



Policy Brief 1

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Innovative and sustainable market-based systems for enhancing diffusion of clean cooking solutions

Key Messages

Why clean cooking solutions?

- With an estimated 3 billion people (30 per cent of households globally) still relying in traditional biomass for cooking daily, the hope of achieving SDG 7 will still remain a mirage.
- Over 81 per cent of East Africa population live without access to modern energy services with over 90 per cent of the rural households using traditional biomass systems on a daily basis, which expose the users to health risks from household air pollution and fire hazards and results in degradation of forests and woodland resources.
- Conducting business as usual will only make things grow worse. Urgent action is needed to scale up access to modern energy cooking solutions through policies, financing, and technology development if SDG 7 is to be achieved in East Africa.

Priority actions

- Awareness and capacity building: One of the challenges of up-scaling clean cooking solution has to do with low awareness among users, especially in rural areas as well as other stakeholders. There is need to focus on awareness creation and capacity building of stakeholders (policy makers, entrepreneurs, financiers and consumers) and build as institutional and infrastructure capacity needed to support clean cooking solutions market.
- Multi-sectoral action: Clean cooking solutions is a cross-sectoral issue and its implementation should engage diverse public and private stakeholders from across the development spectrum, including but not limited to policymakers, health, agriculture, financial sector, environment, and education, as well as private sector actors and gender. This could include strengthening existing frameworks such as national Clean Cookstove Associations, Global Alliance for Clean Cookstoves (GACC), Sustainable Energy Access Forum Kenya (SEAF-K) etc.
- Local manufacturing: There is need to promote local manufacturing of quality products to protect the consumers from sub-standard products. This should be supported by strong innovation networks and

forward looking in-depth technology analysis that will result in design, prototyping and reverse engineering to adapt current technologies to end-user needs. Adequate financial and technological resources are needed to help spur innovation and identify a suite of affordable and scalable clean-cooking solutions. For example, high-performing biomass stoves can serve as an important transitional solution until infrastructure for the cleanest options (such as electricity, LPG, ethanol, biogas, and solar) is built.

- Standard and quality assurance: Having Standards is an important area to support the market. The Draft cookstove Standard in Kenya need to be completed and rolled out. This could also help to benchmark the process in the neighboring countries in East Africa. Together with this is the need to develop a voluntary testing and labeling scheme to support the market and protect consumers. This has been done successfully by Lighting Africa for the solar market.
- Use of ICT Innovation: Unlike solar market, cooking solution market is yet to fully utilize technology innovation, especially ICT to support market development. There is need to invest in ICT innovation to support the market. This will also help in making the technology accessible to poor communities in the rural areas through easy payment system such as mobile phone payment.
- Financing clean cooking solution: Develop a financing mechanism to support research and development of clean cooking solution market as well as suitable low-interest and long-tenure loans and investment financing for supporting and scaling up successful initiatives. This should include a deliberate attempt to attract private sector financing.
- Monitoring: Improved monitoring of household energy use, including primary and supplementary cooking fuels and technologies, as well as those used for heating and lighting, must be adopted to accurately track, measure impact, and assess progress towards achieving universal access. Each country needs to have an in-built system of monitoring and reporting. Assessment of impacts on health, environment, climate, gender and livelihood is crucial to understanding the full burden of polluting fuels and technology combinations.

Introduction

The East African Community's Regional Strategy on Scaling-up Access to Modern Energy Services (2009) estimates that over 81% of the populations in the five East African Community member states live without access to modern energy services and about 90% of rural population are still using traditional biomass. In Kenya for example, biomass energy consumption constitutes 68% of the primary energy consumption. Over 90% of the rural household uses firewood for cooking while 80% of urban household depend on charcoal as the primary source of fuel for cooking (DGICK 2013). Cooking using traditional fuels leads to emissions of greenhouse gases and soot (black carbon) due to poor combustion with serious impact on health and environment. Traditional use of biomass, especially charcoal, is linked to degradation of forests and woodland resources as well as soil erosion.

Cookstoves markets in this region are not adopting clean fuels and stoves hence not tapping into the potential positive health, environmental, social and economic impacts of clean/modern cooking practices. Most of the East African improved cookstoves sector emerged in the 1980s with the development of the Kenyan Ceramic Jiko (KCJ). Since then, countless stakeholders in each country have developed numerous types of stoves to address both urban and rural communities' clean energy needs.

Despite the decades of efforts, penetration rates remain low, which is an indication of persisting and unaddressed barriers. This study looked at evidence and made actionable recommendations on how to improve the diffusion of clean cooking solutions within a market based approach. The ultimate goal was

to enhance the adoption and diffusion of clean cooking solutions through innovative and sustainable market approach that addresses issues such as a demand-driven approach to facilitate adoption of clean cooking solutions.

