

# Energy Practices in Ugandan Settlements Amid Environmental Challenges





© U-Learn. Solar energy keeping people's mobile phones charged in the settlements

# About us

## **U-Learn (Uganda Learning, Evidence, Accountability, and Research Network)**

is dedicated to enhancing outcomes for both refugees and host communities in Uganda. Through collaboration with the Government of Uganda and various implementing partners and stakeholders, U-Learn focuses on promoting learning, conducting assessments, and amplifying the voices and choices of refugees in the protracted refugee crisis.

**This consortium is financially supported by UKAid** under the BRAER (Building Resilience and an Effective Emergency Refugee Response) programme and is implemented by the Response Innovation Lab (hosted by Save the Children), in conjunction with IMPACT Initiatives and the International Rescue Committee.



© U-Learn. Staff at Welcome Restaurant in Nakivale using charcoal powered stove to prepare samosas for the restaurant

**Established in 2010, IMPACT Initiatives** is a non-governmental organisation (NGO) based in Geneva and the largest independent data provider in crisis contexts. It advocates for the development of research that is centred around people in contexts ranging from conflict and disasters to regions affected by displacement and migration.

The work of IMPACT Initiatives is carried out through its two initiatives – REACH and AGORA and through the provision of direct support to partners regarding Project Appraisals and Assessments (PANDA). IMPACT Initiatives is a sister organisation of ACTED, a non-governmental organisation with headquarters in Paris.

For more information regarding IMPACT Initiatives' work in Uganda and elsewhere, see its [Resource Centre](#).

**As part of the Comprehensive Refugee Response Framework (CRRF)**, the national Working Group on Energy and Environment (WorkGrEEen) operates with the aim of coordinating a nationwide response in the areas of energy and environment to empower both refugees and host populations.

**The WorkGrEEen** is tasked with ensuring that all populations in need receive timely, suitable, effective and sustainable support, aligning with the Sphere Humanitarian Charter and Minimum Standards in Humanitarian Response and/or Uganda Government standards related to energy and environment. This involves providing oversight and guidance to sector groups at both sub-national and settlement levels.



For enquiries or to connect with U-Learn,

please contact [info@ulearn-uganda.org](mailto:info@ulearn-uganda.org) or visit the [website](#)

# Acknowledgements

**Authors:** IMPACT Initiatives as a part of U-Learn

**Peer reviewers:** Comprehensive Refugee Response Framework (CRRF), Embassy of Denmark in Uganda, Global Platform for Action (GPA), Last Mile Climate, UN Women, Working Group on Energy and Environment (WorkGrEEEn).

**Coordinating body:** WorkGrEEEn

**Donor:** UKAid



© U-Learn. Solar lamps providing cleaner lighting for people in refugee communities

# TABLE OF CONTENTS

<b>ABOUT US</b>	<b>3</b>
<b>ACKNOWLEDGMENTS</b>	<b>4</b>
<b>EXECUTIVE SUMMARY</b>	<b>6</b>
<b>RECOMMENDATIONS</b>	<b>10</b>
<b>LIST OF ABBREVIATIONS</b>	<b>12</b>
<b>KEY DEFINITIONS</b>	<b>13</b>
<b>CONTEXT</b>	<b>16</b>
<b>RATIONALE</b>	<b>17</b>
<b>METHDOLOGY</b>	<b>18</b>
Sampling and data collection	20
Data analysis methods	20
Limitations	21
<b>RESEARCH FINDINGS</b>	<b>22</b>
Demographics	22
Energy	23
Cooking stoves	23
Stove fuels	30
Dry cell batteries and solar power	34
Environmental degradation	40
Climate change	44
<b>CONCLUSION</b>	<b>52</b>
<b>ANNEXES</b>	<b>54</b>
<b>REFERENCES</b>	<b>56</b>

# Executive summary

## CONTEXT AND RATIONALE

Uganda faces considerable economic, social, and environmental challenges. Uganda is classified as a low-income country and one of the United Nations' least developed countries (LDCs). The country, is home to over 47 million people, including 1.6 million refugees, mainly from South Sudan and the Democratic Republic of Congo (DRC). A 2017 report by the Ministry of Water and Environment (MWE) highlights Uganda's alarming deforestation rate, positioning it among the top two countries globally facing this issue<sup>1</sup>. If the current deforestation trend persists, studies suggest that Uganda could lose all its forests within the next 40 years<sup>2</sup>.

This scenario is compounded by the fact that both refugees and host communities primarily rely on traditional cooking methods, which accelerates the environmental degradation and further intensifies the pressure on existing biomass resources.

Limited access to clean cooking fuels persists, especially in rural areas and refugee settlements. These challenges unfold amid the backdrop of climate change, amplifying existing pressures and exacerbating vulnerabilities among the most marginalised populations.



© U-Learn. Morish Obidia of Palabek Refugee Settlement using solar powered radio



**47 million**  
population of  
Uganda



**1.6 million**  
refugees living in  
Uganda



**40 years**  
loss of all forest  
if deforestation  
persists

The Global Refugee Forum (GRF) technical Roundtable on Environment, Energy, and Climate Change held in Kampala in July 2023, **recognised three environmental challenges within Uganda's refugee hosting districts:**

**1. A high reliance on woody biomass is accelerating deforestation**

**2. A lack of access to sustainable, clean energy options to meet basic needs and reduce reliance**

**3. A limited access to clean water, which is exacerbated by climate change**

According to the roundtable, **opportunities to tackle these challenges include:**

**1. Enhancing of access to sustainable and clean energy sources**

**2. Improved cooking fuels and technologies to decrease reliance on biomass**

**3. Better management of natural resources to foster resilience to climate change**



© U-Learn. Charcoal bags

These strategies align with Uganda's Comprehensive Refugee Response Framework (CRRF) and are supported by initiatives like the Sustainable Energy Response Plan (SERP) and the Water and Environment Sector Response Plan (WESRP).

Improved cookstoves (ICS), designed to be more efficient than traditional cookstoves, have been promoted globally to address environmental and health challenges. Uganda, including its refugee settlements, has been a focus for ICS initiatives. Despite its proven effectiveness and past research on ICS in Uganda<sup>3 4</sup>, the adoption of ICS remains limited in settlements. Recognising this and informed by a comprehensive scoping exercise conducted by U-Learn in May and June 2023, there is a growing need for a more nuanced understanding of the challenges hampering the adoption of sustainable alternatives.

## RESEARCH DESIGN

This research aims to explore knowledge, attitudes and practices related to household energy use, environmental degradation, and climate change in Uganda's 13 refugee settlements, with a focus on ICS and alternative fuels.

In addition to identifying challenges influencing the uptake of sustainable energy practices and exploring measures to overcome barriers within the context of environmental degradation and climate change adaptation, this research also holds programmatic value for the humanitarian response.

It offers a framework to contextualise the situation and provides baseline data for measuring future changes, thereby contributing to more effective and targeted interventions in the humanitarian sector.

The research has adopted a mixed method approach. Both quantitative individual interviews (2,491) and qualitative individual interviews (53) were conducted across all settlements in September and October 2023.

Quantitative data for the refugee and host community groups is representative on the settlement and on the regional level, with a margin of error of 5% for West Nile and 10% for Southwest. Data for the gender groups is representative on the regional level of West Nile and Southwest, with a margin of error of 10%.

There are some limitations associated with this research. Firstly, KAP studies rely on self-reported data, which may differ from actual behaviours. Mitigation measures, such as adequate sample size, Joint Analysis Workshops, a Secondary Desk Review, and a peer review process were employed to enhance data reliability. Secondly, gender representation was observed at the regional level rather than settlement level, maintaining statistical significance.

Thirdly, the subject of the tools was somewhat technical in nature. To ensure comprehension of technical terms (e.g. ICS, climate change, etc.), enumerators underwent a 2-day training, received printed definitions, and definitions were integrated into the survey tools. Finally, some GIS-generated data points inaccessible due to weather or road conditions were excluded. New data points were generated and targeted in more accessible areas to compensate. Refer to Annex 2 for excluded locations.

## RESULTS: ENERGY

### COOKING STOVES

Both female and male participants reported cooking at least once a week for their households. This seems to challenge traditional gender norms associated with cooking, and thus it indicates the need to include men in cooking-related projects.

There is a high self-reported awareness of the notion of stove efficiency (in terms of fuel usage) among respondents, but the majority still use less efficient traditional stoves due to factors like cost and availability. The pervasive traditional mud stove, while not classified as an ICS, remains widely used but offers only marginal improvements in fuel efficiency compared to open fires, another prevalent cooking method.

Misconceptions regarding fuel types for ICS, like the belief that only charcoal and not firewood, can be used, create additional barriers. The misunderstanding may arise from the limited availability of and exposure to firewood-ICS compared to charcoal-ICS. Willingness to purchase ICS tends to rise with flexible payment options.

Both refugees and host community members cited reduced cooking time as the primary benefit of ICS, followed by reduced fuel costs. The financial benefit of ICS was noted by fewer respondents, possibly due to free availability of wood or lack of awareness about cost effectiveness. Limited financial literacy and insufficient tracking of spending and savings may also contribute to the underreporting of the cost benefits associated with ICS.

A large portion of respondents own a combination of ICS and non-ICS, indicating either a transitional shift toward cleaner cooking technologies or a reluctance to abandon traditional cooking methods completely.

### SOLAR ENERGY

More than half the refugee and nearly three quarters of the host community respondents use solar energy use, a decision driven by cost benefits and environmental advantages. Refugee participants were more likely than participants from the host community to cite receiving a free solar device as a motivating factor for using solar energy. This observation may elucidate the disparity in the proportion of refugees citing cost benefits as their primary motivation for adopting solar energy, as opposed to members of the host community. The availability of free devices would outweigh financial considerations. Nonetheless, cost remains a significant barrier to adoption among those that do not own a solar device, with respondents expressing willingness to purchase with flexible payment options or direct financial support.

### COOKING FUEL

Firewood is the primary cooking fuel for both refugees and host communities, followed by charcoal. Due to seasonal variations, some households find themselves switching between firewood and the typically costlier charcoal.

This is particularly evident during the rainy season when drying wood becomes more challenging. Installing wood drying and storage facilities could help mitigate the challenges of 'fuel-hopping' between wood and the often more expensive charcoal during the rainy season.

Additionally, promoting alternative fuel sources that are less susceptible to weather fluctuations, such as high-quality briquettes, could offer more reliable options for cooking year-round.

Briquette adoption remains limited, with less than half the respondents familiar with the concept. Awareness levels vary significantly between refugees and host communities across regions. Limited availability and cost are the main reported barriers to regular briquette use, but respondents show willingness to purchase with flexible payment options or direct financial support.

### DRY CELL BATTERIES

Dry cell batteries are widely used, primarily for lighting and powering devices like radios. However, disposal practices often involve harmful methods such as throwing batteries into pit latrines or the environment, posing environmental contamination and health risks. A small yet concerning percentage of respondents engage in the hazardous practice of opening dry-cell batteries to extract manganese, a highly corrosive substance, which they then use as black paint. While recognising the potential environmental and health risks associated with certain disposal methods, the widespread practice of discarding batteries into the environment/pit latrines may indicate a lack of awareness about the severity of the problem, limited access to appropriate disposal facilities, or a general disregard for the issue.



## **RESULTS: ENVIRONMENTAL DEGRADATION**

Deforestation and forest degradation are significant issues, with Uganda experiencing high rates of forest loss over the past few decades<sup>5</sup>. The arrival of refugees exacerbates environmental pressures, though broader degradation is often attributed to ongoing activities such as those of the host communities<sup>6</sup>. Consequences of environmental degradation include wood fuel shortages, water scarcity, disruption of livelihoods, increased vulnerability to disasters, and potential resource conflicts.

A high percentage of refugees and host community respondents demonstrated awareness that their surrounding environment was at risk. Nearly all respondents considered this worrisome to some extent, and nearly half would quantify their level of concern as “a lot”. Greater concern often leads to increased community mobilisation to address environmental issues promptly.

A high portion of respondents identified land clearing and deforestation as issues, particularly in Bidibidi and the refugees in Imvepi and Rhino Camp. The primary associated concerns were the potential shortage of wood and the impact on rainfall patterns, primarily reportedly related to household energy use and agriculture.

Discussions on environmental degradation predominantly focus on tree cutting and the importance of tree planting to mitigate deforestation. Respondents identified cutting trees for wood fuel, construction materials, and clearing land for agriculture as main drivers of deforestation.

Recognition of these drivers suggests a positive trend in community knowledge, with potential for further education on sustainable alternatives like ICS.

## **RESULTS: CLIMATE CHANGE**

Uganda experiences various impacts of climate change, including extreme weather events and unpredictable weather patterns. These affect agriculture, water resources, infrastructure and health, impacting both the environment and communities, including in refugee settlements.

A high percentage of respondents from both refugee and host communities have heard about climate change and recognise its observable effects, such as more frequent droughts, erratic rainfall and unpredictable growing seasons. Over half the respondents said that such impact was felt “a lot”.

While most respondents attribute climate change to human activities, a notable proportion believe it is driven by an Act of God. This belief may impact individual and collective agency in adapting to climate change.

Many respondents have implemented adaptation measures, including tree planting, using climate-adapted crops and practising crop rotation. There seems to be a lack of understanding regarding the limitations of relying on tree planting, suggesting a need for awareness about adaptation measures in other sectors like agriculture and infrastructure.

Challenges to implementing adaptation measures reportedly include a lack of knowledge on suitable actions and financial constraints, highlighting the need for awareness campaigns and financial support.

While a high percentage of respondents anticipate negative impacts of climate change in the upcoming year, showing significant concern, a notable percentage do not foresee negative climate change impacts on their household or community in the coming year.

# Recommendations

Based on the findings presented, several recommendations can be made to humanitarian and development actors active in the settlements:

1

## **Inclusive cooking**

**projects:** Include men in cooking-related projects and campaigns. Given the notable involvement of both men and women in cooking, this might lead to more inclusive participation.

2

## **Promoting flexible payment options for ICS:**

Recognising the importance of cost and availability in ICS adoption, promoting flexible payment options will increase willingness to purchase ICS among refugees and host communities.

3

## **Addressing misconceptions about ICS:**

Increasing awareness about the versatility of ICS and providing sensitisation on their benefits when compared to traditional stoves, will address misconceptions regarding fuel types for ICS.

4

## **Transition to sustainable cooking fuels:**

Given the prevalence of firewood and charcoal as primary cooking fuels, promoting alternative fuel sources such as high-quality briquettes could offer more reliable options for cooking year-round. Additionally, installing wood drying and storage facilities could help mitigate challenges associated with fuel-hopping between wood and charcoal during the rainy season.

5

## **Awareness and education on battery disposal:**

Efforts should be made to raise awareness about the environmental and health risks associated with improper battery disposal. Providing access to appropriate disposal facilities and education on safe disposal practices can help mitigate these risks.

6

## **Support for solar energy adoption:**

Cost remains a significant barrier to solar energy adoption. Therefore, providing direct financial support or flexible payment options can facilitate increased adoption of solar energy among refugees and host communities.

7

## **Community mobilisation for environmental protection:**

Recognising community concern about environmental degradation, efforts should be made to mobilise communities for environmental protection initiatives. These could include promoting tree planting, sustainable land management practices, and education on the importance of environmental conservation.

8

## **Education on climate change adaptation:**

There is a need for awareness campaigns and financial support to overcome challenges in implementing climate change adaptation measures. Providing knowledge on suitable adaptation actions and addressing financial constraints can empower communities to better adapt to climate change impacts.

9

## **Tree planting:**

Tree planting seems to be a common solution among respondents for combating environmental degradation and climate change. To maximize impact, a comprehensive approach should include strategies such as climate-smart agriculture, water management, and clean cooking, among others.



© U-Learn. Solar powered portable wireless radio in Palabek Refugee Settlement

# LIST OF ABBREVIATIONS

CRRF	Comprehensive Refugee Response Framework
DRC	Democratic Republic of the Congo
DSAG	Data Saturation and Analysis Grid
FAO	Food and Agriculture Organization of the United Nations
ICS	Improved cookstoves
KAP	Knowledge, attitudes and practices
MWE	Ministry of Water and Environment
NGO	Non-governmental organisation
U-Learn	Uganda Learning, Evidence, Accountability, and Research Network
UNHCR	United Nations High Commissioner for Refugees
WBG	World Bank Group
WorkGrEEen	Working Group on Energy and Environment

# Key definitions

**Briquettes:** a compressed block of combustible biomass (including waste) or coal dust, used as a fuel. They are moulded into a specific shape and size, sometimes with a binding agent. They may be non-carbonised (e.g. sawdust logs), carbonised (charcoal briquettes) or made using pre-carbonised material ('char').

**Climate change:** long-term changes in the average weather patterns that have come to define Earth's climate. It involves alterations in temperature, precipitation, wind patterns and other aspects of climate that occur over extended periods, ranging from decades to millions of years. Climate change can result from natural processes, such as variations in the sun's intensity or volcanic activity, but is primarily driven by human activities in recent times<sup>7</sup>.

**Data Saturation and Analysis Grid (DSAG):** a structured tool or framework used to organise and analyse data systematically. It typically involves categorising data into themes, concepts or codes, and organising these elements in a grid or matrix format for clearer visualisation and interpretation.

**Deforestation:** the conversion of forested land to another land use, typically agriculture, urban development or infrastructure. This process leads to the loss of trees, biodiversity and the ecosystem services provided by forests<sup>8</sup>.

**Environmental degradation:** the deterioration of the environment, often involving the reduction or deterioration of the quality and productivity of natural resources, including air, water, soil and biodiversity<sup>9</sup>.

**Forest degradation:** an anthropogenically induced reduction in the overall health, quality or biodiversity of a forest ecosystem without complete removal. It includes activities that lead to the decline of the forest's capacity to provide ecosystem services and support biodiversity<sup>10</sup>.

**Host communities:** for this assessment, 'host communities' does not refer to all host communities in the refugee-hosting districts covered. Instead, it refers to those communities which reside in sub-counties that border or overlap with the targeted refugee settlements, and who are at most 15km from the settlement border.

**Improved cookstoves (ICS):** a diverse array of cooking appliances that offer users more benefits than traditional methods of cooking such as open fires and traditional mud or metal stoves. Such stoves can be operated with various biomass fuels, such as firewood, charcoal, pellets or briquettes. The ICS generally have a combustion chamber and may have a chimney for ventilation. They can be either locally manufactured or imported, often presenting a more cost-effective option than traditional stoves<sup>11</sup>.

**National grid:** a system of high-voltage power lines from power stations that is a critical component of the electricity infrastructure and serves as the backbone for supplying power to homes, businesses and industries. While the national grid in Uganda can offer the highest level of electricity access, reliability issues or complete unavailability may arise, particularly in remote areas and situations of displacement, such as the refugee settlements.

