



# The State of Sustainable Household Energy Access in Refugee Settings in Uganda

Survey Findings in Rhino Camp Settlement and Imvepi Settlement, Arua District, West Nile Region



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# Executive Summary

# Executive Summary

Uganda is home to more than 1 mio. registered refugees and asylum seekers, most of them migrants from South Sudan, the Democratic Republic of Congo (DRC), Somalia Burundi, Rwanda, and Eritrea. The influx of refugees into the country has aggravated the already existing depletion of natural resources. This is especially true for deforestation due to the high demand for fuel wood. 97% of cooking fuel is derived from wood biomass (81% used firewood-based stoves, 19% charcoal-based stoves) to prepare daily meals, for boiling water. The situation is further exacerbated through the use of inefficient traditional “3-stone-fires” and/or metal stoves. At least 55% of refugee households use this as their main cooking device. Wood consumption of refugees and host community members in and around settlements surpasses natural replenishment and has consequently led to deforestation and forest degradation. It is furthermore contributing to conflicts over firewood between refugees and the host communities.

For domestic lighting, 49% of households use disposable torches, 26% solar lamps/panels and about 25% dry cell torches. In the local markets, a high number of branded products exist; 99% of the solar lamps in use in the settlement were acquired through development partners. However, 81% of households using solar devices are experiencing some sort of problems with their lighting devices, such as brightness, lighting duration, cost of technical fixing and availability of access to servicing.

The pilot project “Sustainable Use of Natural Resources and Energy in the Refugee Context in Uganda” was funded by DFID and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the World Agroforestry Centre (ICRAF). The aim was to pilot an integrated and innovative approach to natural resource management by creating sustainable solutions to improve access to energy, water and other ecosystem goods and services for refugees and host communities. The Imvepi and Rhino Camp settlements located in the Arua District/West Nile sub-region have been selected as implementation areas.<sup>1</sup>

The objective of the pilot was to find evidence whether and to which extent market-based approaches can provide access to sustainable energy in refugee settlements and host communities. GIZ Energising Development (Endev) Uganda oversees the implementation of the energy component of the project.

To set a robust baseline, Endev Uganda implemented three assessments, interviewing 400 refugee and host community households, 30 energy business owners and 8 focus groups.

From the baseline survey, it was established that firewood and charcoal are the main sources of fuel in the settlements. In most average households (size of seven individuals), two meals per day are prepared, though cases of outliers of up to fifteen individuals were recorded. The women mostly prepare the meals from inside shelters. This situation has – besides the environmental impact – negative consequences for the health of especially women and children. Most of the residents are aware of the benefits of improved cooking technology and are willing to both pay and work to acquire the improved stoves.

The provision of electricity and lighting devices by developmental agencies has been both advantageous and retrogressive. Solar lamps received (49%) from development agencies as handouts have increased access to acquiring solar products, especially lamps, but this also stifles the free market and increases dependency on aid. It also challenges the sustainability of the approach.

So far, there are hardly any businesses which provide improved cooking stoves or good-quality solar products. The assessment study suggests that there is potential for sustainable market-based solutions benefitting refugees and host communities in both settlements.

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<sup>1</sup> [https://ugandarefugees.org/wp-content/uploads/U-WN-AR-Factsheet-Endev-UG-Refugee-Pilot\\_Final-2018.pdf](https://ugandarefugees.org/wp-content/uploads/U-WN-AR-Factsheet-Endev-UG-Refugee-Pilot_Final-2018.pdf)



# Demographics

# 1. Demographics

## 1.1 Background

Uganda's favorable refugee policy, coupled with a comprehensive refugee response framework, has placed the country as one of the top refugee hosting countries worldwide. The ongoing crisis in South Sudan has contributed to the influx of refugees into Northern Uganda. The refugees are hosted in settlements as opposed to a camp system, and the refugee populations have fused with the host communities. The demographics below are indicative of the sample that was used for the baseline survey drawn from the two settlements in the district of Arua, Northern Uganda.

Rhino Camp settlement has existed for more than a decade with the highest refugee migration patterns into the camp recorded between 2013 and 2016. Most of the refugees (40%) have lived in the settlement for two to five years, 25% for less than two years, 9% for more than five years. 26% are members of the host community living within settlement zones. The country of origin was mainly (78%) South Sudan; with up to 80% females/children, and 39% representing children below 30 years of age. The average household comprises seven to eight individual members.

Imvepi settlement is a relatively new settlement. It has existed for not more than three years and was reopened in 2016. Its refugee inhabitants are predominantly South Sudanese from the Kakwa ethnic group (89%).

The main languages spoken within the settlement are Lugbara and Kakwa. Arabic is sparingly used. Females represent the majority of refugees in the settlement (65%) and are also the bread-winners for most households. Similarly, the average household comprises seven to eight individual members.

*Photo: section of Zone III of Imvepi refugee settlement, as of December 2017*



## 1.2 Population

Females dominate the population of Rhino Camp settlement (80%) and Imvepi Settlement (65%). Women are the bread-winners, mainly because most of the men who survived the insurgency have remained in their home countries or migrated to other countries for work to support their families in the settlement. The average household in both Imvepi and Rhino Camp settlements comprises seven to eight members.