Methodology

The study was carried out through a national level inventory to provide a broad idea of the status of clean cooking solution market. The study used random and purposive sampling techniques to identify respondents in rural (cooking solution producers, users and retailers), peri-urban (consumers, distributors and manufactures of cook stoves) and urban settlements (consumers, distributors and manufactures of clean cook stoves). The study design was based on a simple random sample. The study adopted standard sampling procedure to come up the sample numbers for a large Cochran (1963:75). Using this procedure a total of 467 households were interviewed, 71% who were women, majority (83%) between the ages of 25-45 years. The study also interviewed 27 traders.

The study used mixed methods and approaches including desk reviews, stakeholder interviews, case studies and focus group discussions. Both quantitative and qualitative data was collected using mixed methodologies such as desk review, household surveys using questionnaires, key informant interviews and focus group discussions to capture all actors in the value chain including producers, traders, consumers, researchers, development agents and policy makers. The Study was conducted in Kenya and Tanzania. In Kenya the counties covered include Kwale, Migori, Homa Bay, Kisumu, Vihiga, Nakuru, Kajiado, Machakos and Meru. In Tanzania the districts covered were

Kinondoni, Bagamoyo and Mkuranga. Data was cleaned, collated and analyzed using SPSS version 24. Quantitative data were analyzed at 95% confidence level. Qualitative information from focus group discussions (FGD) was analyzed using both content and thematic analysis to complement the quantitative information.

Results

The study revealed that an average of 97% of respondents in the rural areas do not use any clean cooking solution while in peri-urban areas the average for 54% (Fig. 1). Of those using clean cooking solutions, all were using improved cookstoves while on 13% were using improved cookstoves with a clean fuel (mainly briquette).

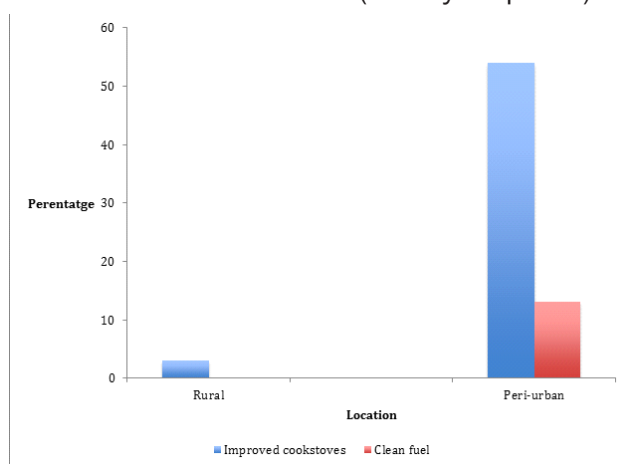


Fig. 1 Use of clean cooking solutions in peri-urban and rural areas



Figure 2: Mother and a child using three-stone traditional stove in a poorly aerated room in Kenya

The study interrogated whether the stoves are imported or locally manufactured. Of the respondents using improved cookstoves, majority (89%) of the households in rural areas are using locally manufactured improved cookstove, while in the peri-urban areas the ratio of imported and locally manufactured stoves are almost equal (Fig. 3).

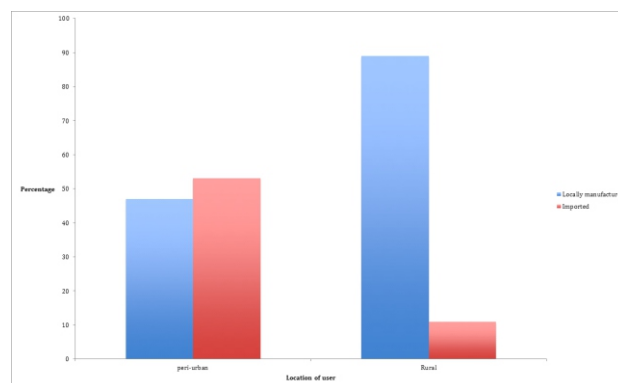


Fig. 3 use of imported versus locally manufactured improved cookstoves.

The study identified two main types of improved cook stoves (ICS), 1) portable ICS and 2) fixed ICS. While the portable were found both in rural and peri-urban areas, the fixed type is predominantly in the rural areas. The portable systems are light, easy to transport and can be carried and used in different locations. Most of the portable stoves are for charcoal burning with only very few designed for firewood, which are currently emerging in the market such as the burn stove (Jikokoa). On the other hand, fixed ICS are predominantly found in the rural areas. They are fixed either on the floor or on a wall, and are mostly are firewood stoves. The stoves exist in different sizes and designed and are fitted with chimney. One example is Enzaro Jiko, which was introduced in the 90s by Japanese International Corporation Agency in several parts of western and eastern Kenya.