**Qualitative individual interview:** a private semi-structured conversation with a single participant. Researchers use open-ended questions to encourage participants to express themselves in their own words. While there may be a general guide or set of topics to cover, qualitative individual interviews often follow a flexible and conversational structure. Data is analysed using qualitative research methods such as thematic analysis, content analysis and narrative analysis.

**Quantitative individual interview:** a one-on-one structured interview administered through a survey with predetermined close-ended questions and predefined response options. These questions are standardised and asked in a consistent manner across all participants. After conducting the interviews, researchers use statistical methods to analyse the quantitative data. This may involve calculating averages, percentages, correlations, etc.

**Refugees:** According to the United Nations High Commissioner for Refugees (UNHCR), refugees are people who have been forced to flee their home countries due to well-founded fears of persecution, conflict, violence, or other forms of severe human rights violations. These people seek safety and protection in another country and are unable or unwilling to return to their home country because of the risks they face<sup>12</sup>.

**Settlements:** in the Ugandan context, areas assigned for refugee settlement by the Government of Uganda. The settlements are managed by the Office of the Prime Minister with the support of UNHCR<sup>13</sup>.

**Stove adoption:** while there is no set definition for what constitutes the 'adoption' of a new behaviour/practice, this assessment considers adoption as both acquisition and regular use (at least once a week) of a type of stove.

**Stove stacking:** stove stacking refers to the practice of using multiple cooking devices or stoves simultaneously, often involving a combination of traditional and improved cooking technologies. This can occur within households where people use different types of stoves for different cooking purposes. For example, a household might use a traditional three-stone fire or mud stove for some cooking, while also using an ICS for specific tasks<sup>14</sup>.

**Three-stone fire:** often referred to as an open fire, this is a rudimentary device used for cooking, particularly in rural and traditional settings. They have been used for centuries and are characterised by their basic design, usually consisting of three stones arranged in a triangle to support a pot or cooking vessel over an open flame.

**Traditional biomass:** organic materials burned using basic methods, such as three-stone fires or simple mud-stoves. These materials include wood, charcoal, crop residues and animal dung<sup>15</sup>.

**Traditional cooking systems:** in this assessment refers to the use of basic stoves (e.g. three-stone fires or mud stoves) paired with traditional biomass. Often termed 'basic' stoves and fuels, these cooking systems typically exhibit high emissions and low efficiencies, yet they remain the most affordable and accessible options.

**Wood fuel:** any type of wood or woody biomass used as a source of energy for heating or cooking purposes. It includes firewood, charcoal, wood chips, pellets and other forms of processed or unprocessed wood.



© U-Learn. Someone bagging charcoal for sale

# Context

Uganda, a landlocked country in East Africa, is designated as a low-income country<sup>16</sup> and falls within the category of economies recognised by the United Nations as least developed countries<sup>17</sup>. As of 2023, Uganda is home to more than 47 million inhabitants, including 1.6 million refugees primarily originating from South Sudan and the Democratic Republic of Congo (DRC)<sup>18</sup>. It stands out as being the country with the highest number of refugees on the African continent<sup>19</sup>. Over 90% of refugees live in 12 districts spanning the West Nile and Southwest regions. Residing in open villages known as settlements, they coexist with the local communities<sup>20</sup>.

A 2017 report by the Ministry of Water and Environment (MWE) sheds light on Uganda's alarming deforestation rate, positioning it among the top two countries globally facing this issue<sup>21</sup>. If the current deforestation trend persists, studies suggest that Uganda could lose all its forests within the next 40 years<sup>22</sup>.

This situation is exacerbated by the fact that most Ugandan households rely on traditional, less efficient cooking methods, notably three-stone fires fuelled by firewood and charcoal, contributing to forest degradation alongside agricultural activities<sup>23 24</sup>.

Poor and rural communities have limited access to clean cooking fuels, including biofuels, electricity and piped natural gas<sup>25 26</sup>. For example, only 35% of the population in rural areas has access to electricity<sup>27</sup>.

Similarly, in the settlements, sustainable energy access remains a significant challenge. A 2015 study by UNHCR revealed that 97% of refugees use firewood as their primary cooking fuel, and 65% rely on three-stone fires, exacerbating fuel collection distances, escalating energy costs, and risking tensions with host communities<sup>28 29 30</sup>.

Environmental degradation around settlements and climate change could further intensify the pressure on biomass resources, potentially leading to even greater scarcity and compounding the aforementioned issues.

The Global Refugee Forum (GRF) technical Roundtable on Environment, Energy, and Climate Change held in Kampala in July 2023, **recognised three environmental challenges within Uganda's refugee hosting districts:**

- 1. A high reliance on woody biomass is accelerating deforestation**
- 2. A lack of access to sustainable, clean energy options to meet basic needs and reduce reliance**
- 3. A limited access to clean water, which is exacerbated by climate change**

According to the roundtable, **opportunities to tackle these challenges include:**

- 1. Enhancing of access to sustainable and clean energy sources**
- 2. Improved cooking fuels and technologies to decrease reliance on biomass**
- 3. Better management of natural resources to foster resilience to climate change**



These strategies align with Uganda’s Comprehensive Refugee Response Framework (CRRF) and are supported by initiatives like the Sustainable Energy Response Plan (SERP) and the Water and Environment Sector Response Plan (WESRP) <sup>31</sup> .

The discourse surrounding improved cookstoves (ICS) in Uganda, both at the national and global levels, is not a recent phenomenon. ICS were first introduced to developing countries as part of efforts to address environmental, health and energy-related challenges associated with traditional cooking methods.

The international promotion of improved cookstoves began in the 1970s and gained momentum in subsequent decades<sup>32</sup>. As early as 1996, research was underway in Uganda, exploring the introduction of the Lorena stove – a widely used ICS model – and its impact on reducing firewood consumption, alongside the challenges hampering its widespread adoption<sup>33 34</sup>.

## Rationale

Despite the well-known issue of wood shortages, the proven effectiveness of alternative models, and Uganda’s substantial experience with them, the persistence of the limited adoption of ICS in settlements indicates a need for better understanding.

Acknowledging the ongoing challenges of energy access and environmental degradation in and around the settlements, and guided by a thorough scoping exercise conducted by U-Learn involving multiple stakeholders emphasising the need for baseline data, this research aims to explore the knowledge, attitudes and practices related to household energy use in all 13 refugee settlements of Uganda.

The primary focus is on thermal energy, with a specific emphasis on the acceptance and adoption of sustainable alternatives for cooking, such as ICS and alternative fuels. By investigating behaviour within and around settlements, the goal is to uncover the factors contributing to the limited uptake of these alternative stoves and fuels.



© U-Learn. Evalyne Aciro, a kiosk owner in Palabek Refugee Settlement uses solar power to light her grocery store

Additionally, this study places its findings within the broader context of environmental degradation and climate change, acknowledging the significant external factors that can influence individual actions.

In conclusion, the objective of the study is to inform humanitarian and development actors in the refugee response about the barriers and enablers to uptake of sustainable energy practices (based on existing knowledge, attitudes and practices) and identify measures to overcome them in the context of environmental degradation and climate change adaptation.

IMPACT Initiatives is conducting this assessment under the umbrella of the U-Learn Consortium. It is funded by UK Aid and has benefitted from the support of the Working Group on Energy and Environment (WorkGrEEen) coordinating forum. For more information, please see the [Terms of Reference](#).

# Methodology

## THE KAP MODEL

A knowledge, attitudes and practices (KAP) study is a widely accepted research method commonly used in public health, social sciences and other fields to assess and understand people's knowledge, attitudes and practices related to a specific topic or issue<sup>38</sup>. KAP studies, which are representative of the target population, are conducted through surveys and self-declared information provided by the interview participants. **The main components of a KAP study are as follows:**

### KNOWLEDGE

This component of the study aims to assess what individuals know about a specific topic or issue. Questions are asked to determine the level of understanding, awareness and factual knowledge regarding the subject. The survey's evaluation of knowledge levels assists in identifying areas where additional information and educational initiatives are needed<sup>35</sup>.

### ATTITUDES

This part of the study examines people's attitudes and beliefs related to the topic. Researchers seek to understand the opinions, feelings and perspectives individuals have about the issue in question. Attitudes, thus understood as the positive or negative evaluation of an object, can significantly influence behaviour and decision-making<sup>36</sup>.

### PRACTICES

The practices component focuses on the regular behaviours and actions of the individuals that are shaped by commonly held social norms and beliefs<sup>37</sup>. Data is collected on how people engage with or respond to the issue, including their behaviours, habits and routines.

The survey and analysis are not compartmentalised into distinct knowledge-attitudes-practices categories because of their strong interdependence and tendency to overlap. For instance, if an interview participant were to declare that "ICS are less efficient and use more wood fuel than traditional stoves", that could reveal both a lack of knowledge and a negative attitude.

### The findings from a KAP study can be used to:

- Elicit the baseline knowledge, myths, misconceptions, attitudes, beliefs and behaviours in relation to a specific topic.
- Identify which of the above act as barriers and enablers of behaviour change as well as ways to correct practices by tailoring culturally appropriate interventions.
- Convey information about topics or situations of interest in a way that will resonate with the target audience<sup>39</sup>.

Past research has uncovered numerous linkages among knowledge, attitudes and practices<sup>40</sup>. With advancements in behavioural science, it became evident that all three components mutually influence each other, and knowledge does not necessarily have to be the initial factor in modifying behaviour<sup>41 42</sup>.

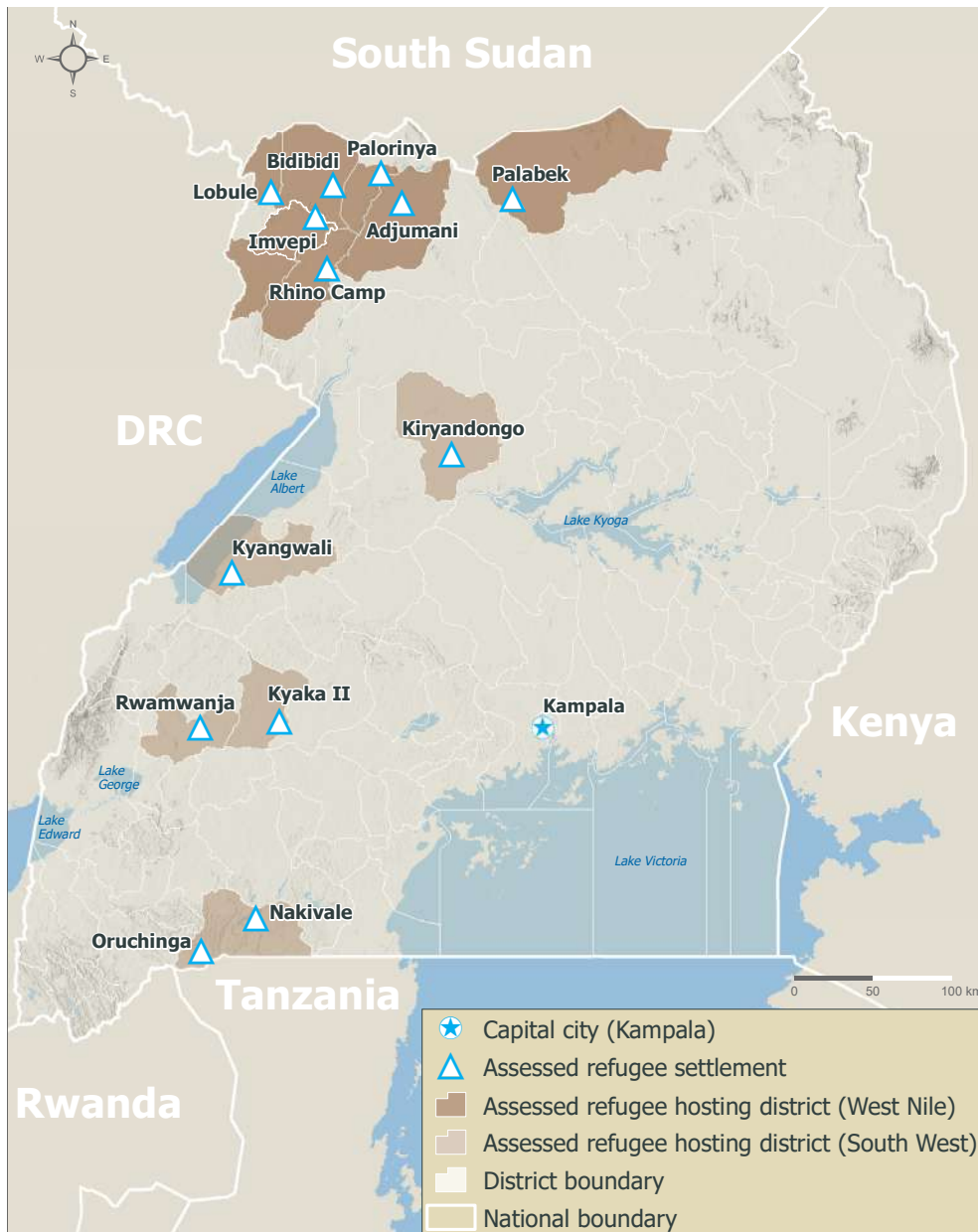
## GEOGRAPHIC SCOPE

This assessment covers all 13 refugee settlements in Uganda: Adjumani, Bidibidi, Imvepi, Kiryandongo, Kyaka II, Kyangwali, Lobule, Nakivale, Oruchinga, Palabek, Palorinya, Rhino Camp and Rwamwanja. While Kampala hosts a certain number of refugees, access to energy in the capital differs significantly to the settlements and Kampala was therefore not included in the scope of this assessment. This assessment primarily focuses on two key population groups:

- Refugees residing in the settlements
- Host community members within a 15km radius of the settlement borders

The decision to employ a fixed radius, as opposed to considering the entire population of the host district, was based on both programmatic considerations and the acknowledgment that the living conditions of the host community in close proximity to the settlements are similarly affected (in terms of energy access, environmental degradation and climate change) as opposed to the living conditions of the host communities residing much farther away from the settlement.

Map 1: Settlements covered in the geographic scope



## SAMPLING AND DATA COLLECTION METHODS

Two data collection methods were employed for this assessment:

### • Quantitative individual interviews

Energy, environment and climate change were all addressed in the surveys. A total of 2,491 quantitative individual interviews were conducted between 6 September and 24 October 2023. A detailed sampling table can be found in Annex 1. The sample was established based on a random sampling methodology with:

- a 95% confidence level and 10% margin of error at location and population group level in the settlements in West Nile
- a 90% confidence level and 10% margin of error at location and population group level in the settlements in Southwest<sup>43</sup>
- a 90% confidence level and 10% margin of error at the national group level.

Sampling was conducted by generating GPS points randomly. Consequently, the outcomes obtained for each population group in every location can be deemed representative.



© U-Learn. A charcoal stove

Aggregation on the regional or national level was weighted to correct over- or under-representation of either the refugee or host community. The data is representative for gender on the regional/national level.

### • Qualitative individual interview

The qualitative interviews focused mainly on the attitudes towards the three-stone fire and improved stoves, and the knowledge and attitudes towards environmental degradation. In total, 53 interviews were conducted across all 13 refugee settlements.

## DATA ANALYSIS METHODS

### • Quantitative analysis

The cleaned data was analysed with an automated R script which includes the weighted aggregation to correct under- or over-representation of certain groups (e.g. for aggregations of the regional and national level). A weighted Excel analysis is generated with the outcome for each option of each question, per population group at the settlement, regional and national level, as well as per gender at the regional and national level. This [dataset](#) and [data tables](#) are publicly available in the IMPACT Resource Centre.

### • Qualitative analysis

Interviews were transcribed and analysed with the MAXQDA programme to produce a [DSAG](#). They aid in identifying patterns, relationships and connections within the data, contributing to the development of themes and the overall understanding of the research question.

## LIMITATIONS

**The KAP model:** as is true of all KAPs, these evaluations are necessarily dependent on 'declarative' accounts – meaning the statements provided by interview participants.

Subsequently, there remains a potential for disparities between verbalised intentions and actual behaviours. The sample size, the joint analysis workshop, and the secondary desk review are all mitigation measures to ascertain the reliability of the data.

Adequate sample size minimises sampling errors, increasing the reliability of the data. It helps ensure that the findings are not due to chance variations, enhancing the confidence in the conclusions drawn from the primary data. Joint analysis workshops provide an opportunity for diverse perspectives to be considered, potential biases to be addressed, and the validity of findings to be discussed.

The collaborative nature helps in verifying and validating the results, enhancing the overall reliability of the primary data. Finally, a thorough desk review ensures that the primary data collection is grounded in existing knowledge and context. It helps identify potential sources of bias, validate findings against existing information, and improve the overall reliability of the collected data.

**Gender representation:** the representation of gender is at the regional level (West Nile and Southwest) rather than at the location or settlement level, as observed in the refugee and host community groups. Despite this slightly reduced granularity, the data remains statistically representative at the regional level, enabling the identification of patterns and drawing conclusions at that level and above.

**Technical concepts:** the surveys incorporated various technical concepts (e.g. climate change, ICS) that carry the potential for misunderstanding. To address this risk, each enumerator underwent a comprehensive two-day training course, received a printed list of definitions, and had definition recalls integrated into the Kobo survey tool.

**Inaccessible locations:** some of the GIS-generated locations were inaccessible due to adverse weather and road conditions. In such instances, new geopoints were generated by excluding these inaccessible areas. To identify these excluded locations, please refer to the map provided in Annex 2.



© U-Learn. A charcoal seller in Palabek Refugee Settlement

# Research findings

The findings highlighted in this report are derived from several data sources, including the primary qualitative and quantitative data collected, as well as the secondary sources that were consulted. This section's organisation mirrors the three primary assessment areas: energy, environmental degradation and climate change.

## DEMOGRAPHICS

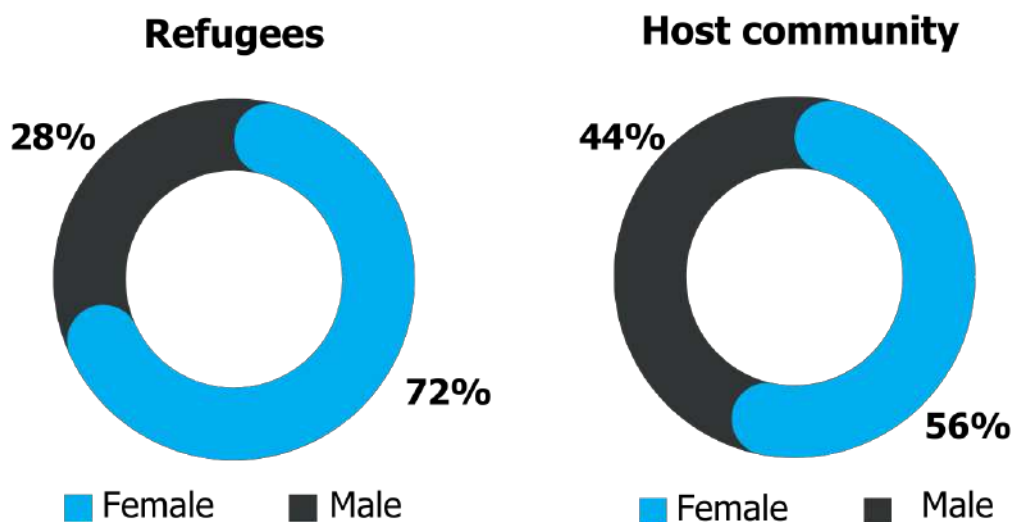
A total of 2,491 participants were surveyed for this assessment: 1,249 refugees and 1,242 members of the host community. The majority of the respondents were female, heads of household, and had an average age of 37 years old. No minors were surveyed.