The population of the host community is more homogeneous in both Imvepi and Rhino camp settlements: it consists mainly of females (55%) (UBOS report 2016). The average host community household in the settlement area comprises ten to twelve individual members.

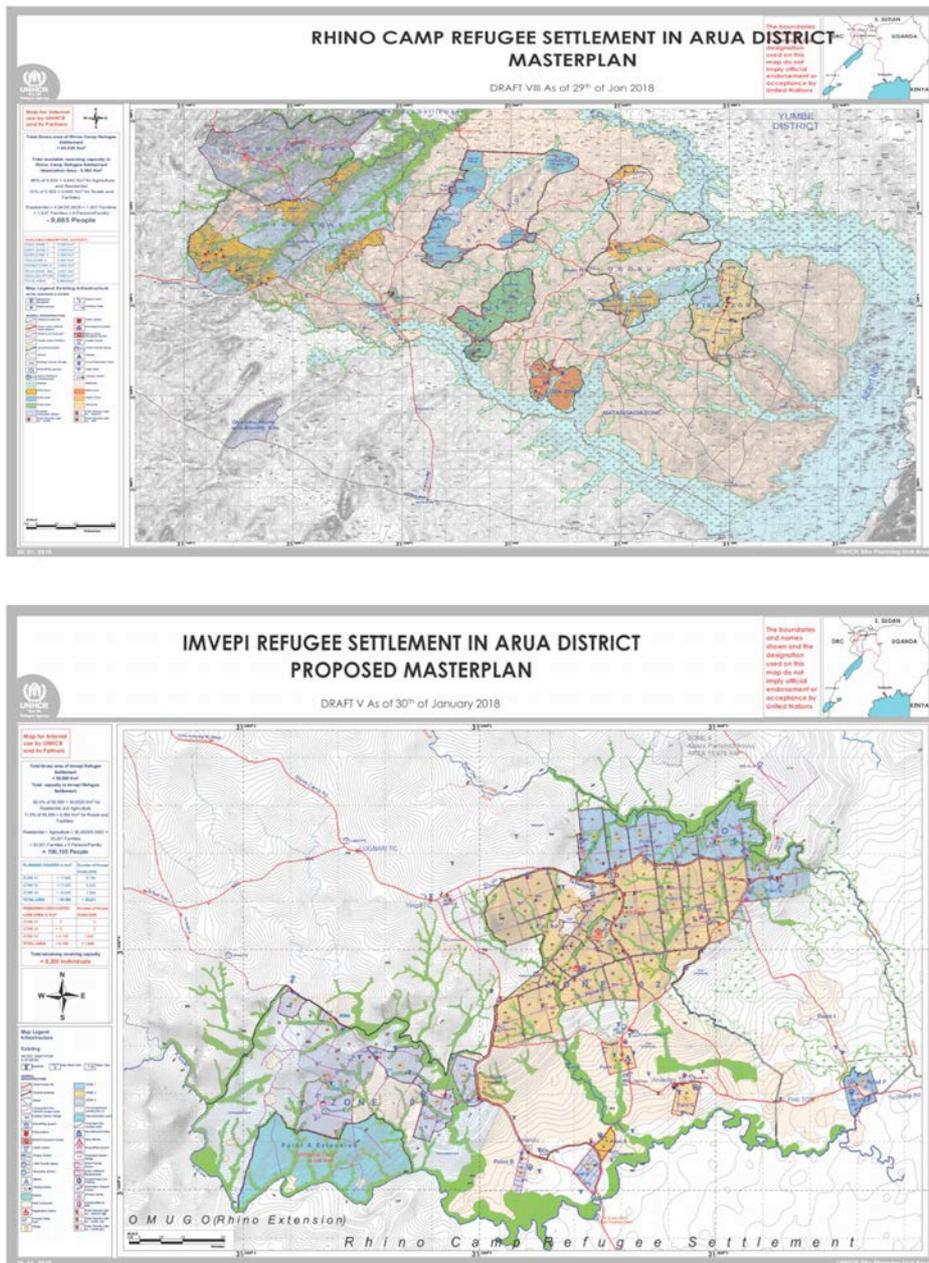
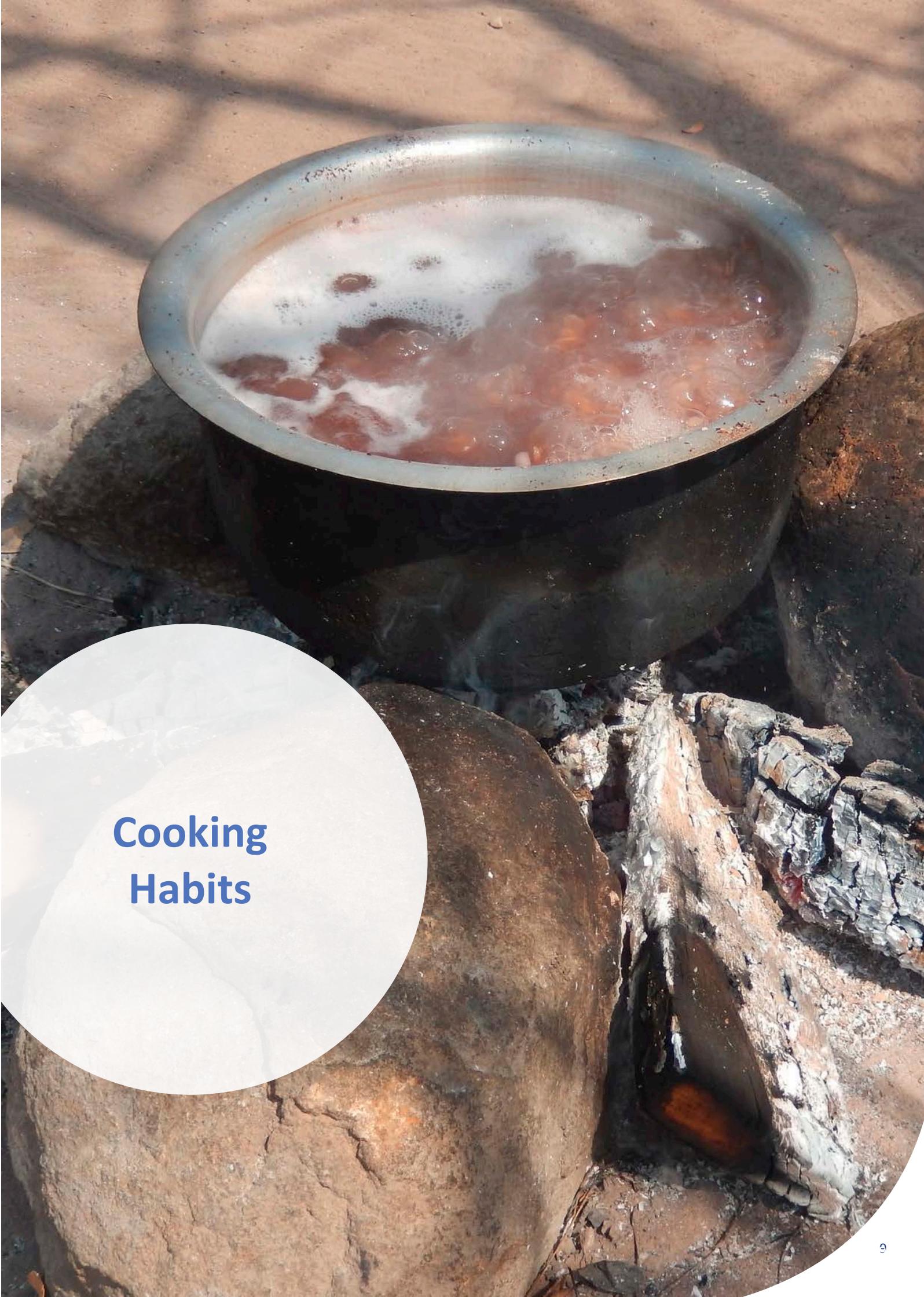


