

## Assessing the Spread of Improved Charcoal Stoves in Urban Areas, Tanzania

### Themes

- ★ Energy Efficiency
- ❖ Financing mechanisms and private sector involvement
- ❖ Technical capacity development
- ❖ Institutional capacity development
- \* Poverty alleviation (MDG 1)

### PROJECT DATA

**Name:** A Study of Factors Hindering Wide Adoption of Improved Charcoal Stoves

**Implementing Organization:** Tanzania Traditional Energy Development and Environment Organization, or TaTEDO (NGO)

**Location:** Dar es Salaam, Tanzania

**SGP Contribution:** \$25,724.00 (for assessment)

**Date of assessment:** March 1998

### ENERGY OVERVIEW

**Energy Resource:** charcoal

**Technology:** improved charcoal stove (ICS, or jiko bora)

**Application:** cooking

**Sector:** residential, commercial (micro-enterprises)

**Households Served:** 4,000 ICS produced per month

### BACKGROUND

The Improved Charcoal Stove (ICS) was first introduced in Dar es Salaam by the Ministry of Energy and Minerals in 1988 with assistance from the World Bank. Adapted from the Kenyan ceramic jiko, this stove consists of a metal outer casing, a ceramic firebox and an insulation collar. The stove has been promoted because it is low-cost, reduces cooking time, improves thermal efficiency by 30-36%, and reduces the consumption of charcoal and therefore household expenditure. In 1992, the Tanzania Traditional Energy Development and Environment Organization (TaTEDO) assumed responsibility for disseminating this technology in the country. It has trained artisans to produce the stoves and helped establish workshops and repair centers by offering small loans, training and technical support.

Dar es Salaam's population in 1998 was about 3 million and growing. More than 85% of the population depends upon charcoal as cooking fuel, and each person consumes an average of 120 kg of charcoal per year. As a result, 360,000 tonnes of charcoal are consumed in Dar es Salaam annually, accounting for 50% of charcoal use in the country. Prices of charcoal are increasing, as it must be transported from further away due to the scarcity of trees in nearby villages.

However, the sales and production of the ICS had not expanded as much as TaTEDO had hoped. In 1997, demand for the ICS was estimated at 12,000 per month. However, only about 4,000 stoves were actually being produced each month. Therefore, TaTEDO conducted a study in 1998 with funding

from SGP to understand the reasons for this lack of production and market expansion.

### PROJECT DESCRIPTION

#### Overview

The study conducted by TaTEDO was intended to determine why the production of ICS had not expanded to meet existing demand and why existing demand was not greater given the benefits offered by the stove, and to identify ways of addressing these problems.

#### Implementation

The study was conducted as a Participatory Rapid Appraisal because information from users and producers of the stove was essential to identify problems and evaluate possible solutions. A four-member team of energy and environmental engineers, sociologists and socio-economists conducted the study, which involved visiting four workshops, conducting semi-structured interviews of producers, users and distributors, and holding focus group discussions involving these same groups. Based on the findings, the team prepared a report that included a plan for resolving the problems identified through the study.

#### Environmental Benefits

**Global:** The use of an ICS reduces the amount of charcoal used in cooking by 30-36%, if stoves are made according to established standards. This reduces carbon dioxide emissions that contribute to climate change.

**Local:** Reduced use of charcoal improves local air quality. In addition, since coal is produced from wood obtained from the country's forests, reducing the use of charcoal also alleviates one source of pressure on forests.

#### Livelihood Benefits

**Health:** The reduced use of charcoal improves indoor air quality and therefore reduces the risk of respiratory and eye problems.

**Poverty alleviation:** The use of an ICS reduces the amount of charcoal a household must purchase, which saves money. This assumes that the ICS was constructed according to standards.

#### National Benefits

**Reduced use of wood products:** By reducing charcoal use in Dar es Salaam, other regions of the country in which coal is produced from wood will suffer less depletion of forests. This was a goal set out in the country's 1992 National Energy Policy.