The majority of refugees (68%) reported having been in Uganda for a period ranging from 5 to 10 years before data collection. This duration was the most frequently reported across all settlements, except for Nakivale, where the most commonly reported length of stay was between 10 and 15 years (31%).

Regarding the country of origin among the surveyed refugees, there was considerable variation between settlements. In West Nile, a minimum of 97% of refugees in the settlements of Adjumani, Bidibidi, Imvepi, Kiryandongo, Palabek, Palorinya and Rhino Camp indicated South Sudan as their country of origin.

Conversely, in Kyaka II, Kyangwali, Lobule and Rwamwanja, at least 90% of refugees appeared to be from the DRC. Nakivale and Oruchinga stood out as the most diverse settlements in terms of refugee nationality, with respondents hailing predominantly from the DRC, Rwanda and Burundi.

Figure 1. Gender of survey respondents



## ENERGY

According to the [UN-REDD+ National Programme](#), the primary drivers of deforestation in the country are agriculture and the cutting of firewood<sup>44</sup>, with the prominence of one over the other varying based on the specific location<sup>45</sup>. Indeed, agriculture continues to be a crucial element of Uganda's economy, constituting approximately 23% of the country's GDP in 2014, with two-thirds of the population directly involved in agricultural production<sup>46</sup>.

Agriculture also remains the primary source of employment for 88% of both refugees and hosts, largely due to the rural location of most settlements<sup>47</sup>. The heavy dependence of approximately 96% of the population on wood fuels, together with the reluctance of many households to embrace energy-saving technologies, has led to an increased demand for wood fuel, contributing to the unsustainable extraction of wood from the landscape, which can eventually lead to deforestation<sup>48</sup>.

Among various environmental consequences, deforestation poses a risk of changing the biomass supply accessible to households in terms of type, quantity and quality of fuels used<sup>49 50</sup>. Previous studies have shown that women and children, typically tasked with the responsibility of gathering firewood, would then need to invest additional time and cover greater distances for wood collection.

This not only exposes them to increased safety risks (e.g. sexual and gender-based violence)<sup>51</sup> but also diminishes the time available for other tasks such as livelihood opportunities and educational pursuits. Finally, there are reports of certain households coping with reduced access to cooking fuel by undercooking meals, reducing the frequency of meals prepared, and modifying the types of foods cooked, potentially affecting overall nutritional status<sup>52 53</sup>.

The reliance on biomass in and around settlements, coupled with concerns about deforestation and environmental degradation, has led to increased interest and initiatives related to alternative fuels and cooking methods. Uptake of alternative cooking methods and fuels is closely related to people's knowledge, behaviours and perceptions. Accordingly, this section of the report concentrates on individuals' perceptions regarding ICS<sup>54</sup> and stove fuels.

Furthermore, given that 20% of refugee households lack an energy source for lighting, 37% resort to battery-powered torches, 23% use solar energy (either through solar lanterns or solar home systems), and 10% depend on firewood, this report also examines the use of dry cell batteries and household use of solar energy. These are two other prevalent energy options in the settlements<sup>55</sup>.

## COOKING STOVES

The functionality of a cookstove is defined by three processes:

- 1. Heat-transfer efficiency**, indicating the extent to which the pot absorbs heat.
- 2. Combustion efficiency**, denoting the percentage of energy and carbon in the fuel that is converted to heat and carbon dioxide.
- 3. Overall thermal efficiency**, representing the proportion of energy in the fuel that is absorbed by the pot.

An improved stove, often referred to as an improved cookstove, is a type of cooking appliance designed to be more efficient, cleaner and safer than traditional or basic cooking stoves. These stoves are typically developed to address the drawbacks and challenges associated with traditional cooking methods, which often involve open fires or simple, unimproved stoves. Improved stoves come in various designs and models, but they share common features aimed at enhancing cooking efficiency, reducing fuel consumption, and improving safety and environmental sustainability. Source:

World Bank Group, [Understanding the Differences Between Cookstoves](#), 2014

## Results

When asked whether the respondent cooked at least once a week for their household, 95% of refugee and 96% of host community respondents said yes.

Interestingly, the majority of male respondents (93% of male refugees, 95% male host community members) also reported to cook at least once a week for their household. In a recent publication from Makerere University's School of Women and Gender Studies, it is highlighted that certain cultures in Uganda have traditionally regarded the kitchen space, along with its associated tasks, as a domain associated with femininity<sup>56</sup>.

Comparable observations have been noted in Eastern DRC and South Sudan, the primary source regions of refugees in Uganda<sup>57 58</sup>. Should the cultures included in this assessment indeed abide by patriarchal values where women are expected to be the main household cooks, than this observation suggests a potential evolution in traditional gender roles, possibly influenced by forced displacement, which may contribute to the erosion of some of the most rigid social conventions and could have influenced surrounding host communities.

This shift is likely a response to the need for adaptation to new circumstances and economic considerations. Alternatively, and as suggested by the School of Women and Gender Studies, this could also be a result of the extensive COVID-19 lockdown which may have seen men entering spaces traditionally reserved for women<sup>59</sup>.

**This trend could highlight the importance of incorporating male participants in projects related to cooking**, especially considering that women's decision-making authority regarding alternative cooking solutions may be limited due to men typically controlling budgets<sup>60</sup>.

When asked whether **the respondents believed that some stoves are more energy/fuel efficient than others, 90% of refugees and 91% of the host community said yes, pointing towards awareness of the concept of stove efficiency, at least to a certain degree<sup>61</sup>.**

However, among these respondents, the predominant stoves owned in their households were the traditional mud/clay stove (66% of refugees, 48% of the host community) and the three-stone fire/open fire (43% of refugees, 71% of the host community).

Notably, these stoves are less efficient than improved alternatives like improved mud stoves, improved ceramic stoves and kerosene stoves. However, while traditional mud stoves are not considered ICS in this assessment, they are relatively more efficient than the three-stone fire and the open fire, albeit only marginally<sup>62</sup>.

The comparatively higher traditional mud stove ownership might nevertheless suggest a greater willingness to embrace more efficient stove technology in comparison to people who own three-stone fires or open fires and can therefore still be considered as incremental progress.

### Are traditional mud/clay stoves considered to be ICS ?

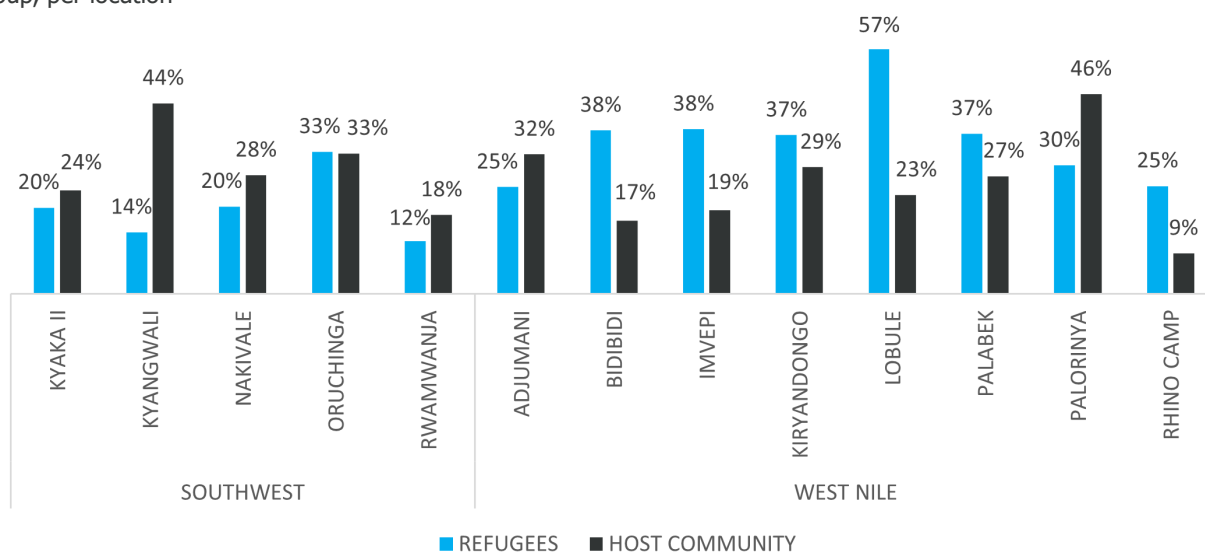
In this assessment, traditional mud/clay stoves are not considered to be ICS. The definition of an ICS is relative, comparing the efficiency of one stove to a less efficient alternative. While the traditional mud/clay stove is more efficient than a three-stone fire or an open fire, its efficiency is only marginally superior, and there still exists a risk of exposure to air pollution due to the inefficient combustion of solid fuels. In the survey, ICS included the gasifier stove, the kerosene stove, improved mud stoves, improved charcoal stoves, improved ceramic stoves and solar cookstoves.

Source: World Bank Group, [Understanding the Differences Between Cookstoves](#), 2014



## Results

Figure 2. % of respondents who believe some stoves are more efficient and who reportedly own at least one ICS, per group, per location



**In terms of ICS ownership, 26% of refugees and 28% of host community members reportedly owned at least one such stove** (e.g. improved mud stoves and improved ceramic stoves<sup>63</sup>). However, differences between refugee and host community respondents varied greatly depending on location, with Lobule and Kyangwali displaying the largest differences (34 and 30 percentage points, respectively).

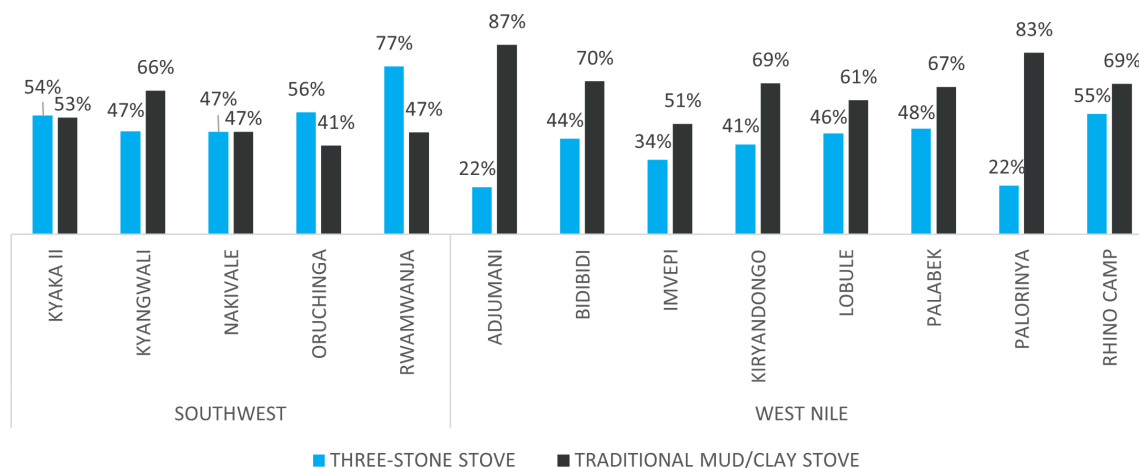
While there is no set definition of stove 'adoption', this assessment considers adoption as both acquisition and regular use (at least once a week) of the stove.

**Among respondents who claimed ownership of an ICS, 97% of refugees and 96% of host community members also reported using the ICS on a weekly basis or more.**

Based on anecdotal evidence, certain respondents own an ICS but opt not to use it regularly due to concerns about potential damage. Instead, they reserve its use for special or festive occasions.

This behaviour may account for the small percentage of respondents who claim ownership of an ICS but either do not use it or use it infrequently<sup>64</sup>. Alternatively, it is conceivable that respondents were simply not satisfied with the stove but did not want to rule themselves out of future donations.

Figure 3. % of refugees who reportedly understand the concept of stove efficiency, per ownership of a three-stone stove and/or a traditional mud stove, per location



## Results

Regarding **the perceived benefits of ICS, the most frequently reported answer among both refugees and host community participants<sup>65</sup> was the reduced cooking time (75% and 72%, respectively), followed by the reduced cost of fuel (62% and 54%, respectively).**

Indeed, several factors can contribute to faster cooking times with ICS: increased heat transfer efficiency, combustion efficiency, concentration of heat, uniform heating, reduced heat loss and optimised airflow<sup>66</sup>.

The factors that contribute to quicker cooking times also lead to a more efficient use of fuel, consequently lowering fuel costs when not freely gathered. However, the financial benefit was cited by a smaller number of respondents.

Several explanations could support this. Firstly, the cost benefit may not be perceived if wood is collected for free from the surrounding environment. Alternatively, **it could suggest a lack of awareness regarding the cost effectiveness of ICS.**

This could further be explained by potentially low financial literacy rates or lack of tracking spending and savings may be another of the possible reasons why the long-term cost benefits of ICS are not perceived. **The cost benefit was perceived by the least respondents in Oruchinga, Nakivale and Palabek<sup>67</sup>.**

**When enquiring about the reasons behind participants acknowledging the efficiency of certain stoves yet not owning an ICS, the predominant response was the high cost,** cited as a barrier by 89% of refugee and 79% of host community respondents.

Both communities estimated the cost of the cheapest available ICS in Uganda to be between UGX15,000 and UGX25,000, with the highest estimates reported in Rhino Camp and the lowest in Bidibidi, Kiryandongo, Kyaka II, Kyangwali, Lobule, Oruchinga and Palorinya. There was minimal variation in the median values reported by this group of respondents and those specifically mentioning price as a barrier.

**When respondents who identified price as a barrier were asked if payment in instalments or a loan would be conducive to purchase, 50% of refugee and 62% of host community respondents expressed willingness,** most notably refugees in Rwamwanja (67%) and Kyaka II (66%) and host community members in Lobule (86%) and Nakivale (74%).

A study conducted in 2013 examined sales offers for ICS in Uganda. It found that one-week free trial periods, four-week payment schemes, and rent-to-own payment plans based on the savings facilitated by ICS were advantageous. The study also introduced indicators to assess present bias and impatience, which are believed to influence ICS purchasing decisions<sup>68</sup>.

Subsequently, a 2018 study in rural Tanzania, building on the earlier research, concluded that extending free trial periods and repayment periods (ranging from three months to one year) further promoted the adoption of ICS<sup>69</sup>.

For the remaining respondents who still considered price a barrier regardless of whether payments could be done in instalments or loans, direct financial support rather than a flexible payment scheme might be more effective in encouraging ICS purchase.



**90% of refugees believe that some stoves are more efficient than others**

## Results

Interestingly, the Tanzanian study also found that distributing ICS for free resulted in low sustained use. The authors attributed this to households having limited autonomy in selecting an ICS tailored to their specific needs.

In other words, households will accept free ICS even when they do not necessarily favour them, despite the stoves' marketed features, resulting in low uptake<sup>70</sup>. **This points towards the importance of involving the target audience at the design stage.**

**The second and third most frequently reported reasons**, although with much lower response rates, were the **limited availability of ICS** (16% of refugee and 25% of host community respondents) and **the misconception that ICS require more expensive fuel types** (12% of refugee and 14% of host community respondents).

The lack of availability was most reported by refugees in Palorinya (32%), Bidibidi (25%) and Palabek (23%), while the host community reported this issue more frequently in Bidibidi (41%), Rwamwanja (29%) and Rhino Camp (29%).

It is important to highlight that the reported lack of availability of ICS does not necessarily imply their unavailability throughout the entire settlement. Instead, it might indicate that ICS are not accessible within the immediate vicinity of the respondent.

For instance, even if there is an ICS stock located 5km from a specific household, it does not guarantee that the household has the means to reach that location or is aware of stocks there.

Additionally, while it is true that certain ICS models may necessitate specific and potentially pricier fuels such as charcoal (which may be more expensive depending on location and seasonality), it is important to note that there are many different examples of ICS, with models capable of accommodating traditionally more accessible fuels like firewood while others are designed to be used with charcoal.

The Rocket Lorena, for example, is crafted for the combustion of wood and agricultural residues, while the Kenya Ceramic Jiko is tailored for charcoal use<sup>71,72</sup>. While most stoves are typically engineered for either charcoal or wood, there are exceptions, such as the Dual Stove by Ugastove, designed to accommodate the use of both fuels<sup>73</sup>.

**The misconception that ICS necessarily require more expensive fuel types might represent a barrier to the uptake of ICS. In practice, ICS are designed to function optimally regardless of the fuel type of the end user.**

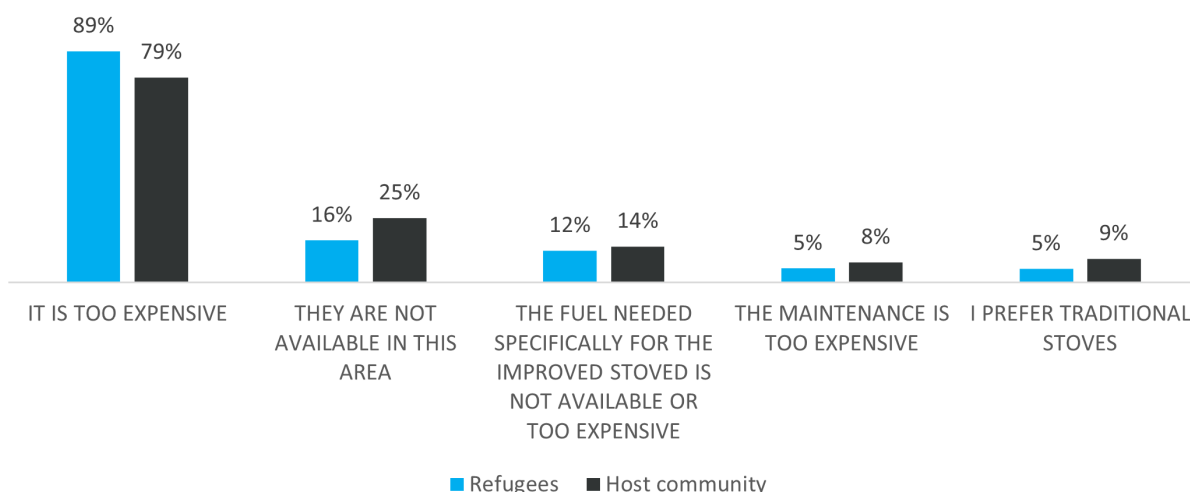
Another potential obstacle to the adoption of ICS, particularly in a scenario where the supply chain may not cover the entirety of the settlements and their surroundings, is the lack of knowledge on how to build an ICS (for example, the Rocket Lorena).