Figure 1.1: aerial maps of Rhino Camp and Imvepi settlements, in Arua district (UNHCR, map legend as of 29<sup>th</sup> Jan 2018)



**Cooking  
Habits**

## 2. Cooking Habits

### 2.1 Meal Preparation

Preparation of meals within enclosed structures is common practice among refugees, with more than half (58%) cooking inside the shelters. This practice leads to higher levels of indoor air pollution and causes negative health impacts especially for women and children, who spend the most time close to the cooking place. Household meals are generally prepared by women between the ages of 18 and 24, many of whom prepare two to three meals per day.

The preparation of a single meal lasts about three to five hours for refugees compared to one to three hours for host community. The meals cooked within the settlements are composed of maize flour, cassava, sweet potatoes, pumpkin, dry beans, greens, silverfish and sometimes vegetable leaves from wild for lunch/dinner and porridge at mid-morning.

55% of Refugee households prepare 3 hot meals/day, while only 50% of host households prepare at least 2 hot meals/day. Food shortage is the major reason for skipping meals only 11% cited fuel shortage as the reason for skipping meals.

Reasons for Skipping Meals per Settelement

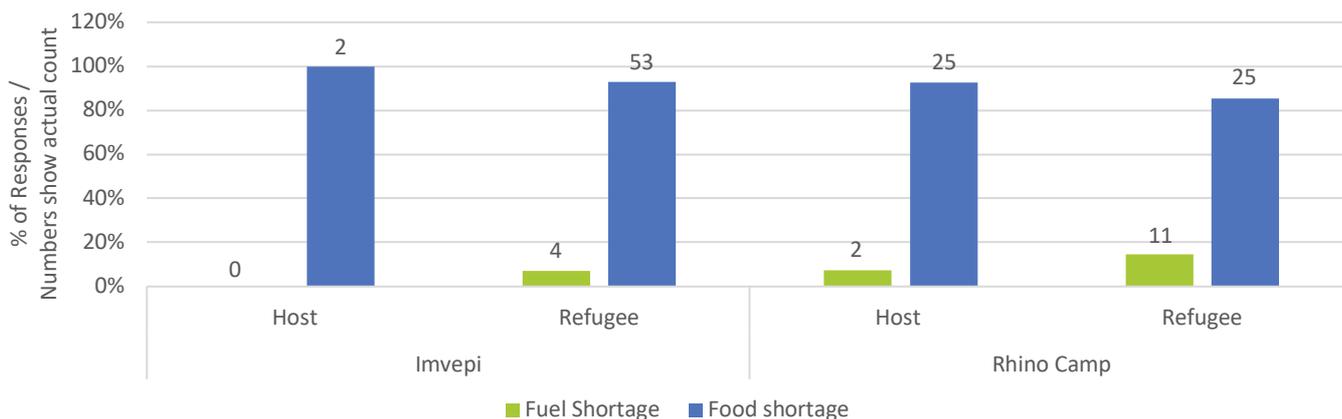
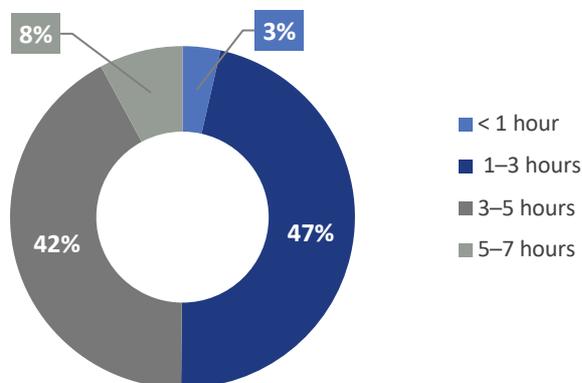


