

## **Solar Cooking—the solution to environmental impact and fuel scarcity in Kakuma Refugee Camp**

*By Eng. Godfrey Mawira Kaburu*

In Kakuma Refugee Camp, solar fuel potential is enormous as the area has some of the best insolation profiles. However, firewood is normally used and provided by aid agencies, but it's scarce and inconsistent. Providing enough firewood has been an uphill task and refugees are forced to supplement their firewood needs by cutting surrounding trees. Others resort to barter-trading away their meager food rations from the World Food Program (WFP) for charcoal, with some even burning plastic jerrycans.

Kakuma camp sits on an ecological knife edge in one of the most arid environments in Kenya, and tree cutting could completely propel the entire northern region onto a path of desertification.



Reports indicate that an influx of refugees in Kakuma and Dadaab Refugee Camps has caused rapid environmental devastation as acute fuel shortages drive refugees into cutting anything available.

Numerous reports in recent years highlight incidences of SGBV<sup>i</sup> against women who are collecting firewood, not to mention physical injuries such as snake and scorpion bites. Other protection challenges include the risk of arrest for illegal firewood collection and refolement<sup>ii</sup>. Too many women in Kakuma use firewood for heating needs, consequently damaging their health, their children's health, and the health of their habitat.

The WHO estimates that globally 4 million deaths occur annually as a result of household air pollution.

Solar fuel holds great promise in dealing with these challenges. It is free, unlimited and renewable, has zero-emissions and can be one of the most significant harvestable energy resource in the region. Nevertheless, effective strategies are yet to be put in place to minimize firewood use and scale-up solar fuels in Kakuma.

Recent research (by Godfrey Kaburu of WFP) noted that in Kakuma, solar cooking was introduced as early as 2003. It brought about substantial monetary savings and improved living standards for refugees, especially during periods when firewood rations were delayed. Solar cooking decreased the amount of time women spent looking for firewood, or for collecting/purchasing charcoal. With time saved, women could take on other livelihood activities and invest more in social activities like child care. This would be a key factor in ensuring that children were healthy and ate nutritious food. Nevertheless years later, solar fuel adoption has been disappointingly low.

In the research, a cross-sectional study using systematic sampling selected and interviewed 125 former solar cooker recipients. It was revealed that firewood was the most widely used fuel type at 83.6%, followed by charcoal (15.6%) and solar (0.8%). Charcoal was noted to be the most preferred fuel because of its flexibility; speed, ability to cook all types of food both indoors and outdoors for all family sizes. Flexibility and simplicity in use and plus need for training in operation and maintenance also made it attractive. Interestingly solar fuel ranked as the second most preferred cooking option - see per the figure below;

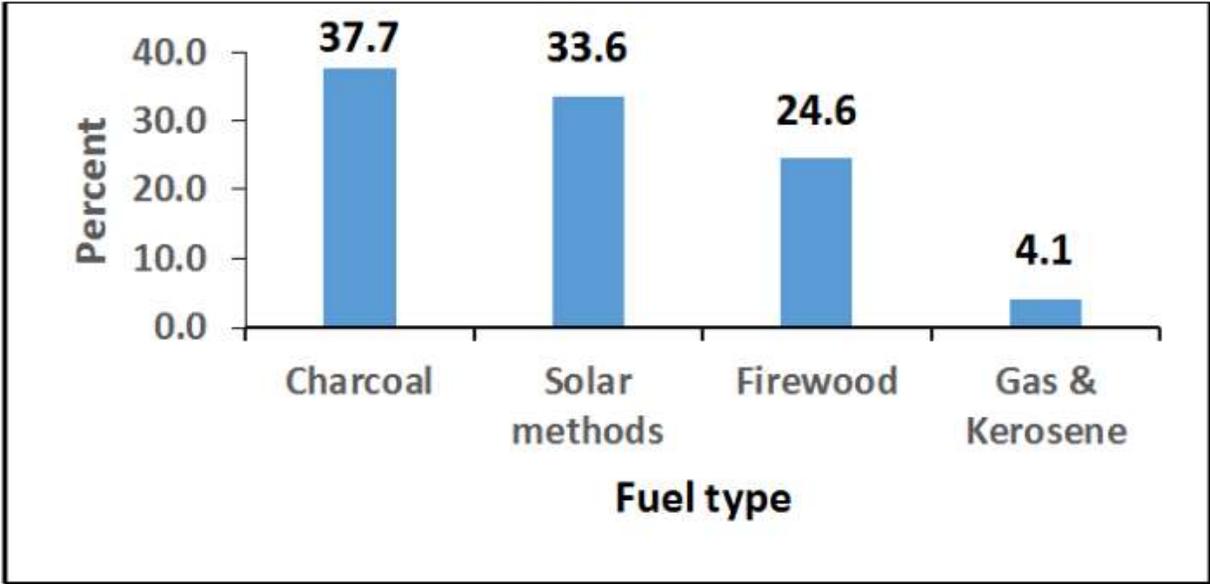


Figure 1: Fuel Type Preference among Refugees  
Source: (Godfrey Kaburu, 2016)

Paltry adoption of solar cooking was influenced by social, cultural and programming issues including gender, low level of education, place and times of cooking, scanty beneficiaries’

participation and repair and maintenance follow-ups, poor programme design and absence of funding. The research concluded that there is great potential to scale-up solar cooking in Kakuma to be widely used, sold, supported and ideally even produced locally in the camp. Solar cooking like in any community project should be tailored according to needs of beneficiaries thus careful participants, community and cooker-type selection was noted as paramount to success of solar cooking. On the other hand, looping in passionate people who could do follow-ups and maintenance of cooking kits, and address community views alongside a major solar cooking investment and roll out was critical.

The study also noted that time and place of cooking negatively impacts solar cookers' efficiency. Some families in Kakuma preferred to cook indoors or in the morning/evening, leading to a low cooker effectiveness.

Time is of essence as ideal period would be between 10am and 4pm within the tropics when the solar radiation is intense. The researcher proposes having extensive community mobilization and lobbying as well as beneficiary advocacy to adjust cooking times and locations at household level. Adapting the designs of solar cookers to the specific environment would also be vital in success of solar cooking.

A cooker with a canopy can give some sun shading and be more attractive to beneficiaries and for institutional and mass cooking incorporate parabolic and curved reflectors to collect, direct and concentrate sun's rays onto a receiver. Some previous solar cookers were not suited to Kakuma region as some would be blown away by wind as food cooked, and others violently stolen leading to loss of food.

In some instances some were swept away by floods, and the majority broke down due to harsh weather. It's recommended to seek views from individuals and communities, and careful preliminary studies before roll-out ahead of a major solar cooking intervention. This would ensure that interventions are tailored to the needs of potential beneficiaries (particularly women's needs as they are typically the primary cooks). Factors particularly relevant to solar cookers include durability, cost, life-span, climate, ease of assembling, operation and maintenance and careful cooker selection is needed ahead of roll-out.

Strategic partnership with Kakuma-based agencies would also be necessary. Beyond humanitarian assistance, it would also be a good idea to explore carbon credit financing for investment sustainability. Solar heating industry is also poised to take root, flourish and blossom not only among refugees and rural communities but also within institutions and factories in Africa.

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<sup>i</sup> Sexual and Gender Based Violence

<sup>ii</sup> Unwillingness of authorities to grant asylum or involuntary repatriation pervade