, as this will be the driving force which will eventually ensure sustainability.
- Focusing on each level of the market (sales, installation and utilization), so that all activities and strategies are geared to increasing uptake of the stoves (Figure 6).
- Capacity building to empower community members with the appropriate technical skills. This will reduce the role of institutions in the quality control, coordination, monitoring and evaluation

of the stoves.

- Operating within existing government structures and staff, to bring on board local networks and political ownership, vital in supporting the project.
- Creating opportunities in stove activities for those directly and indirectly affected by HIV/AIDS in order to create opportunities to save time, money and labour.
- Sensitizing the community to support the creation of a market for stoves.

Focal areas

- Western:
 - Kakamega
 - Vihiga
 - Bungoma
 - Kisumu
 - Siaya
- Transmara:
 - Kisii
 - Transmara
 - Bomet
- Central:
 - Thika
 - Kiambu
 - Muranga

Achievements

- More than 29,000 stoves have been disseminated on a commercial basis (between Jan to Dec 2006). They are all produced by private stove producers, sold out through various marketing groups and installed by private entrepreneurs.
- 13 producer groups have been developed so that they are able to undertake stove production and marketing as a business.



Figure 6 Stove promotion on a market day (photo: Anna Ingwe)

- Support has been gained from two Members of Parliament.
- 15 groups have been trained with installation skills and are marketing stoves as an income generating activity.
- The support and backing of a financing institution has been acquired to offer loans for stove activities

Providing a choice

Despite the fact that the Maendeleo liner stove has been promoted in Kenya for nearly twenty years and has recently been produced on a more commercial basis, the stove has remained at a low level of use within rural communities- only 4% of the population were using this stove.

The provision of an energy saving stove to the majority of the population is one of the major objectives of GTZ. As a result of this concern, GTZ PSDA has introduced the rocket mud stove into Kenya, which has an even higher efficiency, to provide a choice between technologies to the consumers.

Following the success of the rocket mud stove in Uganda, where 100 000 stoves were built in only one year, it was decided to introduce the same stove to Kenya (see Boiling Point 52). The rocket mud stove is a wood-burning stove, which is available as a mobile unit or can be fixed in the kitchen by a trained stove installer. The stove is designed for household use and is suitable for both large and small families.

Advantages of the rocket mud stove:

- Easy to build using locally available materials.
- The rocket mud stove is clean burning and together with the chimney, significantly reduces the amount of smoke produced.
- The stove gives a potential 50-70% saving on firewood.

The decision to introduce the rocket mud stove in Kenya was based on the following reasoning:

- The maendeleo liner is produced in areas near clay deposits.
- The cost of the maendeleo stove can increase significantly once it is transported from the production

site to other areas for marketing. This has the effect that the stove becomes out of the price range from many people to buy.

- It is important to provide an alternative choice of firewood stove, especially to cater for areas that are not producing the Maendeleo liner.
- The communities and rural life in Uganda where the rocket mud stove has been very successful are similar to those in Kenya, and therefore could apply lessons from Uganda to adapting the stove for the Kenyan environment.

It was decided that the first step would be to introduce the stove as part of a pilot scheme in Kisii, as the stove is a new technology to Kenya. The experience gained from the pilot project would also help the project to develop a suitable strategy to promote the stove in other parts of Kenya. The stove was introduced in May 2006.

Kenya experience with the Rocket Mud Stove

- The stove has had high acceptability in the pilot scheme in Kisii, which increases its chances for replication. Between June and October 2006, approximately 7,800 stoves have been installed in the Keumbu Division (Figures 7 & 8). This covers around 80% of the division.
- The major investment has been training people in the skills needed



Figure 7 Rocket stove in use (photo: Anna Ingwe)

to construct the stoves. Income generation is an incentive for the stove builders to continue building stoves, however, out of 480 stove builders trained, only 98 stove builders are constructing this stove on a commercial basis.

- It is a good idea to train a large number of stove builders as it increases the rate at which a stove becomes utilized over an area. However, in the long run, there can be negative consequences to this strategy, in that if the area is rapidly saturated with stoves there will be few jobs for the trained stove builders, unless they move to other areas. The benefits of training a few, local people to build stoves are that their skills are perfected through the continued process of building and that the cost of the stoves is reduced now that there are no transport costs. At present, the cost of construction of a stove is between Ksh. 50 to 200.
- In some areas, depending on the soil type, the fire chamber can erode at a rapid rate as a result of wear through use, especially in places where the firewood touches the back of the fire chamber. The erosion of the fire chamber interferes with the efficiency of the stove- a fact which had prompted the development of the maendeleo liner twenty years earlier.
- The pot rest tends to wear out fast because cooking ugali, one of the most common foods cooked in Kenya, requires a large amount of strong stirring which affects the pot rest. In Uganda this was less of a problem because the staple food is banana cooked in a way that does not affect the pot rest.

Way forward

- Train only a few stove builders so that they have a continuous market over time and are able to perfect their skills. This should also help to keep the price of the stoves stable since excessive competition between stove builders for clients would drive the price too low.
- Carrying out field tests using ceramic product insertion for the fire chamber.



Figure 8 One can also sit while cooking on the rocket stove (photo: Anna Ingwe)

- Field test with ceramic pot rests.

It is evident that the inclusion of two separate ceramic parts in the product may affect the price of the stove. Nonetheless, it is also important to make sure that the necessary adjustments are made to ensure that the technology lasts.

Recent evaluations show a positive uptake of the stove by the Kenya community of Kisii, although there are a few technical problems that require attention in order to provide the community with a more efficient stove that will last longer.

Profile of the author

Anna holds an MSc in Renewable Energy from University of Oldenburg. She has been involved in Household Energy since the early 90ties and is currently heading the GTZ Household Energy Project in Kenya.