Figure 2.1: Represents frequency of reasons for skipping meals among refugees and host community

Time Spent on Cooking Across the Settlements



Host community: 47% of households cooking time between 1–3 hours per meal prepared  
 Refugee Community: 42% of the households cooking time between 3–7 hours per meal

Figure 2.2: Time Spent Cooking Across the Settlements

## 2.2 Domestic Activities

While cooking, women engage in a wide range of other activities, such as doing laundry, cleaning the home-stead, attending to children, grinding sesame or groundnuts paste and farming. Due to the diverse roles performed by women, children end up having to do household chores like meal preparation, an activity that involves having to ensure that there is enough heat on the cooking stove (shoving firewood into the stove) and monitoring food readiness.

## 2.3 Communal Cooking

Communal cooking is a coping mechanism to save fuel; it is a long-standing tradition that is an opportunity to conserve energy. However, it is an uncommon practice among the refugee households mainly because of food scarcity, variation in household sizes – which presents a challenge of how to contribute to the common cooking pot – as well as ego and power dynamics among the household heads and co-wives in case of polygamous families. Some of the coping mechanisms include having to exchange food items for fuel as well as skipping meals.





# Cooking Technology

# 3. Cooking Technology

## 3.1 Nature of Stoves

The most predominant cooking technology is the traditional “3-stone fire” (55%), followed by the inefficient metal fabricated stove (15%). Most households use more than one type of stove/fuel (both firewood and charcoal). Firewood-based stoves are used by 81% and charcoal-based stoves by 19%. This is because wood biomass fuel is relatively cheap and readily available compared to other forms of fuel and technologies. Despite the apparent knowledge that 3-stone fires require a lot of fuel and produce a lot of smoke which poses a health concern, this traditional 3-stone method of cooking largely remains prevalent in use, mainly because for some types of meal, the stones must be adjusted in the cooking process for the saucepan to fit deeper while stirring.

Reasons for Liking the Most Preferred Cooking Technology

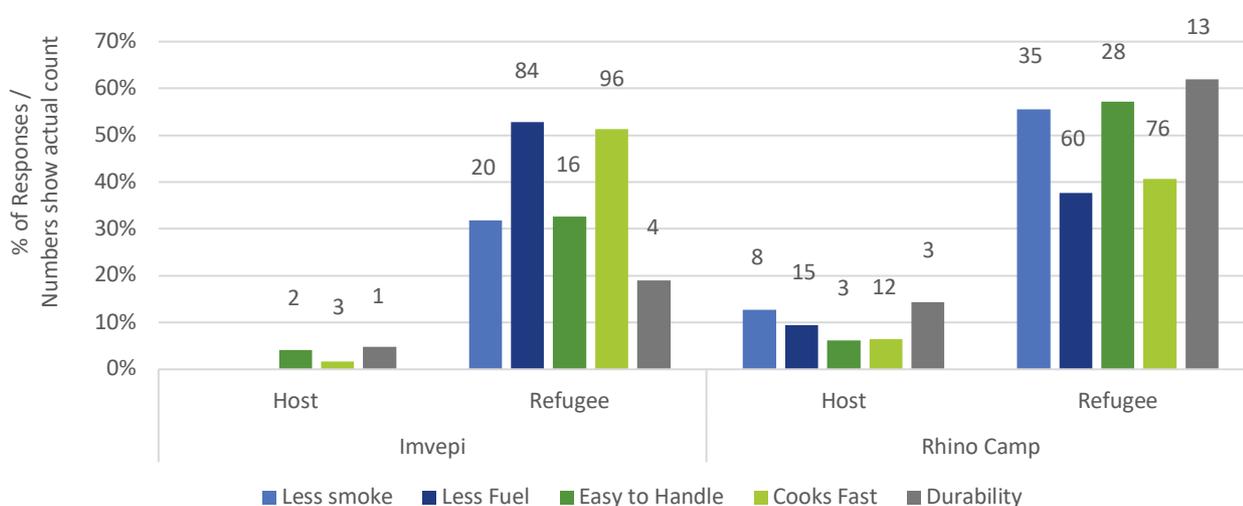


Figure 3.1: Reasons for Liking the Most Preferred Cooking Technology



Those using both, improved stoves and the 3-stone stove prefer the improved stove because it retains heat for a long time which makes it possible for one heating unit to cook a variety of meals. However, the key factors influencing the choice of energy source are affordability, cooking-pace and the optimal use of fuel.