**Only 27% of refugee and 25% of host community participants who grasped the concept of stove efficiency claimed to know how to build an ICS themselves.** The highest response rates were observed in Adjumani (49% of refugee and 52% of host community respondents), in notable contrast to Kyaka II (9% of refugee and 4% of host community respondents).

This knowledge would likely only become beneficial for adoption if, at minimum, the necessary tools and materials are accessible and affordable, and if the advantages of using an ICS are well understood.

# Results

Figure 4. % of refugees who are aware of stove efficiency, per reason for not owning an ICS (multiple choice) (TOP 5



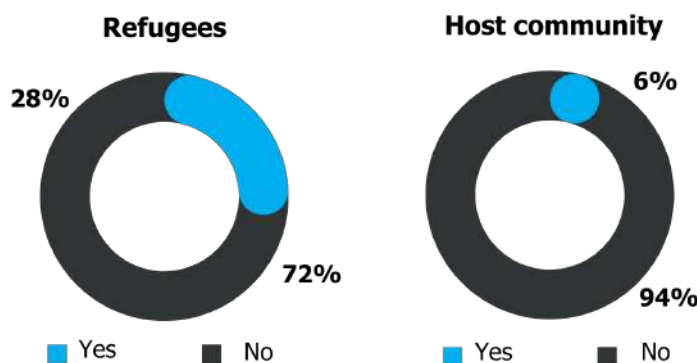
When asked whether the respondents who grasp the concept of stove efficiency had ever received an ICS from an NGO or a UN agency for free, 28% of refugee respondents said yes, in contrast to only 6% of the host community respondents. This trend was most pronounced in Lobule (73%) and Bidibidi (60%) among refugees, while Rwamwanja (10%) and Kyangwali (9%) reported lower response rates.

Among people who received a free stove, 9% of refugees and 2% of host community members mentioned having sold an ICS that was initially provided for free by an NGO or UN agency at some point in their lives<sup>74</sup>.

Considering the decrease in humanitarian aid in the settlements, it is plausible that these figures may rise further, particularly among respondents facing challenging circumstances who may prioritise the immediate transfer value of a stove over its long-term savings.

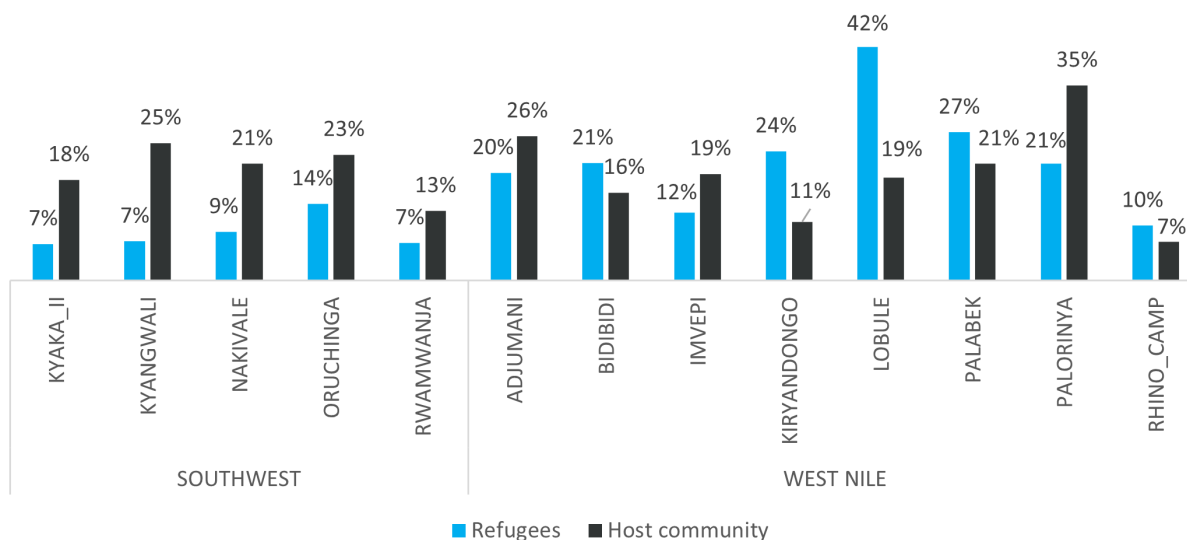
Another phenomenon that warrants investigation is that of stove stacking, defined as the practice of using multiple stoves or cooking devices simultaneously or in succession. Stove stacking may be employed for various reasons, including the need to cook multiple items simultaneously, improve cooking efficiency, or achieve specific culinary results. Ultimately, it is thought that stove stacking stems from the inability of the primary cookstove/cooking system to perform all functions<sup>75</sup>.

Figure 5. % of respondents who claim to have received an ICS for free from an NGO or a UN agency, at some point in their life



## Results

Figure 6. Among respondents who reportedly understand the concept of stove efficiency, the % of respondents who own both a traditional, non-improved stove, and an ICS



**During the assessment, it was observed that 41% of refugee respondents and 55% of the host community owned between two and four stoves.** It is important to note that for the remaining respondents with only one stove, this does not necessarily imply that the single stove meets all their needs. Rather, it could signify financial constraints preventing them from engaging in stove stacking.

When stove stacking involves both ICS and non-ICS, then this behaviour could suggest a transitional phase wherein households are gradually adopting cleaner and more efficient cooking technologies. Conversely, the stacking of stoves may also underscore challenges in the widespread adoption of ICS.

Barriers such as cost, availability, accessibility and user preferences may impede a complete transition, resulting in the coexistence of traditional and improved stoves. Additionally, the coexistence of different stoves could be influenced by cultural or culinary considerations, or ingrained habits.

**Further research into these specific habits could unveil the drivers behind such behaviour, providing valuable insights to tailor targeted interventions effectively.**

To maximise the positive impacts of ICS, the stoves must first be used correctly and consistently, but just as importantly, they must effectively replace the use of traditional stoves<sup>76</sup>. Understanding the nuanced reasons behind stove usage patterns is essential for developing strategies that address the unique challenges and preferences within the community.



© U-Learn. Firewood used for cooking in Palabek Refugee Settlement

## STOVE FUELS

**Firewood appears to be the primary choice for cooking among both refugees (87%) and host communities (86%), with charcoal being the following choice (53% and 56%, respectively), indicating a high demand for biomass<sup>77</sup> from the settlements and their vicinity.**

It is important to note that according to some research, while there is a noticeable rise in observed biomass loss in Uganda, the spatial distribution does not strongly indicate that this increase is primarily (or predominantly) a result of direct harvesting of woody biomass by refugees, at least in Northern Uganda.

The most significant losses are, in fact, observed in host community areas situated away from the settlement boundaries, potentially where industrial-level tree harvesting takes place<sup>78 79</sup>. However, **the substantial dependence on firewood in regions with diminished wood fuel availability remains a concern in that it could amplify ongoing challenges and heighten the vulnerability of already marginalised populations.**

For example, prior studies have shown that refugees, particularly women and girls, may be required to cover longer distances in search of firewood, diverting time from paid labour and potentially impacting education; the increased exposure during their searches for firewood may lead to heightened risks of sexual and gender-based violence escalating firewood prices might render it unaffordable; and coping strategies might involve skipping meals due to a shortage of or unaffordable firewood<sup>80 81</sup>.

During the qualitative interviews, 47 of 53 participants had reportedly reduced or attempted to reduce their firewood/charcoal consumption. The most commonly cited factor was related to seasonality (13 qualitative interviews), which results in fuel-hopping from firewood to charcoal between seasons. During the rainy season, wood cannot be dried for use as fuel, thus prompting certain households to turn to charcoal, and then back to firewood during the dry season.

Figure 7. % of respondents per main cooking fuel, per group (multiple choice)

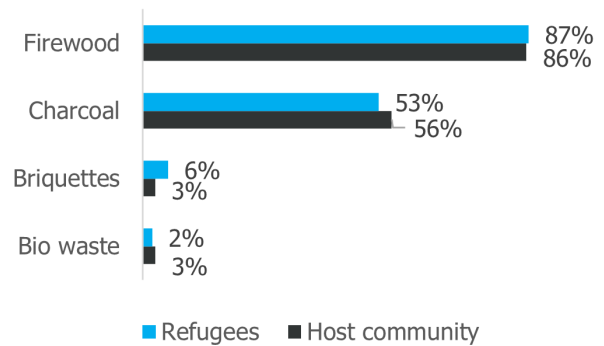
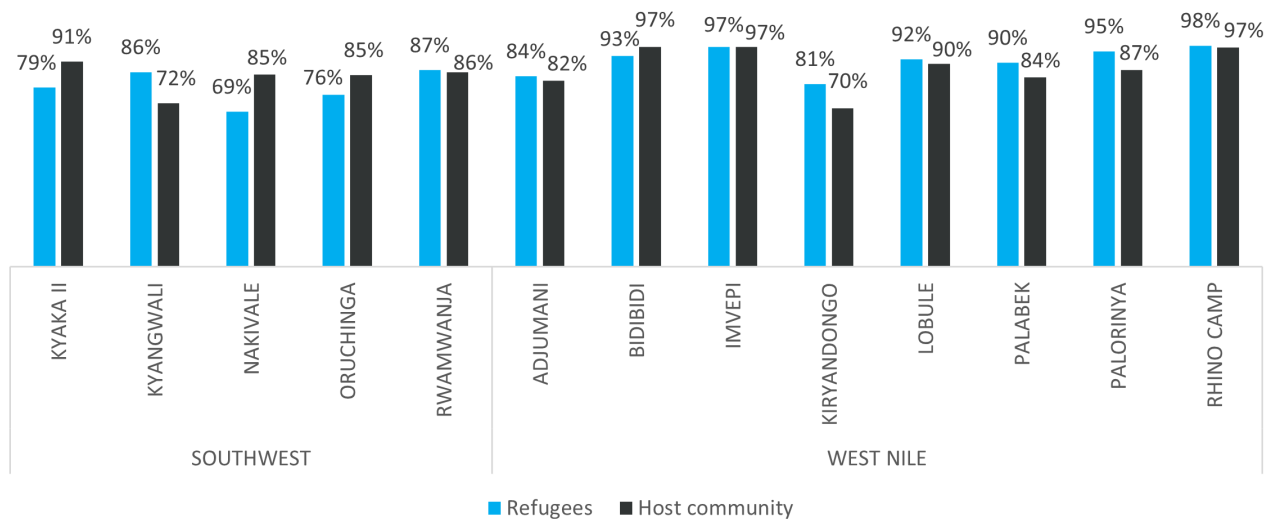


Figure 8. % of respondents per main cooking fuel, per group (multiple choice)



## Results

In a previously mentioned study conducted in rural Tanzania, it was noted that consumers showed a strong preference for ICS capable of using both firewood and charcoal<sup>82</sup>. This dual-fuel option could be particularly relevant in settings where seasonal variations significantly influence fuel choices.

However, additional research may be required to assess the actual efficiency of such dual ICS, as traditional stove designs typically cater to either firewood or charcoal due to the distinct combustion characteristics, heat intensity, ash production, and the need for different airflow designs associated with each fuel type.

The second most commonly reported method for curbing the consumption of firewood or charcoal involves extinguishing the fire (12 qualitative participants), often by using water or sand, and subsequently drying and reusing the fuel. Additionally, one participant pointed out that extinguishing and preserving firewood for later use is comparatively more straightforward than doing so with charcoal.

### **Only 6% and 3% of respondents from the refugee and host community, respectively, identified briquettes as one of their primary cooking fuels.**

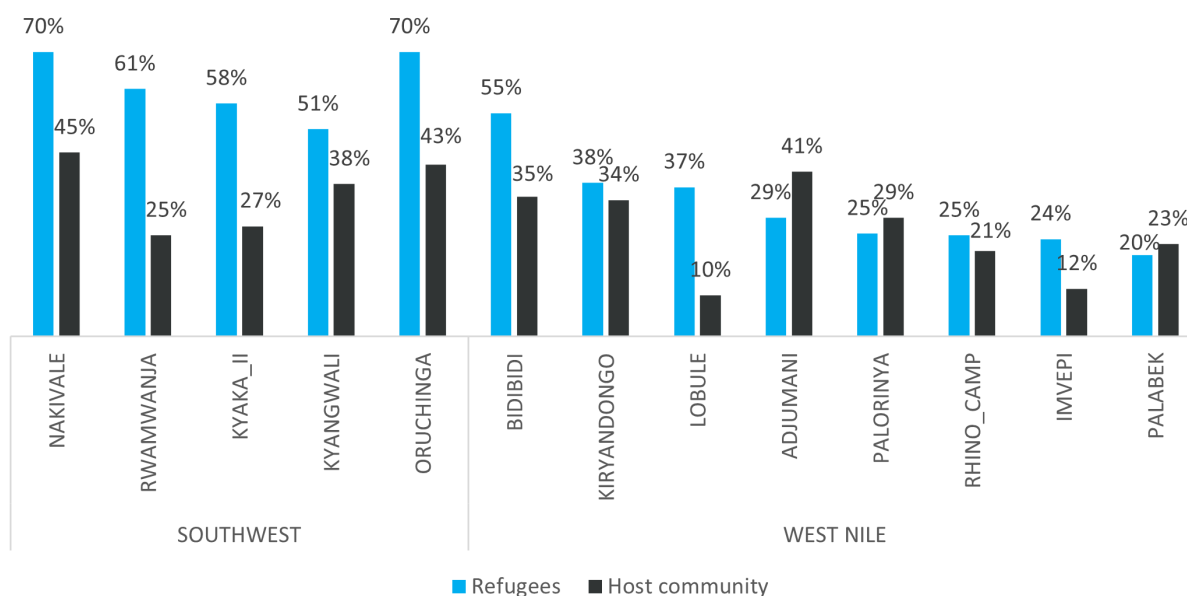
This limited adoption may be attributed, at least in part, to a lack of familiarity with the concept of briquettes, with only 44% of refugees and 34% of host community members reporting having heard of them.

Notably, refugees in the Southwest region exhibited a higher awareness level (61% of respondents) compared to their host community counterparts in the same region and compared to both groups in the West Nile region (ranging from 32% to 34% of respondents). The lowest awareness of briquettes was observed among refugees in Palabek (20% of respondents) and host community members in Lobule (10% of respondents).

### **Among respondents who reported regular use of briquettes, the primary ingredients cited for their briquettes, listed in descending order of prevalence, were charcoal, cow dung and sawdust.**

“ After cooking we used to stay behind around the fireplace to converse but now, after cooking, we put off the fire to save the firewood. We reduce so that we don't frequently go to the forest to get firewood. **Respondent in Bidibidi** ”

Figure 9. % of respondents who are reportedly familiar with the concept of briquettes



## Results

**Among participants who claimed awareness of the briquette concept, only 20% of refugee and 12% of host community respondents said that they used them regularly (at least once a week over the past three months).**

Among respondents who reported awareness of the concept, **the most commonly mentioned perceived benefits for both communities included the cost effectiveness of cooking with briquettes, time savings and the reduced smoke production compared to alternative fuels.**

Despite being the most frequently highlighted advantage, the cost benefit was acknowledged by only around half the respondents in each group. **This could suggest a potential lack of awareness of the advantages of briquettes among the surveyed individuals, including cost-benefit, or, potentially, past experience with sub-quality briquettes did not yield positive results.**

Shortage of wood was reported as the fourth reason by both groups, mainly by the refugees in Rwamwanja (58% of refugee respondents who were aware of briquettes). **When questioned about the reasons for not using briquettes regularly** (defined as at least once a week in the past three months), the predominant response from 56% of refugee and 60% of host community respondents who reportedly had heard of briquettes was the unavailability of briquettes in their area.

As highlighted in the previous paragraph on the perceived availability of ICS, it is plausible that briquettes might be present in the settlements without the respondents' knowledge or in locations that are inconveniently distant for them.

**Another reported obstacle to adopting briquettes was the cost**, with 31% of refugee and 15% of host community respondents identifying it as a barrier. **Among this group, 50% of refugee and 60% of host community respondents indicated a willingness to make a purchase if payment options such as instalments or loans were available.**

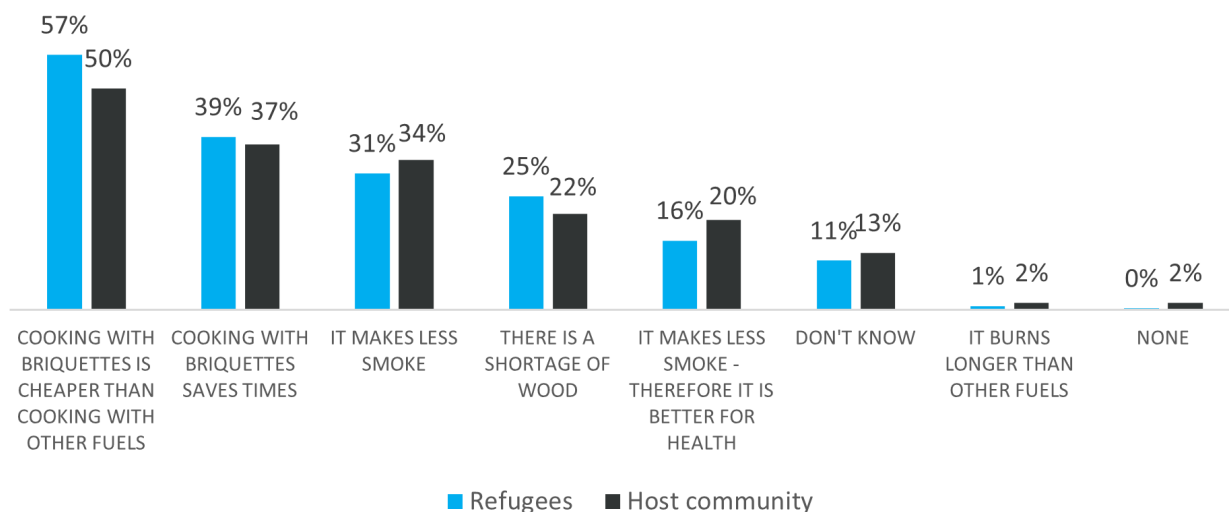


© U-Learn. Pile of firewood



## Results

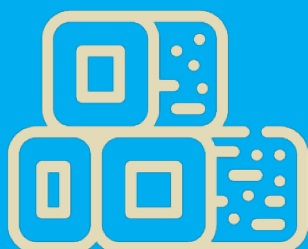
Figure 10% of respondents who are familiar with the concept of briquettes, per perceived advantage of briquettes



For those people who continued to view price as a hindrance despite such options, offering direct financial support, as opposed to a flexible payment scheme, might be a more effective incentive for promoting briquette purchases if they are available.

An interesting observation documented in this assessment involves **the commonly reported practice of leaving cooked food on the stove, with the fire still burning, solely to keep it warm**. This practice was reported by 40% of the refugee and 54% of the host community respondents and seemed especially common among the host community in Oruchinga (76% of respondents).