The thermal efficiency of improved cookstove ranges from 18% to 45% depending on the design configuration. However, all the improved cooked stoves exhibit the rocket principal for enhanced draft and combustion efficiency allowing for sufficient primary air underneath the pieces of sticks and enough draft chamber for full combustion.

The past few years have seen great innovation in improved cookstoves. The innovation is driven by the introduction of climate financing and Carbon Emission Reduction (CER) trading targeting the improved cookstove market. These new technologies are having higher efficiency and more aesthetic value to attract not only the poor but also the middle class users. In our study these types of stoves were recorded predominantly in the peri-urban areas and hardly in the rural areas.

The emerging pattern of the type of stoves and their distribution in rural and urban areas need to focus on a wider perspective on the barriers and catalyst that sees specific stoves suited for specific conditions. The key issues rotate around affordability, availability, quality, suitability and awareness including capacity. The improved biomass stoves are mainly locally produced and thus more affordable, available and suited for local cooking conditions, most of the modern ICS are imported, expensive and in some cases not suited for local cooking conditions.

Though, the locally manufactured stoves seems to be the majority in rural areas, the pertinent question to be asked is the differences in quality between the locally manufactured stoves and imported in terms of fuel efficiency, emissions and other benefits expected from improved cookstoves. In our study it has been demonstrated that the locally manufactured cookstoves are predominantly in the rural areas and are characterized with low thermal efficiency but are more affordable while the

more modern improved cookstoves are found mainly in the peri-urban areas but are relatively more expensive.

The question may be how to strike a balance between the cost and quality. Of those who were not using clean cooking solutions majority (57%) responded that they could not afford the cost of buying an improved cookstove. This was followed by none availability of clean cookstoves in the local market, especially in the rural areas (Fig. 4).

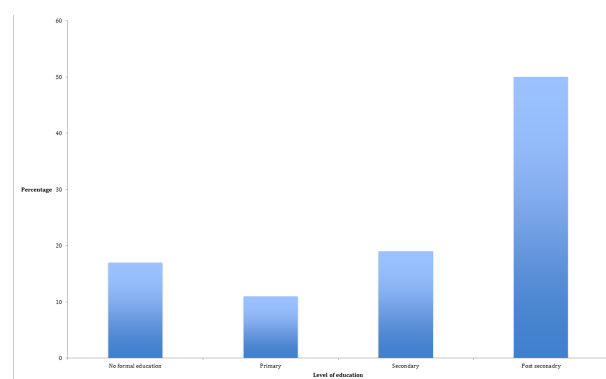


Fig. 6 Education levels of those having clean cooking solutions

This observation could simply mean that household with high education level are likely to have a higher disposable income so are they can afford to buy ICS and are higher aware levels due to better education and exposure to external world. This observation reinforces the observation that the key issues seem to determine penetration of ICS in the rural and urban household are questions affordability, availability, quality, awareness and capacity.

To try to demystify these issues one of the questions we are asking is what constitutes affordability and to what extent does affordability affects quality? In the rural areas where clean cooking solution penetration is lowest, it was noted that the products in the market are more or less locally made and are

cheaper compared to the imported products. That meant that household were more likely to buy locally made products. As many studies, have concluded in the past (Adkins e al 2010), locally made products are of lower quality. For example, since the 1980s when the Kenya Ceramic Jiko entered the market, local manufacturing was taken over by the informal sector (*juakali*). With no Standards to control the trade a lot of sub-standard products entered the market with many stoves not lasting more than 3 months in use at best. This could have made the users to give up on ICS and revert to traditional methods that they are used to.

Innovation in ICT has been used to a high success in solar market in Kenya. For example in solar market traders have invested in ICT innovation such as M-KOPSA to make the product available. In the contrary CCS is yet to see this type of innovation in the market. The current study recorded very low use of ICT in marketing and distribution of CCS with only 15 per cent of the traders indicating they are using ICT while 85% are yet to embrace ICT. Focusing on ICT innovation could help to lower the cost of CCS and help in up scaling the CS market.

Key recommendations

- Awareness and capacity building: One of the challenges of up-scaling clean cooking solution has to do with low awareness among users, especially in rural areas as well as other stakeholders. There is need to focus on awareness creation and capacity building of stakeholders (policy makers, entrepreneurs, financiers and consumers) and build as institutional and infrastructure capacity needed to support clean cooking solutions market.
- Multi-sectoral action: Clean cooking

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