A lot of the stoves that refugees possess were donated to them while the host community build their own cooking stoves. Households within the settlements have on average one or two stoves.

### Most Frequently Used Stove

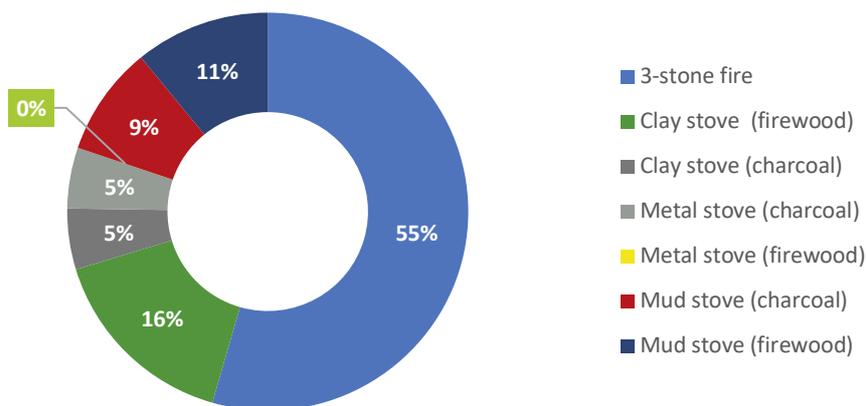


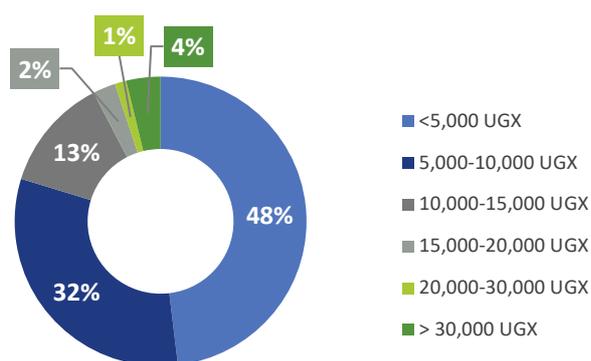
Figure 3.2: Represents 81% firewood stoves and 19% charcoal stoves used

### 3.2 Improved Cooking Stoves

There is high awareness (93%) among the population on improved stove technologies and the benefits that arise from their use. The level of knowledge ranges from efficiency of stoves, use for fuel-saving, durability and health benefits of reduced smoke. This information about improved stoves is often passed on from neighbors, development partners and traders.

Due to awareness of the benefits of improved cooking stoves in both settlements, the households (Rhino Camp-80% and Imvepi-92%) are willing to contribute to purchasing improved cooking stoves either by cash or working hours.

