

# Supply and Demand Chain Analysis of Charcoal and Firewood in Dar es Salaam and Coast Region

## Background

This study was commissioned by Tanzania Traditional Energy Development and Environment Organization (TaTEDO) in order to carry out an independent analysis of, *firstly*, the existing woodfuels demand/supply chain within TaTEDO programme area and to analyse and determine the primary constraints and opportunities that exists in the whole chain in order to lay groundwork for identifying support initiatives that can promote the development of the sub-sector and recommend the most appropriate method of assessing environmental impact associated with woodfuels production and use; *and secondly*, to analyse the various sub-groups within the overall target group for improved stoves and ovens and their respective needs and wishes.

The study has analysed the pattern of woodfuel supply and consumption to and by various target groups both in the rural and urban households, institutions, micro and small enterprises by examining the supply and demand chain/conditions, and also identified the specific needs and preferences of these groups. The study has also analysed the current adoption level of the improved stoves technologies among targeted groups and finally identified possible modifications for the existing prototypes and developed the strategy for increased uptake and adoption of TaTEDO improved stoves and ovens.

## Methodology and Approach

The study is based on information collected from primary sources in the field where a total of 170 respondents were interviewed. The secondary data included the review of available documented reports, information and studies that were thought of relevance to this study. Field survey and visits provided useful information in the form of questionnaires filled. In addition, various key resource persons in the woodfuel sub sector supplied invaluable information.

## The Main Findings of this Study are the following:

- § Although the average daily consumption of charcoal in Dar es Salaam is estimated to be 24,000 bags per day, this study has revealed that only 10 – 20% of this amount passes through legal checkpoints and thus earning the government the revenue.
- § The main types of stoves used by urban dwellers are charcoal stoves and ovens, while rural dwellers use mainly firewood stoves, which are dominated by inefficient traditional three-stone fireplace.
- § Low-income communities located both in rural and urban areas form a potential user group of charcoal and woodstoves. The study has established that none of those who are earning less than TShs. 45,000 per month is using electricity as main energy type.

- § The price of improved cookstove has been seen to be the most important factor impacting adoption of improved stoves by users especially the rural households. Survey results have revealed that affordable stoves are those with prices ranging between TShs.1,350 to TShs.5,000, which are *Bellbottom, Straight, Sazawa, Miguu Mitatu*.
- § While in most regions, fuelwood is still largely free (i.e. people depend on what they can gather themselves), in urban areas fuelwood is largely purchased. The success of improved stoves in the urban areas will depend on how much the user will cut down fuelwood requirements. By using improved charcoal stoves the survey has recorded the savings among the user up to 50 percent.
- § Most of the stoves are not durable and the major factors attributed include usage of low-quality raw materials especially poor quality iron sheets, scrap material and ceramic liners as well as poor workmanship by unskilled artisans who operate informal businesses in the informal sector and have not attended prior stove fabrication training from TaTEDO.
- § Interviewed users of improved stoves reported that, the use of improved stoves contribute a lot to the improved kitchen environment especially with regard to cleanliness and health, and that the amount of smoke that was being produced by the traditional stove has been reduced tremendously and hence the level of coughing, headache and eye irritation has been reduced.
- § There are still a very little number of institutional stoves on the market than the domestic stoves. Artisan fabricators have no technical and financial capacity to produce institutional stoves of high standards.
- § There is a big potential for improved institutional stoves to reduce fuel consumption in the community centres and thereby reduce the deforestation as well as health hazards appreciably.
- § The most commonly used fuel in the institutional stoves is firewood, however the availability of the fuel is uncertain the factor which keeps potential users asking on the possibility or option of using charcoal in the institutional stove.
- § Most users especially those in small food processing and catering business have expressed their concern on the unavailability of larger sizes of charcoal stoves, which are capable to meet their operating requirements.
- § Field observations have indicated that the improved institutional woodstoves which was designed using the knowledge from the University of Dar es Salaam and installed at some schools in Tanzania that have indicated little fuelwood consumption, with fuel saving between 60 to 80%.
- § The adoption level of improved stoves is higher in the urban households as compared to rural households. According to findings of this survey the majority of the urban users have used at least one type of improved stoves. Stove prices seems to be

affordable to the targeted users in the urban areas where woodfuel (particularly charcoal) is purchased hence users are interested to save fuel.

- § It has been observed that the uptake and adoption of improved stoves and ovens depends on the user's cooking requirements both for households and institutional level. In the school survey it could be established that the adoption of improved institutional stoves depended on some key factors such as availability of fuel type, the price of the fuel and the type of foods prepared.
- § Needs and wishes of potential beneficiaries do at a large extent determine modification aspects that should be considered for successful adoption of stoves. Through this study it has been established that durability of the stove is the main aspect of concern and should be taken as a base when planning future modifications. Advanced stove technologies will have to include new materials in order to produce a ceramic liner, which can withstand higher temperature fluctuations and mechanical stresses.
- § The study has revealed that for increased uptake and adoption of improved stoves and ovens the strategies should include constant follow-up throughout the whole stove chain involving stove components manufactures, retailers, users, researchers, and policy makers and/or stoves programs facilitators.
- § From the literature sighted during this study it was revealed that simple traditional kilns are capable of making charcoal at a conversion rates ranging from 2 – 5.20 bags of charcoal from 1 cubic metre of fuelwood (2 – 3bags) and (2.84 – 5.20). If this statement is true, then TaTEDO will need to find ways of improving its technology in order to produce kilns that are more efficient than the traditional earth mound kilns.
- § From the interview it has been ascertained that charcoal dealing is a purely male dominated activity as no women dealers were found during the research period. Further investigations reveal reasons for non-participation of women as charcoal dealers, as that business operation is done during the night when women are supposed to be at home caring for children and other members of the family. Furthermore, because of poor road conditions and poor state of the vehicles used in charcoal transportation, women consider this as risk factor in this business.
- § Apart from many factors that constrains the growth of the charcoal supply / demand chain, there are also many positive factors that provide opportunities for growth and hence strong reasons for TaTEDO and other support organizations to focus their activities in the supply chains.

## Recommendations

- § For TaTEDO to promote successfully improved technologies, the organisation should take steps to make interventions which are aimed at directly impacting beneficiaries through increasing their income and creating employment. For example to assist charcoal producers establish producers association.
- § TaTEDO should lobby for government supportive policies in order to order to reduce tax on charcoal trading.
- § TaTEDO to link artisans Business Development Service providers to assist the formation of legally registered artisans' association of producers.
- § TaTEDO should lobby for government supportive services in order to put in place infrastructure and operating environment, since most of operators do not have approved premises to conduct their businesses.
- § In order to achieve high quality products, TaTEDO should link producer associations to funding organizations (e.g. AREED, ADF) so that they can get an access to finance or supplier of credit for raw materials.
- § TaTEDO should collaborate with University researchers to develop and put into the market the stove materials / components, which have better working properties so that to enhance the performance of the stoves as well as their durability.