#### Capacity Development

**Technical training:** Prior to February 1998, TaTEDO had trained more than 200 artisans who had produced over 150,000 improved stoves between 1993 and 1998. Not every artisan was trained to produce an entire ICS – some learned to produce only certain parts.

**Business training:** TaTEDO has provided some business assistance, especially through the provision of loans for the purchase

## Africa: Tanzania-I

of equipment. TaTEDO is apparently the only source of such credit for most ICS producers.

### Partners

**Government:** TaTEDO has worked with various local and national government entities in promoting the ICS.

The Ministry of Energy and Minerals was responsible for developing policy and regulations related to energy products and use.

The Dar es Salaam City Council was responsible for creating a good business environment via regulations related to designating business areas, producing and distributing products and enforcing measures to safeguard the environment. However, the Council's small business guidelines have not been adequate, and as a result many ICS businesses remain informal in nature.

**NGOs:** TaTEDO was primarily responsible for promoting production via technical assistance and training, and via provision of credit for equipment purchase.

Small Industry Development Organization (SIDO) provided small business management assistance.

**Funders:** SGP provided funding for the study to analyze problems in expanding production and market size.

## LESSONS LEARNED

### Environmental Management

Widespread adoption of the ICS would result in a significant decrease in charcoal use in Dar es Salaam. However, this depends upon the stoves being constructed according to standards, and upon the sufficient expansion of the market for the stoves.

### Barrier Removal

**Technical:** TaTEDO has invested considerable effort in technical training since 1993, and is responsible for training over 1000 artisans to date. However, the report found that some among this group were trained to produce only one part of the stove, or otherwise did not feel that their training was complete. In addition, others learned via apprenticeships or by simply copying designs, which leads to products of variable quality. The problem of having poor quality stoves on the market is a persistent one, and has "tamished the image" of the ICS. In addition to insufficient training, the report identifies several reasons for this. First, quality materials cannot be reliably obtained; for example, rice husks ash is a necessary input for a stove, but there is not a formal market for it, so producers must depend upon personal relations with ginnery operators. Second, many producers lack sufficient capital to purchase the appropriate

materials, and therefore they substitute materials of lower quality. Third, there is not agreement even among the most experienced producers on the established standards for a stove.

**Financial:** Adequate credit is essential for establishing sufficient production, since producers need to purchase equipment. The report recommends establishing a revolving fund for ICS producers and developing producer cooperatives.

On the other hand, those seeking to purchase stoves may need access to credit as well. One way to address this is to find new, more flexible purchase methods, such as a rental system. Cheaper production methods could also be pursued.

**Institutional:** One problem identified through the study was the lack of a coordinated source of information about stove designs, materials and training, and marketing of the products. The report recommended that TaTEDO establish an information center to meet this need.

**Policy:** One of the most significant barriers that face ICS producers is their inability to obtain approved production sites for small-scale production. There is no procedure for allocating small plots for businesses, and thus many ICS producers remain informal despite having business licenses. This creates instability and hinders the sector's development. The report proposes that TaTEDO work with government agencies to address this problem.

### Scaling Up

All of the above barriers are also obstacles to scaling up production of the ICS. A further hurdle, however, is the low level of awareness on the part of potential purchasers concerning the benefits of the ICS. In some cases a reputation of poor quality perpetuated by the factors described above. A serious effort is necessary to raise awareness about the stove, especially among women who are the primary users. In addition, promotion in other cities besides Dar es Salaam where charcoal is used would help expand the market. The report noted that women have not been actively involved in the promotion of the stoves, but since women are the primary users, their involvement is critical. Community-based women's organizations are another potential place to promote the stoves.

## SOURCES CONSULTED

Tanzania Traditional Energy Development and Environment Organisation (TaTEDO), March 1998. "A Study on Factors Hindering Wide Adoption of Improved Charcoal Stoves: A Participatory Rapid Appraisal (PRA) of Improved Charcoal Stove Stakeholders in Dar es Salaam."  
Nehemiah Murusuri, national coordinator, GEF Small Grants Programme Tanzania. Email communication, October 2003.