#### Willingness to Pay for Improved Cook Stoves (Rhino Camp)



#### Willingness to Pay for Improved Cook Stoves (Imvepi)

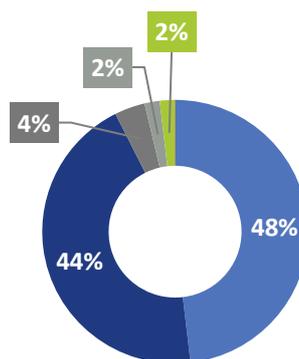
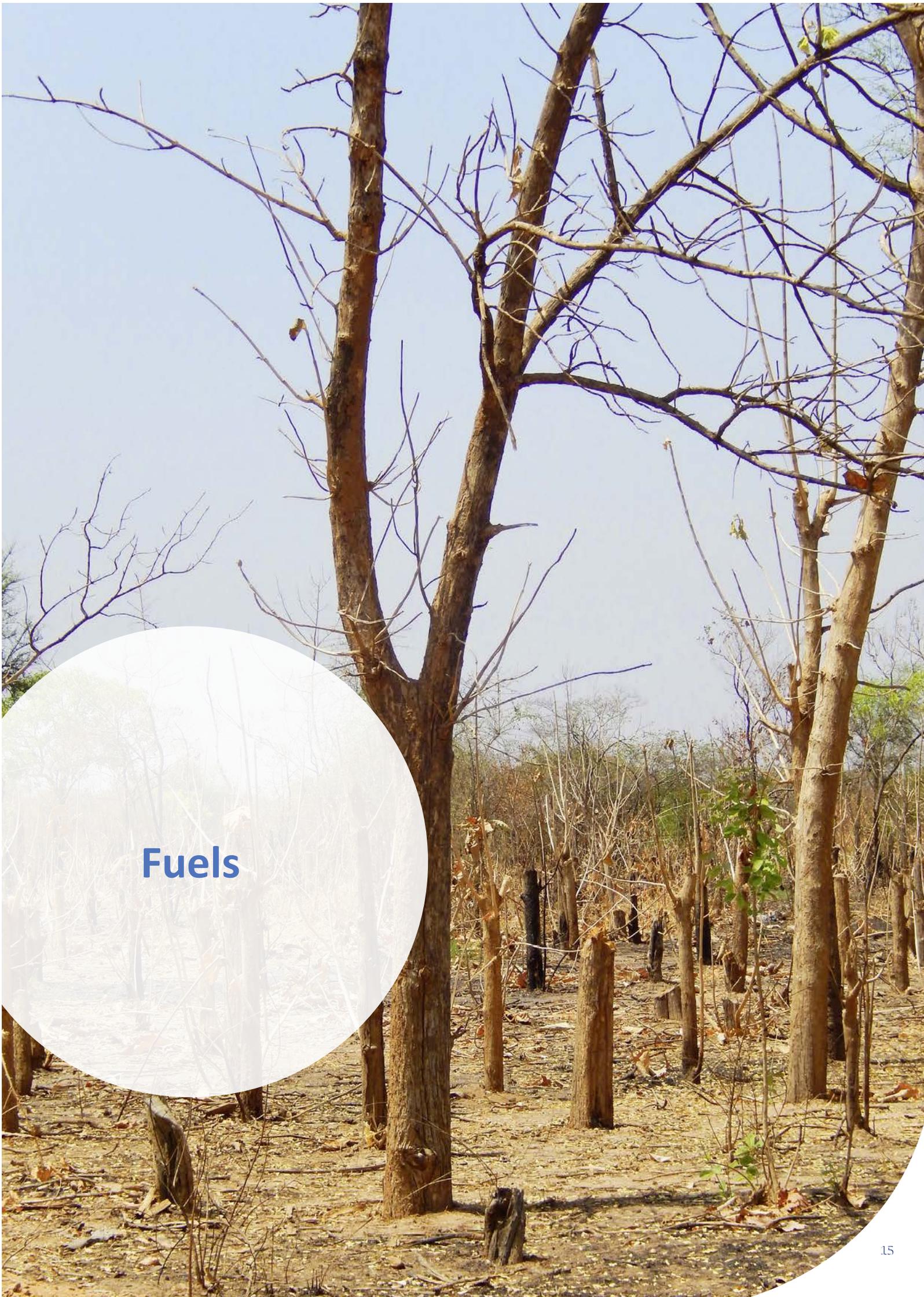


Figure 3.3: Willingness to Pay Cash for Improved Stoves



# Fuels

## 4. Fuels

### 4.1 Usage of Firewood

The main source of cooking fuel in the settlements (97%) is wood biomass. Firewood accounts for 81% of fuels and charcoal for 19%, while others (crop residue, briquettes, kerosene for cooking etc.) are used to an insignificant extent. The firewood is collected for the households by adolescent girls/children and women from nearby bushes and forests. The average walking time and distance of to fuel source are 1.5-2 hours for 6-8 km. Firewood mostly comes from host communities, woodlots, forest reserves and river banks and, to a small extent, from within settlements.

Refugees' access to firewood in exchange for cash or food and non-food items (NFI) is restricted by hosts. The average daily ration of firewood for cooking and heating for a household of 7-8 individuals is 12.5-15 kg/day. A bundle/headload of firewood weighs 25-35 kg and costs about \$1-1.5; equivalent to UGX 3,500-UGX 5,000 or it is bartered for 3 cups of porridge flour & 2 cups of beans. The weekly average consumption of firewood for the same household size (7-8 individuals) is three (3) bundles. On average, a household will require USD 3-5 for energy to meet its weekly heating and cooking needs.

*"A bundle of firewood that can last a household of 7-8 people for 2 to 3 days is exchanged for 3 cups of porridge flour and 2 cups of beans"* – from a survey respondent in Odobu 1 village

There is low-level conflict between refugees and host communities over entitlement to access natural resources from the woodlots and forests. Refugees are often denied access to collect firewood from the forests because most of the wood lies in the host community land. Consequently, refugees are left with options of buying firewood with cash or bartering for it in kind with items like porridge flour, beans and maize.

*Photo: Adolescent girls collecting headloads of firewood weighing 25-35 kg from woodlots/forest as far as 8-12 km away*



### 4.2 Usage of Charcoal

Charcoal constitutes a low proportion of biomass used (19%) because it is more expensive than firewood and requires particular stove technologies as compared to firewood. It is mostly used in local market and trading centers as a complimentary source of fuel to firewood or for productive activities in market places, such as running eating places and tea rooms.

Charcoal production is mainly by hosts/nationals who sell it to refugees in the settlements and to drive-through customers who are mostly doing humanitarian work within the settlements. These drive-through customers are the major target for the charcoal producers due to the large margins attained from selling to them. Although charcoal production is restricted in the settlement for refugees, the hosts still produce and vend it on open market.

A basin of charcoal will last for two 2 days for a household comprising 7-8 individuals. Refugees usually buy charcoal in small quantities to supplement firewood. A bag of charcoal costs about USD 5 (UGX 20,000-25,000), and a bag consists of six 6 basins. On average, a bag would last 12-15 days for 3 meals per day cooking for a household comprising 7-8 individuals.

*Photo: A field data enumerator recording weight of charcoal used by a household in Siripi Zone, Rhino Camp*





**Solar Energy**

## 5. Solar Energy

The sun is the main source of electric power with a minimal use of fuel-powered generators and batteries. Electric power in the settlements is mainly used for lighting and charging phones.