According to anecdotal evidence, this practice is occasionally employed while awaiting the arrival of the husband or head of the household, as the food must be ready for immediate consumption on their estimated arrival. **This habit may result in excess fuel consumption beyond what is necessary for food preparation, highlighting the potential for the adoption of heat-retention technologies like heat retention boxes and hot bags.**



When questioned about the reasons for not using briquettes regularly, **56% of refugee and 60% of host community respondents - who are aware of the concept of briquettes - reported it was due to the unavailability of briquettes in their area**



© U-Learn. Solar panels come in different sizes and capacities, depending on use needs and affordances

### DRY CELL BATTERIES AND SOLAR POWER

The absence of sufficient energy for lighting, phone charging and productive purposes restricts opportunities for education, communication and income-generating activities<sup>83</sup>.

Additionally, it may also compel refugees and host communities to resort to more expensive or environmentally unfriendly alternatives, such as single use/disposable devices and dry cell batteries which can be harmful if disposed improperly. Lack of light may also contribute to fear of crime and gender-based violence<sup>84</sup>.

It is essential to understand the knowledge, attitudes and practices regarding sustainable energy alternatives in order to respond to the needs while taking into account the surrounding environmental challenges.

#### DRY CELL BATTERIES

**In the week leading up to data collection, 46% of refugee and 71% of host community respondents reported using dry cell batteries to operate at least one device**, with large differences between the settlements.

Notably, 81% of refugee respondents in Lobule fell into this category, versus 31% of refugee respondents in Rwamwanja. Among those people who acknowledged using batteries during this period, the primary devices powered included, in descending order, light torches<sup>85</sup>, radios and light bulbs connected to batteries.

Primary sources of light include light bulbs, disposable torches, cell phone torches and rechargeable light torches, underscoring the importance of dry cell batteries when it comes to access to light. Additionally, some respondents mentioned relying on open fires and candles as their main sources of light, both of which pose significant fire risks.

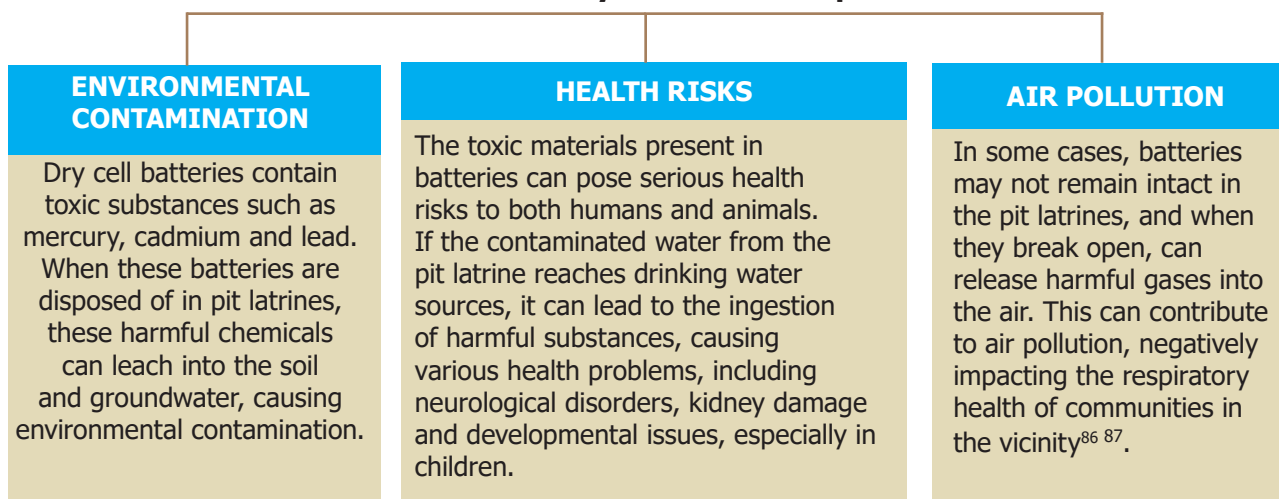
**A small percentage of respondents, 2% among refugees and 1% among the host community, indicated having no source of light at all.** When respondents were asked how they disposed of dry cell batteries most of the time, both groups – with great variations between locations – responded that they would **throw them into the pit latrines** (60% of refugees and 63% of host community respondents).

The second most common method involved **throwing them away along with other waste, such as in streets, landfills, nature or rivers** (39% of refugees and 38% of host community respondents).



**60% of refugees and 63% of host communities who regularly use dry cell batteries said they disposed them by throwing them into pit latrines**

## The harmful reasons of dry cell batteries disposal methods:



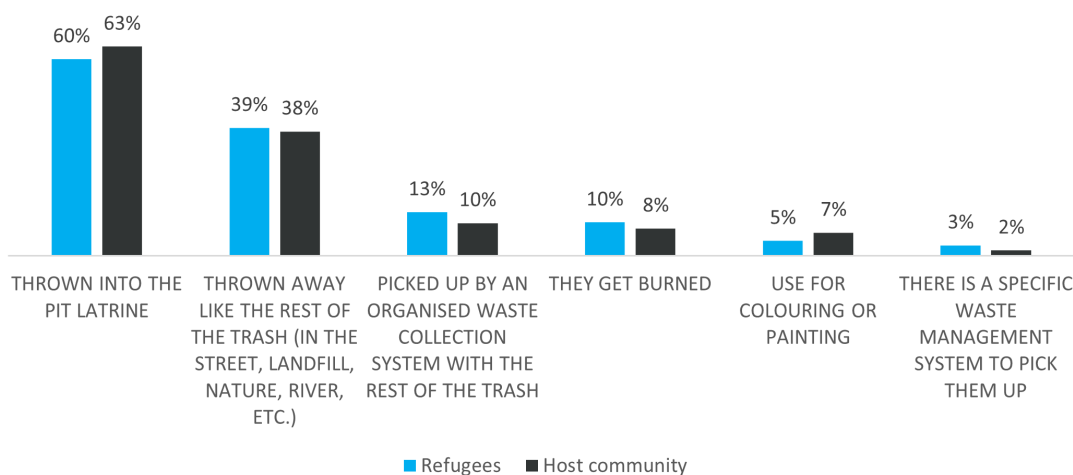
A lower proportion of respondents indicated engaging in alternative practices, such as **burning the dry cell batteries** (reported by 10% of frequent dry cell battery users among refugees and 8% among the host community) or **opening them to extract manganese dioxide for uses like black paint**, often for painting the walls of their shelters (cited by 5% of frequent dry cell battery users among refugees and 7% among the host community).

Although these percentages are comparatively small in comparison to other disposal methods mentioned earlier, their significance lies in the potential health hazards they pose. **These practices involve exposure to toxic emissions and the risk of skin contact with corrosive acids and heavy metals, making them noteworthy despite their lower prevalence<sup>88 89</sup>.**

Despite the prevalence of potentially harmful practices related to dry cell battery disposal, a substantial percentage of respondents demonstrated awareness of at least some of the potential for environmental harm. When asked whether some forms of disposal practices could be harmful to the environment, this awareness was reported by 82% of refugee respondents and 84% of host community respondents<sup>90</sup>.

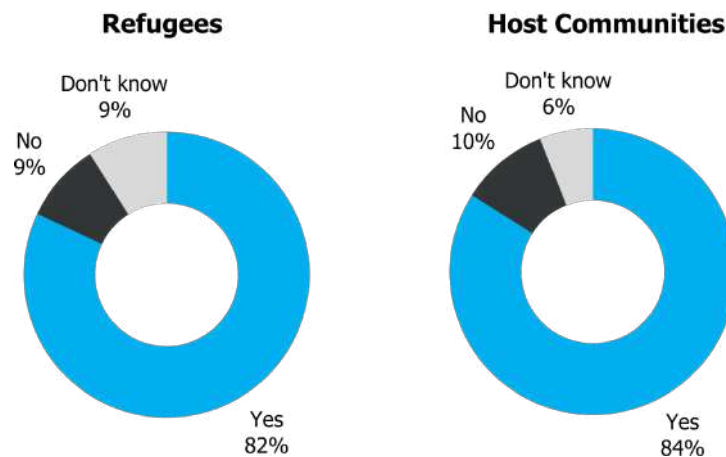
Among these respondents, the most frequently reported disposal practice identified by the respondents as harmful was throwing batteries into the environment, reported by 91% of refugee respondents and 90% of host community members. Second was the practice of burning batteries, reported by 36% of refugee respondents and 38% of host community respondents.

Figure 11. % of refugees who used dry cell batteries to power at least once device during the week prior to data collection, per main way of disposal (multiple choice)



## Results

Figure 12. % of respondents who believe that some forms of dry cell battery disposal can be harmful to the environment, per group

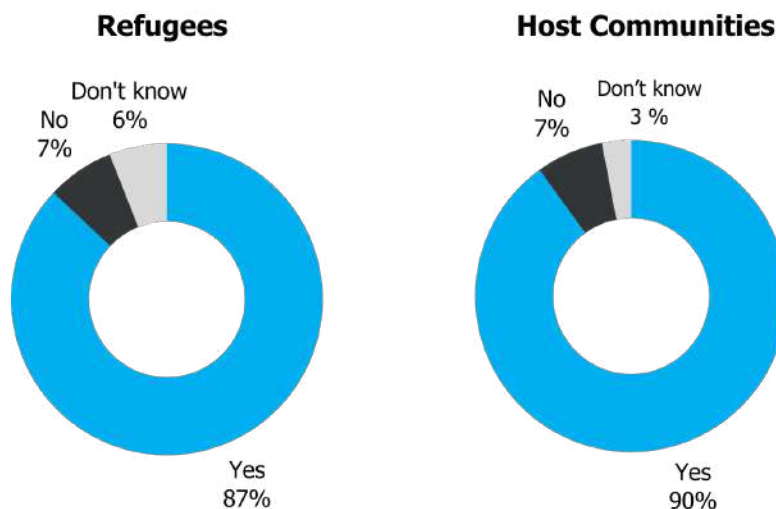


The evident gap between the knowledge of harmful disposal methods and the continued engagement in these practices suggests a potential lack of viable options for proper disposal. Only a small percentage of respondents demonstrated awareness of the risk associated with throwing batteries into pit latrines, with figures standing at 9% for refugees and 8% for the host community, underscoring a knowledge gap in this particular area.

Enquiring about whether respondents thought there were potential health impacts associated with various battery disposal methods, 87% of refugee respondents and 90% of host community members said "Yes". The disposal practices most frequently cited as harmful to health included throwing batteries into the environment, burning them and disposing of them in pit latrines.

**While respondents demonstrated a level of awareness by correctly identifying the environmental impact, a notable portion did not recognise the health risks posed by burning dry cell batteries or disposing of them in pit latrines.**

Figure 13. % of respondents who believe that some forms of dry cell battery disposal can be harmful to the health of their household or community, per group





© U-Learn



© U-Learn

### SOLAR POWER

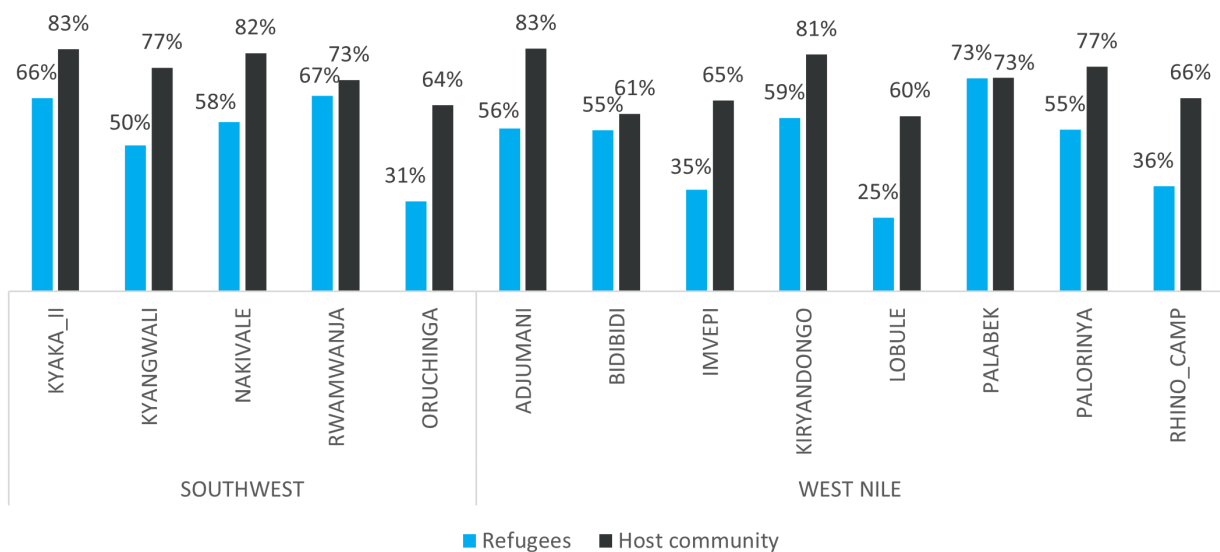
In the month prior to data collection, 55% of refugee and 73% of host community members reportedly used solar energy at their shelter to power/charge at least one device (e.g. phones, light, radios), with the host community having a notably higher usage.

**The predominant response from participants in both communities who used solar energy to power a device in the week preceding data collection highlighted the cost benefits compared to other sources of energy** (63% among refugees and 79% among the host community).

**Notably, the second most commonly mentioned rationale for adopting solar energy was its environmental advantages.** Of particular interest is the disparity between the two groups regarding the reception of a free solar device, with 32% of refugees citing this as a reason, in contrast to only 9% among the host community.

This discrepancy may provide insight into why fewer refugees identified cost benefits as a primary reason for using solar energy, as that incentive would be trumped by the free distribution of such devices.

Figure 14. % of respondents who used solar energy at their shelter to power at least once device in the month leading up to data collection



# Results

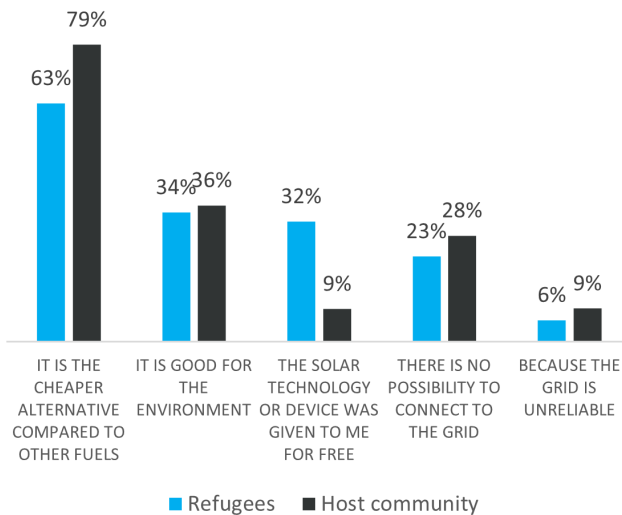
**For respondents who did not use solar energy in the week leading up to data collection, the primary hindrance cited by both groups was the high cost of purchase (96% among refugees and 85% among the host community).**

Additionally, a minority mentioned the expense of maintenance as a deterrent (12% among refugees and 17% among the host community). Availability was only minimally mentioned as a barrier (6% among refugees and 7% among the host community).

Interestingly, among those people identifying the device's price as a hindrance, 45% of refugees and 67% of host community members expressed that the possibility of instalment payments or a loan would be persuasive in encouraging them to purchase solar panels.

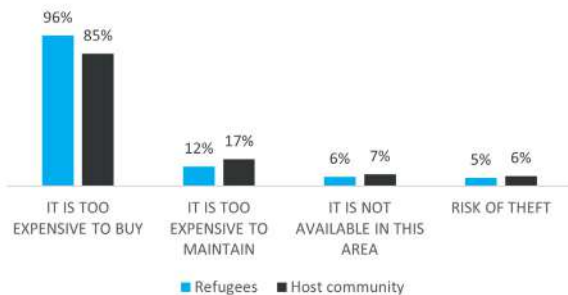
Similar to ICS and briquettes, for the remaining respondents who still considered price a barrier, direct financial support rather than a flexible payment scheme might be more effective in encouraging the purchase of solar devices.

Figure 15. % of respondents who used solar energy in the month prior to data collection, per incentive for using solar energy (multiple choice)



**55% of refugee and 73% of host community members use solar energy at their shelter to power/charge at least one device (in the month prior to data collection)**

Figure 16. % of respondents who did not use solar energy in the month prior to data collection, per reason (multiple choice)



© U-Learn



**3 million hectares of forest were lost in 25 years in Uganda**

### ENVIRONMENTAL DEGRADATION

In Uganda, as in many countries, deforestation and forest degradation are prevalent issues. Deforestation refers to the complete removal or clearing of forested areas, while forest degradation involves a decline in the overall health, quality or biodiversity of a forest ecosystem without total removal<sup>91</sup>.

In a 2017 report by MWE, Uganda appeared to rank among the top two countries globally with the highest deforestation rates<sup>92</sup>. The country's forest cover has dwindled from 24% in 1990 to a mere 9% in 2018, resulting in a loss of 3 million hectares within a span of just 25 years.

If the current trend persists, studies suggest that Uganda could lose all its forests within the next 40 years<sup>93</sup>. Additionally, according to the World Bank Group (WBG), in 2021 approximately 41% of Uganda's land was reported to be degraded, a factor that significantly contributed to economic vulnerabilities and poverty. The rate of degradation and soil erosion exacts a heavy toll, accounting for around 17% of the country's GDP<sup>94</sup>.

It is within this context of enduring environmental pressure in the host country that refugees arrive from their country of departure. This swift demographic influx has contributed to ongoing environmental challenges, though any which can be attributed to the refugee population increase is likely constrained within the immediate vicinity of the settlements.

For instance, as reported by the Food and Agriculture Organization of the United Nations (FAO), in Northern Uganda in 2018 when refugees sought asylum from South Sudan, there was an average increase of approximately 14% in degradation and loss within 5km of the settlement boundaries in woodland, bushland and cropland.

While there was further loss and degradation within an extended 15km buffer, the report states that this was more likely attributable to continuous degradation by host communities rather than to refugees<sup>95</sup>.

Deforestation and forest degradation can have several negative impacts on refugees and the host communities in and around the settlements in Uganda, such as increased wood fuel shortages, water scarcity and reduced quality, the disruption of traditional livelihoods (especially if refugees rely on natural resources for income generation), increased vulnerability to disasters (e.g. landslides, floods), competition and potential conflicts over resources between refugees and host communities or among refugees themselves<sup>96 97 98</sup>.

Understanding the knowledge, attitudes and practices of refugees regarding environmental degradation and deforestation in Uganda is therefore instrumental in fostering environmental sustainability, ensuring the well-being of the already extremely vulnerable refugee and host communities, and promoting peaceful relationships between the different groups.



**41 % of Uganda's land is reported to be degraded**



## Results

When participants were asked whether they thought the environment (nature, forests, wild animals, rivers, etc.) in and around their community was at risk, 83% in both refugee and host communities said “Yes”.