In the case of lighting, a variety of low quality, counterfeit lighting products is available on local markets. A majority of respondents was aware of the benefits of improved lighting sources; 47% learned from a neighbor/relative and 25% from developmental agencies. However, 28% of respondents had limited knowledge of solar products. Some of the products available on local markets include: solar lamps, torches, kerosene lamps (tadooba) and solar bulbs.

30% of respondents showed a willingness to buy (monetary) good quality solar lighting devices, while over 85% were willing to contribute in terms of working hours for solar devices. Those who could not afford to buy available lighting products resorted to the use of dried palm leaves/grass to make flames providing light needed at night, especially when going to the toilet.

A survey has established that 49% of solar lamps/devices used or available on market were handouts distributed by development agencies. UNHCR has been key and keen in the provision of solar lamps as non-food items to the Extremely Vulnerable Individuals (EVIs) and Persons with Special Needs (PSNs) some of which end up in the local market structures and are sold on open stalls. In addition, residents also acquire lighting products from regional market hubs, such as Arua, Yumbe and Koboko, interregional markets of Kampala and Gulu town and from cross-border open markets or some at the local markets. However, the survey found most of the solar products on the open market were of very low quality and did not provide value for money.

### Electricity And Lighting Sources

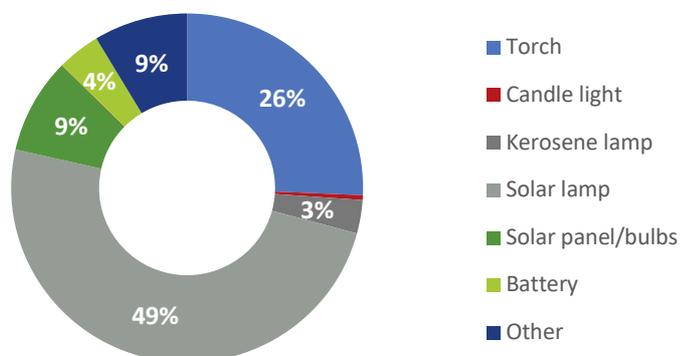


Figure 5.1: Electricity and Lighting Sources

The most preferred solar products were the PV Pico lamps. Though these were not cheap, they remained the highly preferred product because of their brightness and durability. The awareness of the benefits of improved lighting was mainly through word of mouth from neighbors or relatives who have used similar products or attained prior information about the benefits. Development agencies, through demonstrations, had also contributed to informed population.

99% of the high-quality solar lamps in use or on market were acquired through development partners. The local markets were saturated with high numbers of branded products or counterfeit cheap solar items. Such were mostly solar products handed out for free. The key bottlenecks limiting access were affordability, availability, and lack of flexible pay models. The survey established that 70% of the refugee households could not nor were not willing to pay one-off in cash for the different electricity and lighting products. The focus group discussions and key informants have revealed that options to pay in installments or pay-as-you go systems would be the most promising approaches to increase access.



# Energy Vendors

# 6. Energy Vendors

The baseline survey carried out in Imvepi and Rhino Camp settlements has collected information on energy business activities, skills and associations, and challenges and opportunities in operating their businesses.

## 6.1 Business Activities

The energy vendors in the settlements are mostly from the host communities. Their businesses are small scale and solo ownership operated by mainly male stall operators. 78% of energy vendor businesses in Rhino Camp and 80% in Imvepi were run by other people or relatives rather than the proprietors. Therefore, information on the ownership, investment, business plan and record-keeping was not available.

The high involvement of the host community in energy businesses was boosted by incomes from subsistence agriculture (38%) and sale of food (31%) which contributed to sources of operating capital for the businesses.

The product range in the energy vendor stalls was limited to low value products; 60% of energy products on market were counterfeit, 40% were handout branded products. The most common items included non-rechargeable batteries, torches and solar Pico PV lamps, bulbs, etc. In addition, some very few stalls offered energy services, such as phone charging, printing and photocopying. However, the provision of these services was limited by power supply which was often poor quality, irregular and inadequate to power the equipment for long hours.

The survey has found no vendor shops/stalls offering internet café service, computer and solar lantern rental, as well as no sale of improved cooking stoves in both Imvepi and Rhino Camp settlements.

## 6.2 Skills and Associations

A majority of 71% of energy vendors had never received any formal training on business skills/energy topics, 29% had received a basic form of training on business or technical skills, such as product installation, finance and bookkeeping, and these were mostly received from relatives and other sources, which indicates a need for capacity-building in business and technical skills. The key areas of knowledge gap which the energy vendors identified were: finance/book-keeping (46%), technical skills (25%) and marketing (21%).