This could indicate a robust awareness of the overarching environmental risks within the surveyed population, especially among refugees in Bidibidi (95%), Rhino Camp (91%) and Nakivale (88%), and among the host community in Palabek (97%), Palorinya (95%) and Nakivale (93%).

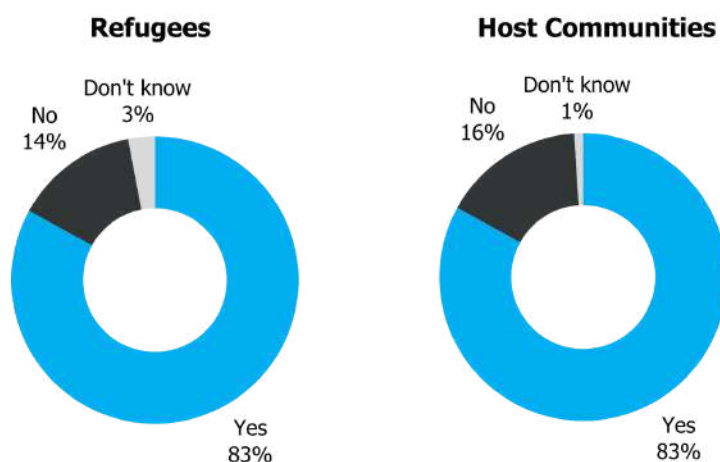
Of those people who identified a perceived risk to their environment, 98% of both refugee and host community respondents expressed concern to some extent, with 50% of refugee participants and 49% of host community respondents specifying that their level of concern was “a lot” (other survey options were “It does not worry me”, “A little”, and “Sometimes”).

Concern often creates a sense of urgency. When people believe that immediate action is necessary to address a problem, they may be more likely to mobilise and engage in activities aimed at resolving the issue promptly. A substantially larger percentage of refugees demonstrated concern about perceived risks in Imvepi (73%), Lobule (67%) and Bidibidi (62%), in contrast to Adjumani (41%), Kyaka II (32%) and Rwamwanja (24%).

### **When asked whether land clearing/deforestation was an issue in and around their community, 78% of the respondents in both groups said yes.**

Notably, among refugees, this perception was particularly high in Bidibidi (90%), while among the host community, it stood out in Palabek (94%). In contrast, respondents in Rwamwanja showed a comparatively lower recognition, with 60% of refugees and 56% of the host community acknowledging land clearing and deforestation as an issue. This could be clarified by considering potential variations in the current deforestation status and trends in the settlements and their vicinity.

Figure 17. % of respondents who believe the environment in/around their community was at risk, per group



During the qualitative interviews, participants reported that, in community discussions on environmental degradation, the predominant focus revolves around the critical matter of tree cutting (33 participants) and its potential impact on rainfall patterns.

A closely linked theme, constituting the second most discussed topic, is the proactive approach of tree planting (16 participants), viewed as a remedy to mitigate the challenges associated with deforestation. Furthermore, there is a shared concern regarding the preservation of swamps (9 participants) by avoiding agriculture in such areas as another vital aspect in the discourse on environmental degradation.

### **The two main reasons why deforestation/land clearing was considered an issue by respondents were that it would cause a shortage of wood and decrease the rainfall in their communities.**

## Results

**Shortage of wood seems to be especially of concern among the refugees in Kyaka II (78%), Kyangwali (77%) and Palabek (73%), and among the host community in Adjumani (74%), Nakivale (74%) and Oruchinga (74%).**

The relationship between deforestation and rainfall is complex and can vary across different regions. Scientific understanding of these interactions is an ongoing area of research. While it is challenging to specify a fixed distance, research suggests that the geographic scope of the impact of deforestation on rainfall tends to be more localised in comparison to broader climatic effects<sup>99 100</sup>.

While respondents may correctly perceive a causal relationship between the observed deforestation in and around their community and the experienced deficit in rainfall, it is important to note that this rain deficit could also be linked to more extensive and persistent deforestation occurring over the long term across Uganda.

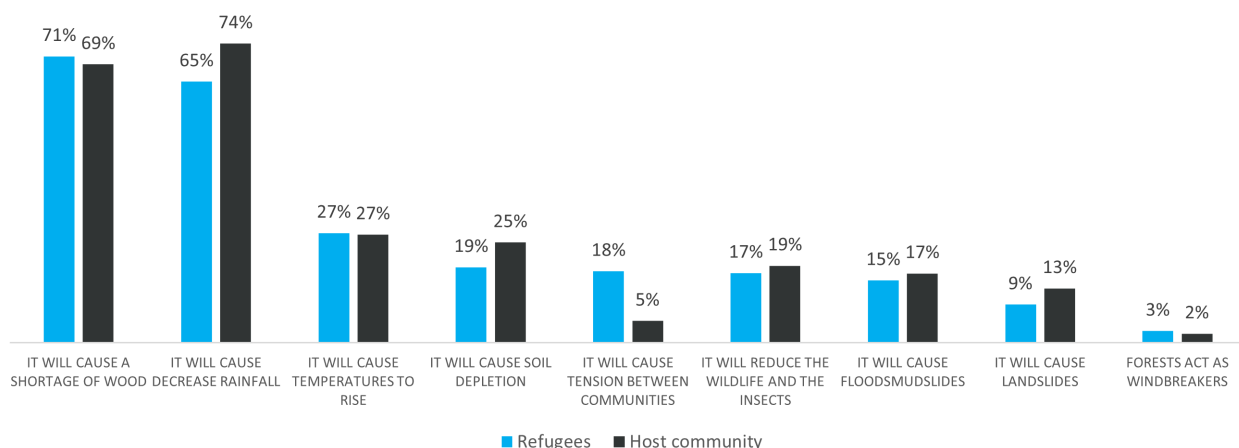
However, beyond providing insights into the respondents' knowledge about the impact of land clearing and deforestation, these answers are equally significant as they reveal the attitudes of the respondents toward these practices, which is that they are harmful. In this context, the primary reported concerns of wood shortage and rain deficiency seem to be associated with household energy requirements and potential agricultural consequences, which could shed some light on some of the incentives that could be prioritised for related projects.

Tension between the two communities is an often-discussed risk within the humanitarian response in Uganda<sup>101</sup>. However, this risk was not listed among the top three reasons why deforestation could be an issue. Still, among those people who viewed deforestation as a risk, refugee respondents appeared to be slightly more cautious (18%) about the potential for inter-communal tensions compared to respondents from the host community (5%).

**Among respondents who considered land clearing/deforestation to be a risk in and around their community, most believed that it was driven by the need to cut trees for wood fuel selling/usage, to make building material for housing/infrastructure, and to clear arable land for crops.**

All three are known to be important drivers of deforestation and forest degradation in Uganda. The target populations recognising that charcoal and firewood play roles in degradation suggests that their knowledge levels are already headed in the right direction. While information campaigns on deforestation can further supplement such knowledge, it may also be suitable to focus on promoting alternatives such as ICS and highlighting their fuel and cost efficiency.

Figure 18. % of respondents who perceive land clearing/deforestation to be an issue in/around their communities, per reason, per group





© U-Learn. Bags of charcoal



© U-Learn

## CLIMATE CHANGE

**Climate change has various impacts on Uganda**, affecting both the environment and communities, including refugee settlements. Among these impacts are extreme weather events and unpredictable weather patterns, with severe impacts on agriculture, water, infrastructure and health<sup>102</sup>.

Knowledge about current practices and behaviours related to climate adaptation provides insights into areas where there may be opportunities to strengthen resilience further. Understanding existing practices helps in identifying opportunities for positive behavioural change, fostering resilience to climate impacts.

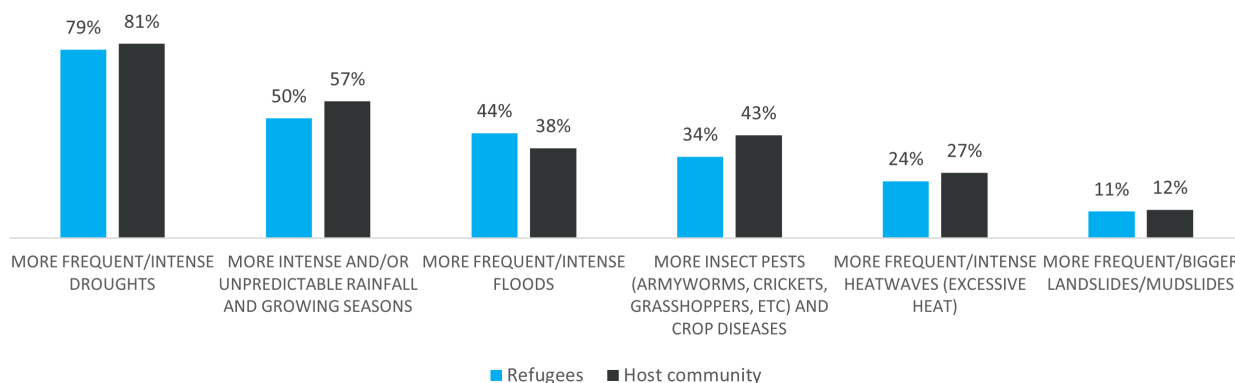
For instance, as reported by the Food and Agriculture Organization of the United Nations (FAO), in Northern Uganda in 2018 when refugees sought asylum from South Sudan, there was an average increase of approximately 14% in degradation and loss within 5km of the settlement boundaries in woodland, bushland and cropland.

**When respondents were asked whether they had ever heard about the phenomenon of “climate change”, 92% of refugee and 95% of host community respondents said that they had**, with the lowest response incidence among refugees and host community members in Rhino Camp (77% and 88% of respondents, respectively)<sup>103</sup>.

When asked which of the phenomena read out to them from a given list had been observed by the respondents in the last 10 to 20 years, **the most frequently observed phenomenon was the more frequent and/or more intense droughts, followed by more intense or unpredictable rainfall** and unpredictable growing seasons.

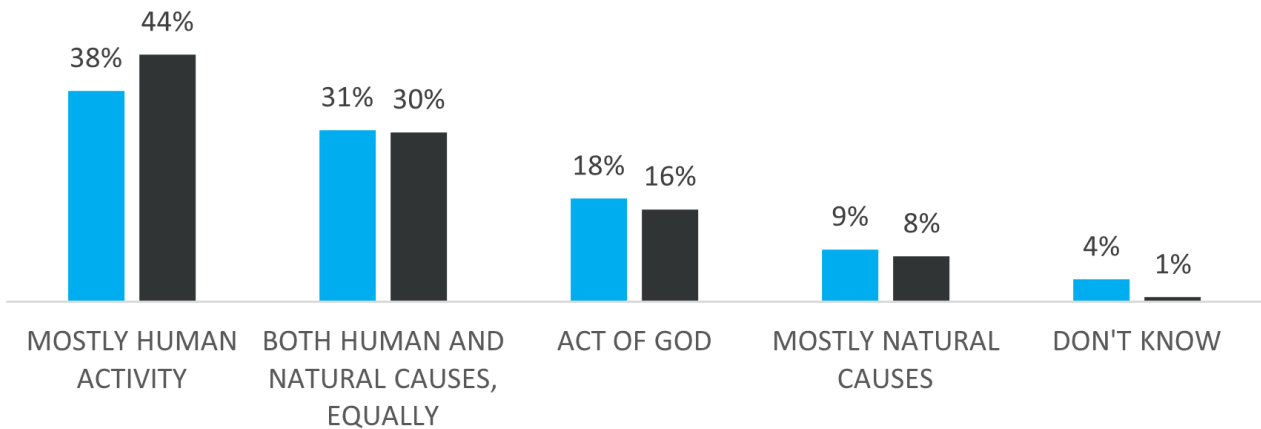
Subsequently, participants were informed that all these occurrences could potentially result from climate change. The definition of climate change was repeated for the benefit of the interview participant, and when asked if the explanation resonated with them, 97% of refugee respondents and 96% of host community respondents affirmed that it did.

Figure 19. % of respondents per observed climate change related phenomenon



# Results

Figure 20. % of respondents who understand the concept of climate change, according to the main cause of climate change, per group



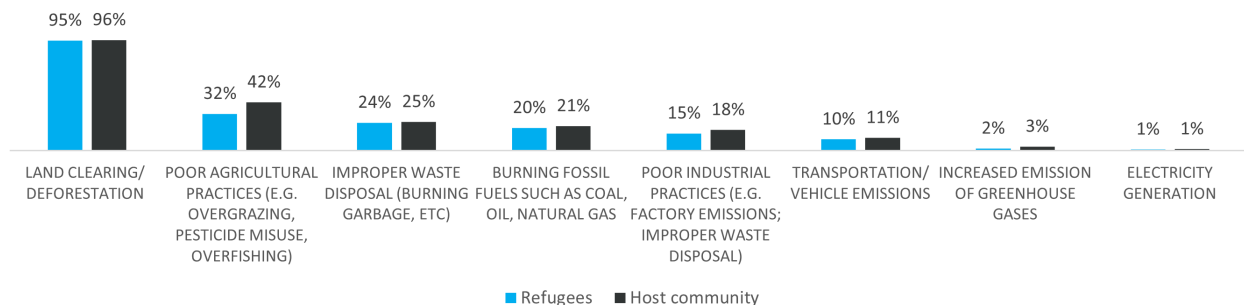
**While the largest share of respondents reported the main drivers of climate change to be either human activities, or both human and natural causes in equal proportions, a significant share believed it is mainly driven by an Act of God.** While the current trend of global warming and climate change is primarily attributed to human activities, the relevance of these answers in terms of climate adaptation lies in whether there is a sense of fatalism.

If people believe that climate change is an Act of God, there may be a diminished sense of individual and collective agency in mitigating its impacts. This can result in a passive attitude toward adopting adaptive measures and taking responsibility for sustainable practices.

The belief in climate change as an Act of God may even contribute to resistance against necessary changes in behaviour, policies and practices. Individuals and communities might resist adopting sustainable habits or transitioning to adaptive technologies, viewing such efforts as unnecessary in the context of divine intervention.

This perhaps explains why clean energy and climate action interventions in displacement settings in Uganda should mostly focus on economic benefits rather than environmental sustainability outcomes to convince such a population to swing into action.

Figure 21. % of respondents who believe climate change is driven mostly by human activities or human and natural causes equally, per main human activity



# Results



© U-Learn

Participants who identified human activities as the primary driver of climate change pointed specifically to deforestation/land clearing as the main issue. This aligns with the widely accepted scientific consensus that human actions, including the burning of fossil fuels (coal, oil and natural gas), deforestation and industrial processes, result in the release of significant amounts of greenhouse gases<sup>104 105 106</sup>.

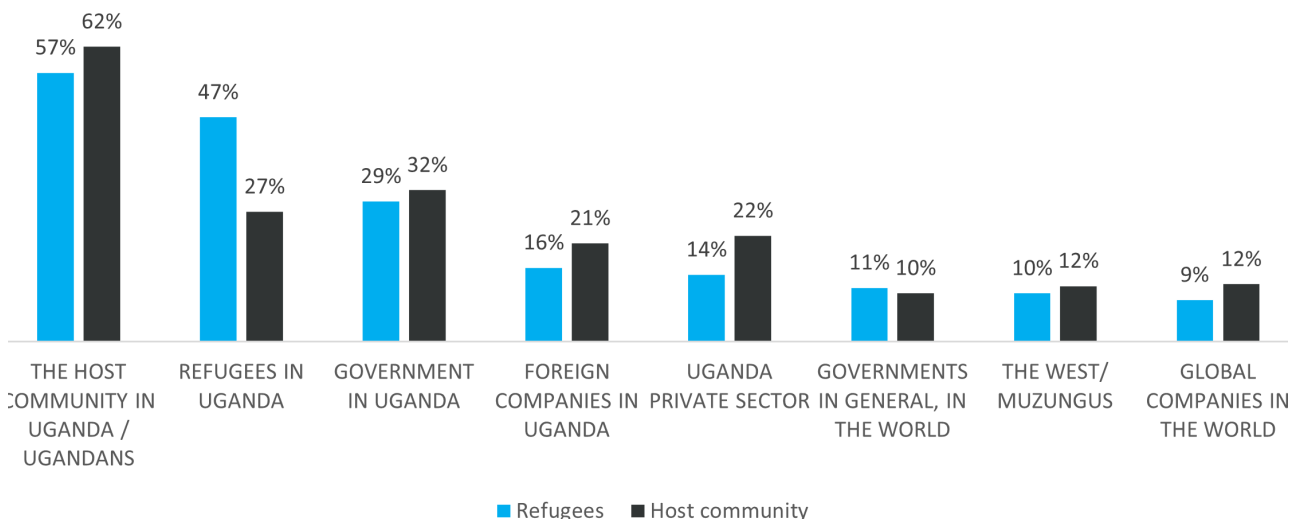
If land clearing and deforestation are acknowledged as the primary human activities contributing to climate change, despite a low percentage identifying the burning of fossil fuels, it suggests that the population is already aware of the negative impacts of deforestation specifically.

While this awareness may not be particularly relevant for climate change mitigation, given the population’s high vulnerability and Uganda’s comparatively low contribution to global CO2 emissions, it could hold significance in the context of climate change adaptation<sup>107</sup>.

If people believe that deforestation is the main driver of climate change, they might be more likely to engage in activities that prevent or reduce deforestation, which could be a climate adaptation strategy.

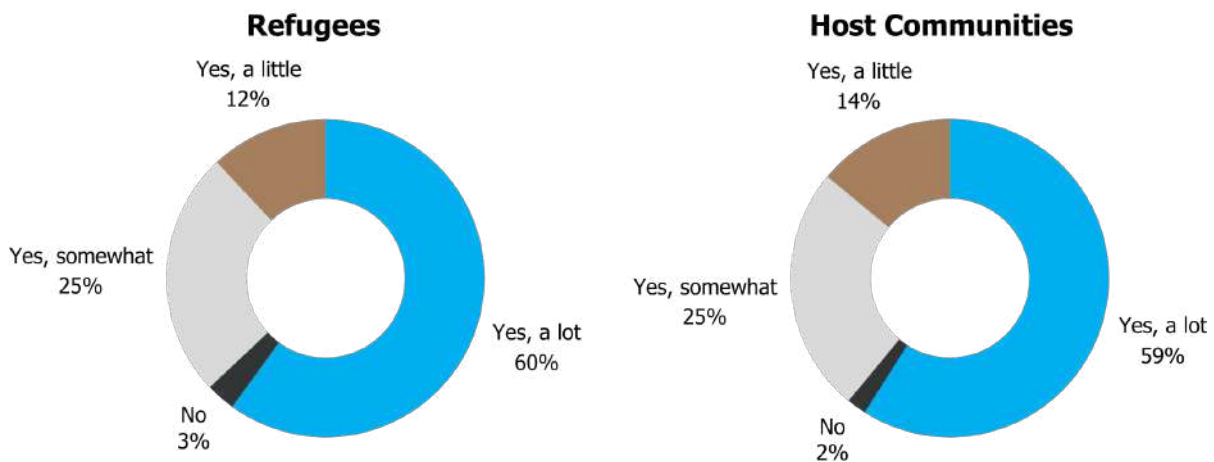
72% of refugee respondents and 74% of host community respondents believed that certain actors bore more responsibility for contributing to climate change than others, with the host community being the most frequently mentioned group among both groups.

Figure 22. % of respondents who believe an actor or group is more responsible for climate change than others, per reported actor or group



# Results

Figure 23. % of respondents who have heard of climate change and who reported that climate change has had a negative impact on their household and/or community in the last 10 years



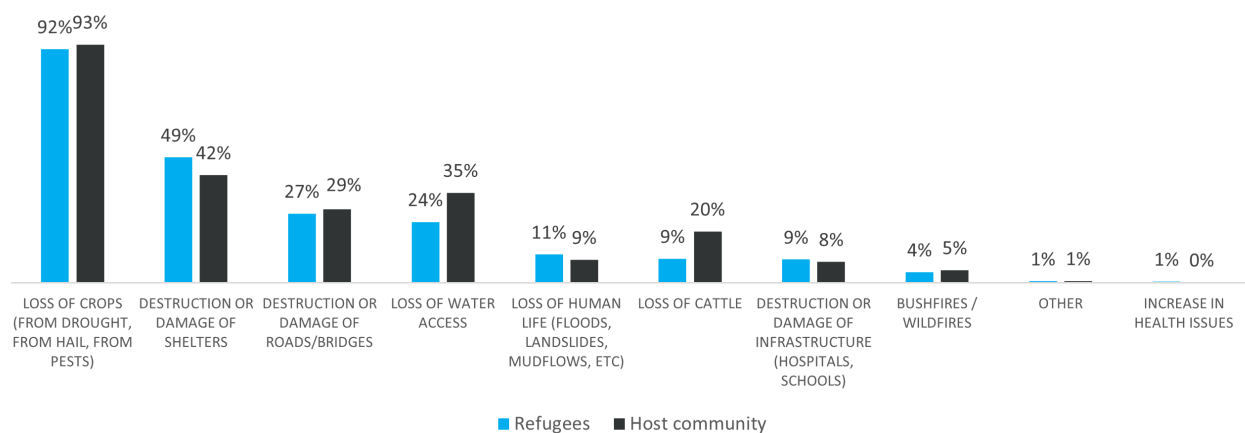
97% of refugee and 98% of host community respondents have reportedly felt the negative impact of climate change on their household and/or community over the last 10 years, with 60% of refugee and 59% of host community respondents saying that this impact was felt “a lot” (other survey options were “No”, “A little”, and “Somewhat”)<sup>109</sup>.

Among refugees, this was especially reported in Kiryandongo (77%), Palabek (77%) and Imvepi (76%), in stark contrast to Rwamwanja (35%). While not all of these respondents might have been in Uganda during the entirety of the 10-year recall period, the relevance of these results is that people who have had to endure the negative impact of climate change might be more inclined to take up adaptive measures to mitigate its future impact on them.

**Among the respondents who reportedly have felt the negative impact of climate change on their household and/or community, the most common reported type of impact was the loss of crops** (due to droughts, hail, pests, etc.), as reported by 92% of refugee and 93% of host community respondents.

Experiencing such repercussions first hand might make people more aware of their vulnerability and the need to adapt to changing conditions to ensure their well-being, the safety of their communities, and the preservation of their resources.

Figure 24. % of respondents who have experience the negative impacts of climate change in the last 10 years, per type of impact (multiple choice)





## The success of tree plantings in mitigating climate change depends on planting the right trees in the right place using the right methods

Considering the population’s exposure to climate change, it may also be relevant to take note of what mitigation and recovery measures have already been implemented, if any, by the population. Generally speaking, improving existing coping mechanisms may prove more effective than introducing entirely new ideas.

In this context, 55% of refugee respondents and 66% of host community members have reportedly implemented measures to adapt to the impacts of climate change. Notably, refugees in Lobule (71%), Adjumani (64%) and Bidibidi (64%) reported higher percentages, while refugee respondents in Kyangwali had a lower rate at 41%.

Both groups primarily engaged in tree planting, using climate-adapted crops, Establishing tree cover in regions that were once forested (reforestation) and in areas lacking previous tree cover (afforestation), when done correctly, can be two cost-effective and readily accessible measures to alleviate the impacts of climate change by addressing various aspects of environmental sustainability, contributing to carbon sequestration, regulating temperatures, managing water resources, supporting biodiversity, enhancing ecosystem resilience and providing livelihood opportunities<sup>110</sup>.

However, reforestation and afforestation efforts, while aimed at mitigating climate change, often prioritise single-species plantings over restoring native forests. This approach may lead to the proliferation of monocultures and invasive species, diminishing biodiversity.

Consequently, such tree planting efforts may replace native ecosystems, negatively impacting biodiversity and not fully recovering the biodiversity of intact forests<sup>111</sup>. Moreover, reforestation and afforestation can have adverse effects on local communities by reducing land available for food production leading to food insecurity and malnutrition, diminishing water supply, increasing social inequity, or displacing people from their land.

**The success of tree plantings in mitigating climate change depends on planting the right trees in the right place using the right methods.** For tree planting to be effective, it must be considered as a long-time commitment, with forest management as an essential pillar<sup>112</sup>. Additionally, the target population needs to understand how it should be done well, the investment it represents, and the difference between, for example, a biodiverse forest, a monoculture forest and agroforestry<sup>113</sup>.

Figure 25. % of respondents who understand the concept of climate change and who have undertaken actions to mitigate the impact of climate change, per main actions cited (multiple choice)

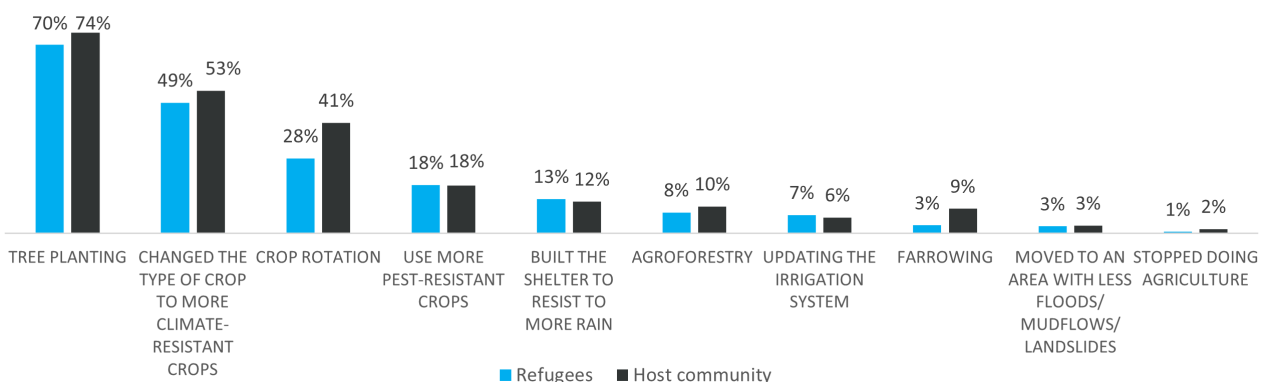
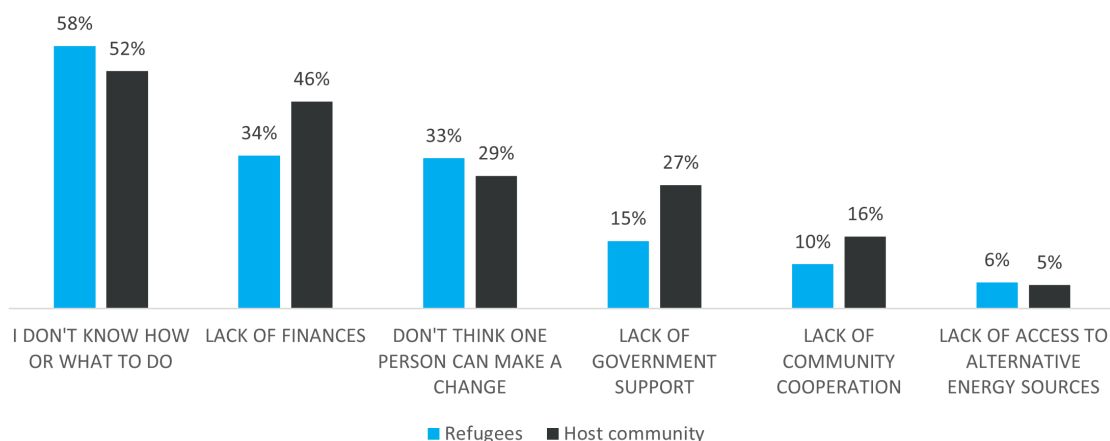




Figure 26. % of respondents who understand the concept of climate change but did not undertake any action to mitigate the impact of climate change, per main reasons cited (multiple choice)



**When asked about the factors hindering them and their households from undertaking climate change adaptation measures, the prevalent response from both refugees and host community members was a lack of knowledge on what actions to take and how to implement them, closely followed by financial constraints.**

In this context, the promotion of behaviour change might be achieved through a combination of information campaigns and awareness-raising initiatives, combined with financial support. Furthermore, it appears that a number of individuals doubt the impact of individual actions, emphasising the importance of promoting household-level solutions as well as fostering community collaboration and organisational efforts as a meaningful agent of change.

Concerning what community-level actions were perceived to be feasible options for adapting to climate change, both refugee and host community respondents commonly emphasised the need for increased awareness about what climate change entails and what actions can be taken (reported by 80% of refugees and 81% of host community members).

Additionally, planting trees emerged as a significant response, with 68% of refugees and 72% of host community members highlighting their prominent exposure to tree-planting projects as well as the magnitude of this endeavour in Uganda.

Notably, only 22% of refugees and 26% of host community members mentioned crop adaptation, while adapting infrastructure was mentioned by merely 12% of refugees and 14% of the host community.

This suggests a potential lack of understanding of the limitations of relying solely on tree planting for climate change adaptation and a possible knowledge gap regarding measures in various sectors such as agriculture and infrastructure.

“ Scarcity of rain sometimes makes the community members to start blaming themselves for cutting all the trees in the environment which has affected the formation of rain. **Respondent in Oruchinga** ”

“

Reforestation has been discussed by the community members as a resolution to curb the situation of prolonged drought. Each home is supposed to plant at least one tree.

**Respondent in Nakivale**

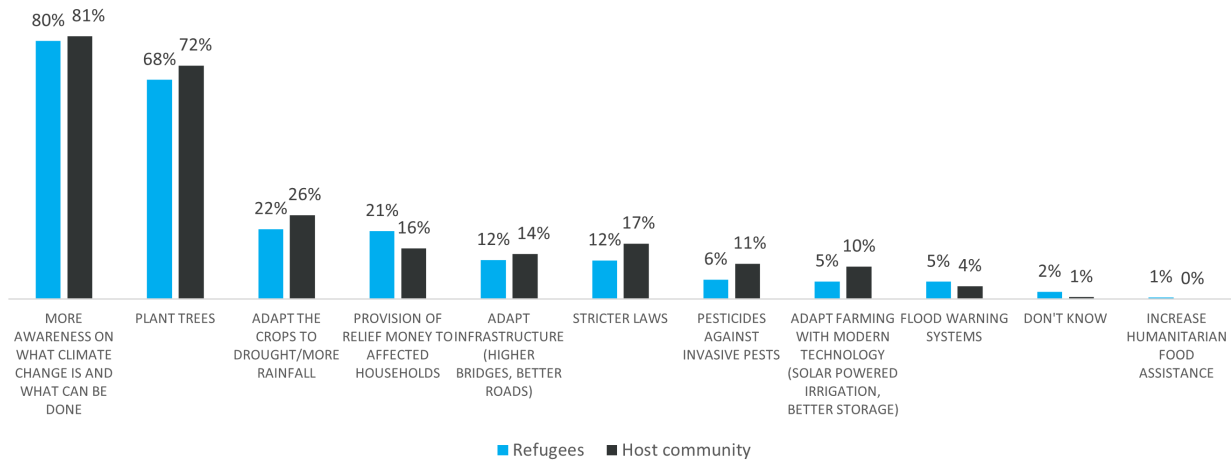
”

Participants in the survey who demonstrated an understanding of the concept of climate change were questioned about their perception of whether it would adversely affect their households and/or communities in the upcoming year. This enquiry served two primary purposes: firstly, to determine whether those participants who had reported experiencing climate change impacts in the last 10 years believed that it might influence them again in the coming year. The underlying theory posits that exposure to the negative impacts of a phenomenon would likely heighten likelihoods of its recurrence. Secondly, the question aimed to gauge the overall level of awareness and concern within the population regarding the impending year.



© U-Learn. A member of Cam Ki Lawoti Village Savings Association in Palabek using solar power and inverter to power her electric hairclippers

Figure 27. % of respondents who understand the concept of climate change, per perception of what could be done on the community level in terms of climate change adaptation (multiple choice)

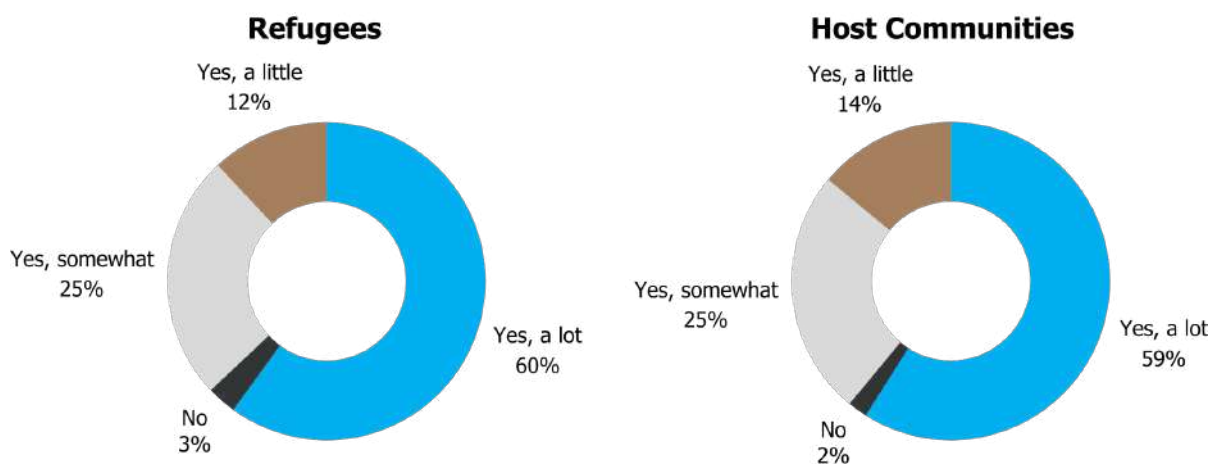


In both the refugee and host community groups, 87% of respondents expressed the belief that climate change would negatively affect their households and/or communities in the coming year. Notably, 48% of refugee respondents and 43% of host community respondents indicated that the impact would be substantial, categorising it as “a lot” (other survey options were “No”, “A little” and “Somewhat”).

This reflects substantial apprehension about the approaching year. What adds an intriguing dimension to this finding is that 97% of refugee participants and 98% of host community participants had previously acknowledged experiencing the impacts of climate change in the last 10 years. Consequently, within each group, there exists a discernible difference of 10 and 11 percentage points, respectively, representing individuals who, despite having experienced climate change impacts in the past, do not anticipate a recurrence in the coming year.

Among those people who expect to be impacted by climate change in the coming year, 74% of refugee and 72% of host community respondents reportedly felt like their community was prepared to face the consequences of climate change, to some extent, but only 22% and 20% respectively qualified this level of preparedness as “a lot” (other survey options were “No”, “A little” and “Somewhat”).

Figure 28. % of respondents who have heard of climate change and who reported that climate change has had a negative impact on their household and/or community in the last 10 years





© U-Learn

## Conclusion

**This KAP assessment aimed to fill key information gaps** in terms of barriers and enablers to the uptake of sustainable energy alternative within a setting of environmental degradation and climate change in the Uganda refugee response. One of the main outcomes from the from the Technical Roundtable on Environment, Energy, and Climate Change at the Global Refugee Forum held in Kampala in July 2023, is that opportunities exist to tackle the interconnected environmental issues within Uganda’s refugee response.

**This involves enhancing access to sustainable, clean energy sources and improved cooking fuels and technologies for both refugees and host communities** to decrease reliance on biomass. Additionally, better management of natural resources can enhance resilience to climate change.

### Energy

**While the data shows that there’s a high awareness of stove efficiency, traditional stoves persist due to cost and availability factors. The prevalent use of the three-stone fire as well as the traditional mud stoves, which only offer marginal efficiency improvements over open fires, underscores the need for more accessible ICS.**

Misconceptions about ICS, such as the perceived exclusivity of the typically more expensive charcoal as a fuel, could pose additional barriers to adoption.

**While respondents recognise reduced cooking time and fuel costs as primary benefits of ICS, financial benefits were underreported, possibly due to the availability of free wood or the lack of financial literacy.** Many households own both ICS and traditional stoves, indicating either a transitional shift or reluctance to abandon traditional methods completely.

**Firewood remains the primary cooking fuel**, with seasonal switches to typically costlier charcoal during the rainy season. **Promoting alternative fuels like high-quality briquettes could offer more reliable year-round options.**

Limited briquette adoption stems from awareness and cost issues, despite respondents’ willingness to purchase with flexible payment options. Common practices like leaving cooked food on the stove could contribute to excess fuel consumption, suggesting a demand for heat retention technology.

**Dry cell batteries**, widely used for lighting and powering devices, can pose environmental risks due to harmful disposal methods.



**Opportunities exist to tackle the interconnected environmental issues within Uganda’s refugee response**

**Solar power** adoption, driven by cost benefits and environmental advantages, is more prevalent among the host community, and appears influenced by free distribution of solar devices to the refugees in the settlements, which may discourage purchases.

## Environmental degradation

**The ongoing environmental degradation in Uganda, exacerbated by the refugee influx, results in deforestation and forest degradation.** Awareness of environmental risks is high among refugees and host communities, with nearly all the respondents feeling concerned to some degree, and nearly half being concerned “a lot”. Concern often creates a sense of urgency. When people believe that immediate action is necessary to address a problem, they may be more likely to mobilise and engage in activities aimed at resolving the issue promptly. Primary concerns centred on wood depletion and impacts on rainfall patterns.

**Drivers of environmental degradation are perceived to be wood fuel extraction, tree extraction for construction purposes, and agriculture.** Community discussions emphasise proactive measures like tree planting and swamp preservation to mitigate environmental degradation and its consequences.



## Climate change

**Uganda faces various climate change impacts,** including extreme weather events and unpredictable patterns, affecting agriculture, water resources and health. The vast majority of the respondents are aware of the concept of climate change, and over half of them said they had felt its impact “a lot”, with the main reported impact being loss of crops.