Training Needs of Vendors

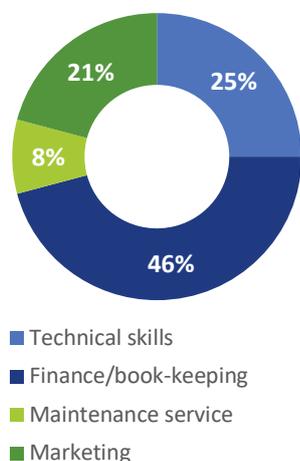


Figure 6.1: Training Needs of Energy Vendors

Types of training received by Energy Vendors

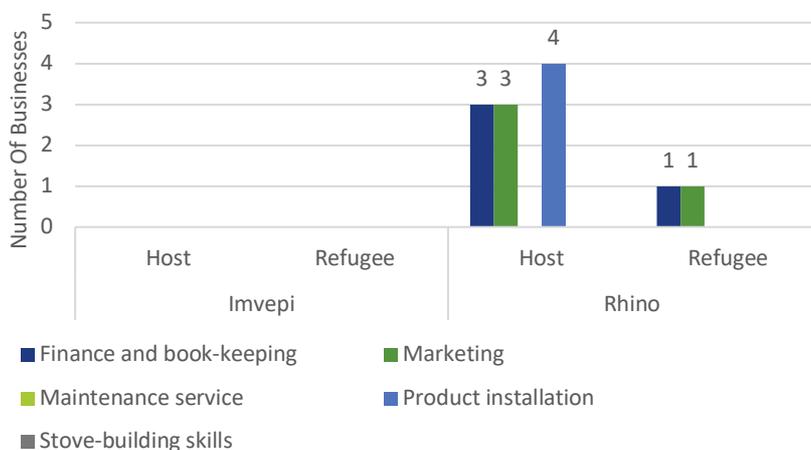


Figure 6.2: Types of training received by Energy Vendors

A minority of 34% of energy vendors belongs to some sort of association (savings groups and cooperatives) from which they often acquire loans to further develop their businesses. Such associations were for host community groups, and the survey did not find a refugee membership in them. The refugee community may need support to be organized and trained on benefits of associations.

### 6.3 Challenges and Opportunities

The state of the energy vendor businesses varied between fair and good. However, a clear majority (92%) of energy vendors face challenges running the business, such as a lack of reinvestment capital and lack of variety of products, especially in the solar category which has high consumer demand.

Consequently, there is a desire among vendors to change their businesses by increasing stock levels to meet the market need, acquire more capital and set up permanent establishments for the business.

The majority of solar products on markets was counterfeit or branded and local vendors had challenges coping with competition from those dealing in cheap counterfeits. They expressed a need for increased market awareness.

The large market segment occupied by dry-cell batteries and torches presents an environmental challenge, but also provides a huge opportunity to increase awareness on environmental degradation and restoration and to promote and adopt durable solar products, such as rechargeable batteries to replace the disposable batteries.

# Findings

## 7. Findings

The collected data shows that residents in the settlements are aware of the benefits of improved cooking technology. Interventions from EnDev, such as raising more awareness and conducting demonstrations to households on improved cook stoves, will inform households about this option and explain to possible future consumers the benefits and use of solar products. These activities will raise demand for improved cookstoves.

Additionally, through training, refugees and members of the host community will be equipped with skills for income generation and for providing services to potential customers with an affordable stove model.

Furthermore, the price discrimination involved in the provision of fuel sources has impacted vastly on refugees who forego food or pay highly for these fuel sources. Therefore, there is a need to cut down on the inefficient use of fuels so that there is not only a positive impact on the environment but also on household economy. Additionally, there is a need for making available good quality improved cook stoves in the local markets. For this purpose, it is necessary to build linkages with cook stove companies and ease their access to settlement and host community markets.

To meet the household budget, financing schemes must be developed and promoted.

Generally, it is important to invest into assessments on cooking practices and consumer preferences as has been done by EnDev. Otherwise, stoves will not be purchased or used.

For electricity, and lighting, there have been efforts to equip residents with special needs with lighting devices. However, there is still opportunity for the provision of lighting devices through market-based interventions that improve access to sustainable energy and offer income-generating opportunities for refugees and nationals. Interventions, such as setting up energy kiosks equipped with improved cook stoves, high-quality Pico PV products, and other energy related services, such as phone and lantern charging will be an opportunity for income generation in the sustainable energy sector.

The baseline survey has shown that there is a need to get the refugees involved in energy businesses since the businesses are mostly dominated by vendors from the host community.

There is a need for capacity-building to equip potential energy vendors with the necessary skills required to operate energy businesses, such as finance/book-keeping, technical skills and marketing, and this can be achieved through trainings and workshops.

# Cooking Energy

97%



of households use Biomass for cooking and heating

## Biomass



firewood 81%

charcoal 19%

55%



of households use exclusively three-stone fires

30%



of households use improved stoves

Households use on average



12-15 kg

of firewood/day



Walking time hours to fuel source is

1.5-2 hrs, 6-8 km



47%



of the total respondents said their cooking technologies were donated to them

39%



of the total respondents said they were bought

93%

of the respondents are aware of the benefits of Improved Cooking Systems and find optimal use of fuel as the most significant benefit



# Lighting



**49%**

of households  
use solar lamps



**26%**

use  
torches



**9%**

use  
solar panels

**99%**



&



**UNHCR**  
The UN Refugee Agency

acquired their lighting sources from NGOs and UNHCR while  
1% acquired them their sources from traders in host community  
and other traders in the host community



**81%**

of the survey respondents  
experienced problems  
with their lighting devices

**89%**

of Imvepi  
Settlement

**96%**

of Rhino Camp  
Settlement

refugees are aware of the benefits of  
improved lighting

Durability, brightness, lighting and cost saving  
are the known benefits of using improved lighting



## **Energising Development**

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