© U-Learn. A solar powered radio in Palabek Refugee Settlement

**While most respondents attribute climate change to human activities, fatalistic beliefs may hinder adaptation efforts.** Anticipation of future negative climate impacts in the coming year reflects substantial apprehension, underscoring the urgency for effective adaptation strategies, but possibly also the willingness of the population to engage in them. Despite adaptive measures like tree planting and crop rotation, challenges include knowledge about further appropriate adaptive measures and financial constraints.

**Efforts to address energy access, environmental degradation and climate change impacts in Uganda require targeted interventions addressing awareness gaps, financial barriers and misconceptions.**

**The findings of this report underscore the importance of ongoing research and community engagement to promote sustainable practices** and foster long-term resilience, especially within refugee settlements. For further insights, please refer to the Recommendations section. Additionally, the data provided in this report serves as a baseline for monitoring future progress in the settlements.

# Annexes

## ANNEX 1

### Number of quantitative individual interviews per group, per location

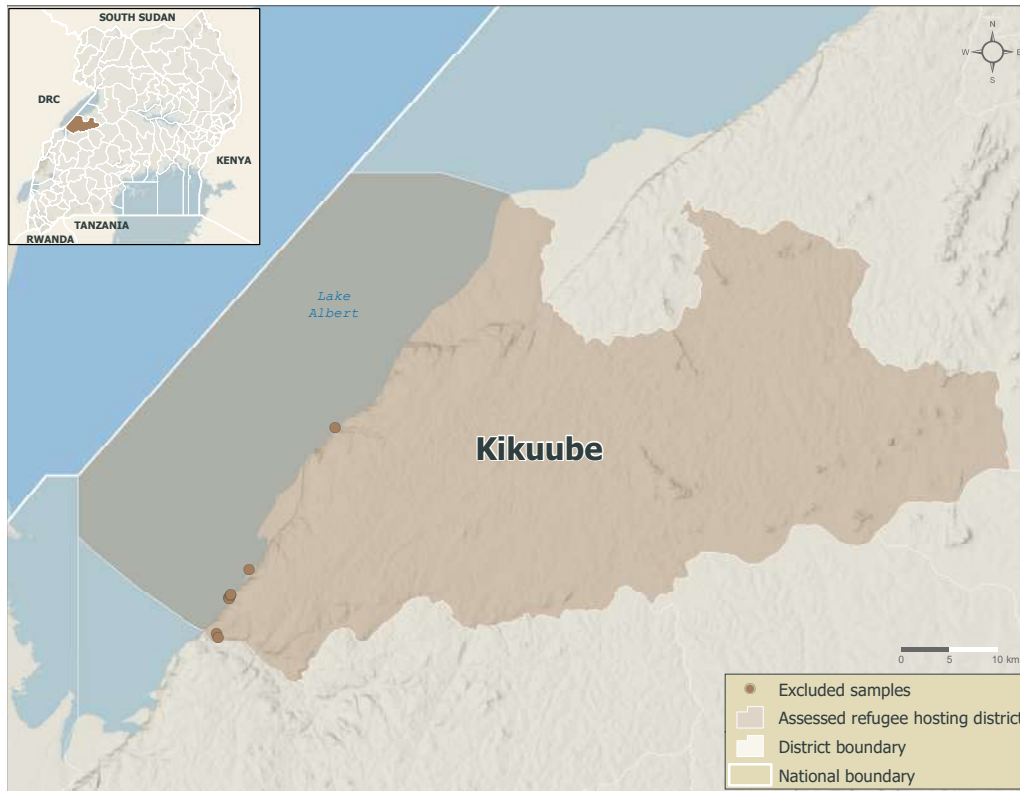
Region	Location	Refugees	Host community	Total
<b>West Nile</b>	Adjumani	109	108	217
	Bidibidi	105	110	215
	Imvepi	112	110	222
	Kiryandongo	79	80	159
	Lobule	111	108	219
	Palabek	104	105	209
	Palorinya	110	109	219
	Rhino Camp	100	104	204
<b>South West</b>	Nakivale	81	88	169
	Oruchinga	81	94	175
	Rwamwanja	85	80	165
	Kyaka II	92	77	169
	Kyangwali	80	69	149
<b>Total</b>		<b>1,249</b>	<b>1,242</b>	<b>2,491</b>

### Number of qualitative individual interviews per group, per location

Region	Location	Refugees	Host community	Total
<b>West Nile</b>	Adjumani	2	2	4
	Bidibidi	2	2	4
	Imvepi	2	2	4
	Kiryandongo	2	2	4
	Lobule	2	2	4
	Palabek	2	2	4
	Palorinya	2	2	4
	Rhino Camp	2	2	4
<b>Southwest</b>	Nakivale	2	2	4
	Oruchinga	2	2	4
	Rwamwanja	2	2	4
	Kyaka II	3	2	5
	Kyangwali	2	2	4
<b>Total</b>		<b>27</b>	<b>26</b>	<b>53</b>

## ANNEX 2 LOCATIONS EXCLUDED FROM THE GEOGRAPHIC SCOPE

Map 2: Locations excluded from the original geographic scope



Map 3: Locations excluded from the original geographic scope



# References

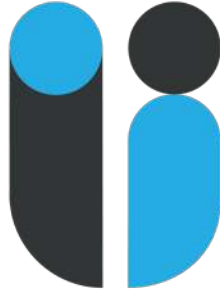
- 1 MWE, Draft Final REDD+ National Strategy, 2017
- 2 Uganda National SDG Secretariat, [Voluntary National Review Report On The Implementation Of The 2030 Agenda For Sustainable Development](#), n.d.
- 3 International Bank for Reconstruction and Development, World Bank Group (WBG), [Improved Cookstoves, a Way to Care for One's Family](#), 2021
- 4 Jacobson, S. [A social and environmental evaluation of fuel-efficient cook-stoves and conservation in Uganda](#), 1998
- 5 Uganda National SDG Secretariat, [Voluntary National Review Report On The Implementation Of The 2030 Agenda For Sustainable Development](#), n.d.
- 6 Food and Agriculture Organization (FAO), [Rapid assessment of natural resource degradation in refugee impacted areas in northern Uganda](#), 2019
- 7 NASA, [What Is Climate Change?](#), n.d.
- 8 FAO, [Global Forest Resources Assessment](#), 2020
- 9 Maurya P.k. et al., [Environmental Degradation: Causes and Remediation Strategies](#), 2020
- 10 International Union for Conservation of Nature (IUCN), [Deforestation and forest degradation](#), 2021
- 11 WBG, [Understanding the Differences Between Cookstoves](#), 2014
- 12 UNHCR, [Who is a 'refugee'?](#), n.d.
- 13 UNHCR, [Uganda](#), n.d.
- 14 Ochieng, C.A. et al., [Household perspectives on cookstove and fuel stacking: A qualitative study in urban and rural Kenya](#), [Energy for Sustainable Development](#), Volume 59, 2020
- 15 Goldemberg, J, Coelho, S.T. [Renewable energy—traditional biomass vs. modern biomass](#), [Energy Policy](#), Volume 32(6), 2004
- 16 World Bank, [World Bank Country Classifications by Income Level](#) (Uganda), 2022
- 17 United Nations Conference on Trade and Development (UNCTAD), [UN list of least developed countries](#), n.d.
- 18 UNHCR, [Uganda Comprehensive Refugee Response Portal](#), last updated on 31 January 2024, consulted on 28 February 2024
- 19 UNHCR, [Uganda](#), n.d.
- 20 Ibid.
- 21 MWE, [Draft Final REDD+ National Strategy](#), 2017
- 22 Uganda National SDG Secretariat, [Voluntary National Review Report On The Implementation Of The 2030 Agenda For Sustainable Development](#), n.d.
- 23 Price, R. (Institute of Development Studies), ["Clean" Cooking Energy in Uganda – technologies, impacts, and key barriers and enablers to market acceleration](#), 2017
- 24 UN-REDD Programme, [Forestry and Macroeconomic Accounts of Uganda: The Importance of Linking Ecosystem Services to Macroeconomics](#), 2018
- 25 [Clean fuels are understood as being clean at point of use](#). For more information, please visit the 2017 Helpdesk Report by the Institute of Development Studies.
- 26 Ibid.
- 27 Tracking SDG 7, [Uganda](#), n.d.
- 28 UNHCR, [Safe Access to Fuel and Energy Strategy 2016-2020](#), 2016
- 29 Energy Solutions for Displacement Settings (ESDS), [Potentials of Biomass Cooking Fuel Production in Displacement Settings](#), 2022
- 30 UNHCR, [Safe Access to Fuel and Energy Strategy 2016-2020](#), 2016
- 31 Global Compact on Refugees, UNHCR, [Environment, Energy, and Climate in Uganda's Refugee Response](#), 2023
- 32 Urmee, T. and Gyamfi, S. [A review of improved cookstove technologies and programs](#), [Renewable and Sustainable Energy Reviews](#), Volume 33, 2014
- 33 Jacobson, S. [A social and environmental evaluation of fuel-efficient cook-stoves and conservation in Uganda](#), 1998
- 34 It is noteworthy that this study did not focus on refugee access to thermal fuel in the settlements but rather on environmental conservation around two national parks (Kibale and Semuliki) in Western Uganda.



- 35 Andrade, C., Menon, V., Ameen, S. and Kumar Praharaj, S. [Designing and Conducting Knowledge, Attitude, and Practice Surveys in Psychiatry](#): Practical Guidance, Indian Journal of Psychological Medicine, Volume 42(5), 2020
- 36 Médecins du Monde. [The Kap Survey model - Knowledge attitude and practices](#), 2011
- 37 Fishbein, M. Attitudes and the Attitude-Behavior Relation: Reasoned and Automatic Processes, European Review of Social Psychology, 2000
- 38 Bourdieu, P. [The Logic of Practice](#), 1990
- 39 Spring Nutrition, [The KAP Survey Model \(Knowledge, Attitudes, and Practices\)](#), 2011
- 40 Valente, T.W., Paredes, P. and Poppe, P.R. [Matching the Message to the Process: The Relative Ordering of Knowledge, Attitudes, and Practices in Behavior Change Research](#), Human Communication Research, 1998, Volume 24(3)
- 41 Ibid
- 42 In a different scenario, a [KAP study](#) aimed at evaluating hygiene behaviour among school children in Senegal revealed that reasons for not washing hands included stubbornness (reluctance to follow adult instructions), laziness, the urgency to take breaks, the time it detracts from play, and the unclean and odorous nature of toilets. Another [study](#) focusing on Ghana identified motivating factors for proper handwashing, such as avoiding disgust (steering clear of dirt and the odour of defecation), nurturing behaviour (teaching children to wash hands for health reasons), status (being accepted due to cleanliness), affiliation (cleanliness associated with better socioeconomic status), attraction (clean individuals perceived as more attractive), comfort (hands feeling and smelling fresh), and fear (avoidance of disease risk). A conventional information campaign lacking insights into barriers and facilitators of change might overlook these various avenues for behaviour correction.
- 43 The different confidence levels between West Nile and Southwest were due to programmatic and budgetary reasons.
- 44 As per the definition of deforestation, the extraction of firewood itself does not directly cause deforestation. However, the removal of wood fuels such as firewood and charcoal can contribute to the gradual degradation of tree cover over time. This degradation may eventually lead to deforestation, particularly if agricultural activities or settlement occur in the area following fuel harvesting.
- 45 UN-REDD Programme, [Forestry and Macroeconomic Accounts of Uganda: The Importance of Linking Ecosystem Services to Macroeconomics](#), 2018
- 46 FAO, [Evidence and policy options on migration, cash crop production and deforestation in Uganda](#), 2021
- 47 Global Compact on Refugees, UNHCR, Self-reliance and Resilience, 2023
- 48 UN-REDD Programme, [Forestry and Macroeconomic Accounts of Uganda: The Importance of Linking Ecosystem Services to Macroeconomics](#), 2018
- 49 Jagger, P. and Kittner, N. [Deforestation and biomass fuel dynamics in Uganda](#), Biomass and Bioenergy, Volume 105, 2017
- 50 According to the same [study](#), in Western Uganda, swift changes in land use have impacted the availability of high-quality biomass, prompting households to redirect their collection efforts from well-stocked forests to degraded forests, agricultural areas and fallow lands that yield lower quantities of biomass per hectare. Besides the reduced yields, biomass obtained from land under various uses, as opposed to fully stocked forests, typically exhibits lower quality. Inferior quality biomass is characterised by lower energy densities and higher concentrations of organic materials, resulting in incomplete combustion and increased emissions of particulate matter. The type, quantity and quality of fuel, including factors such as moisture content and size, play a crucial role in determining the generation of harmful pollutants that contribute to household air pollution.
- 51 Global Compact on Refugees, UNHCR, [Environment, Energy, and Climate in Uganda's Refugee Response](#), 2023
- 52 Jagger, P. and Kittner, N. [Deforestation and biomass fuel dynamics in Uganda](#), Biomass and Bioenergy Volume 105, 2017
- 53 Women's Refugee Commission, [Cooking Fuel Saves Lives: A Holistic Approach to Cooking in Humanitarian Settings](#), 2020
- 54 Improved cookstoves
- 55 Global Compact on Refugees, UNHCR, [Environment, Energy, and Climate in Uganda's Refugee Response](#), 2023

- 56 Mwiine, A.A. [Men in Kitchens and the \(re\) configurations of masculinity in domestic spaces during Covid-19 Lockdown in Uganda](#), School of Women and Gender Studies, Makerere University, 2021
- 57 Royal Norwegian Embassy in Juba, [Men Can Cook: Diffusing Gender Roles in South Sudan](#), n.d.
- 58 Mulumeoderhwa, M. [A Woman's Degree Must End in the Kitchen": Expectations of Women in the Eastern Democratic Republic of Congo](#), Journal of Family Issues, Volume 43(3), 2021
- 59 Ibid
- 60 Institute of Development Studies, ["Clean" Cooking Energy in Uganda – technologies, impacts, and key barriers and enablers to market acceleration](#), page 19, 2017
- 61 No noteworthy differences were observed between regions in terms of awareness of the concept of stove efficiency, nor any difference between settlements or gender.
- 62 WBG, [Understanding the Differences Between Cookstoves](#), 2014
- 63 This result is an aggregation of the respondents who indicated owning an improved mud stove, an improved charcoal stove, an improved ceramic stove, a kerosene stove, a solar cookstove and/or a gasifier stove.
- 64 Anecdotal evidence refers to informal, often first-hand, accounts of experiences, events or observations. This type of evidence is based on personal anecdotes, individual stories or isolated examples rather than on systematic, scientific analysis.
- 65 Participants who reportedly understood that some stoves are more efficient than others.
- 66 WBG, [Understanding the Differences Between Cookstoves](#), 2014
- 67 Percentage of refugee and host community members who reported the reduced cost of fuel as an advantage: Oruchinga: 47% for both communities, Nakivale: 48% and 40% respectively, and Palabek: 54% and 55% respectively
- 68 Levine, D.I., Cotterman, C. [What Impedes Efficient Adoption of Products? Evidence from Randomized Variation in Sales Offers for Improved Cookstoves in Uganda](#), 2012
- 69 Yusuph, J. Kulindwa, et al. [Driving forces for households' adoption of improved cooking stoves in rural Tanzania](#), *Energy Strategy Reviews*, Volume 20, 2018
- 70 Ibid
- 71 Smart Villages, ["Jikokoa": Scaling Up Clean Cookstoves And Providing Local Jobs](#), n.d.
- 72 Jacobson, S. [A social and environmental evaluation of fuel-efficient cook-stoves and conservation in Uganda](#), 1998
- 73 Ugastove, [Dual Stove](#), n.d.
- 74 The recall period was kept purposely broad to put the respondent at ease. Enumerators were instructed to remind the respondent that the survey would remain anonymous and that none of what was shared during the interview would have any bearing on the reception of aid.
- 75 Ochieng, C.A. et al. [Household perspectives on cookstove and fuel stacking: A qualitative study in urban and rural Kenya](#), Energy for Sustainable Development, Volume 59, 2020
- 76 Shankar, A.V. et al., Maximizing the benefits of improved cookstoves: moving from acquisition to correct and consistent use, *Global Health Science and Practice*, Volume 2(3), 2014
- 77 Biomass refers to organic materials, primarily plant or animal-based, that can be used as a source of energy.
- 78 FAO, [Woodfuel Consumption in Refugee Hosting Areas and Its Impact on the Surrounding Forests—The Case of Uganda](#), 2022
- 79 According to a 2020 [paper](#) by the WBG and FAO, "at Kyaka II, Kyangwali, and Nakivale-Oruchinga, tree cover loss was more concentrated in the 5km buffer than the 15km buffer, with the reverse being the case at Kiryandongo and Rwamwanja, suggesting no consistent link between the refugee settlements and patterns of tree cover loss."
- 80 Bizzarri, M. [Safe Access to Firewood and Alternative Energy in Uganda: An Appraisal Report](#), 2009
- 81 Global Press Journal, [Food or Firewood to Cook It? The Dilemma Refugees Often Face in Uganda's Rhino Camp](#), 2018
- 82 Kulindwa, Y.J. et al., [Driving forces for households' adoption of improved cooking stoves in rural Tanzania](#), *Energy Strategy Reviews*, Volume 20, 2018
- 83 GIZ, [Baseline assessment for market-based energy access for scale up projects in refugee settlements in Uganda](#), 2022
- 84 Cavill, S., et al. Lighting, [WASH and Gender-Based Violence in Camp Settings](#), 2018
- 85 Disposable torches are to be understood as single-use or non-rechargeable flashlights.

- 86 Bensch, G., Ankel-Peters, J. and Sievert, M. [The Lighting Transition in Africa From Kerosene to LED and the Emerging Dry-Cell Battery Problem](#), SSRN Electronic Journal, 2015
- 87 Lenz, L., Munyehirwe, A., Peters, J. and Sievert, M. [Does Large-Scale Infrastructure Investment Alleviate Poverty? Impacts of Rwanda's Electricity Access Roll-Out Program](#), World Development, 2017
- 88 Standard Battery, [What Is a Dry Cell Battery?](#), 2024
- 89 Medline Plus, [Dry cell battery poisoning](#), 2021
- 90 The question in the survey was phrased as: "Can some forms/ways of dry cell battery disposal be harmful to the environment?"
- 91 Conserve Energy Future, [Deforestation – Causes, Effects and Solutions To Clearing of Forests](#), n.d.
- 92 MWE, [Draft Final REDD+ National Strategy](#), 2017
- 93 Uganda National SDG Secretariat, [Voluntary National Review Report On The Implementation Of The 2030 Agenda For Sustainable Development](#), n.d.
- 94 WBG, [Uganda Economic Update: Uganda Can Achieve Greener, Resilient and Inclusive Growth by Investing in Sustainable Land Management and Climate-Smart Agriculture](#), 2021
- 95 FAO, [Rapid assessment of natural resource degradation in refugee impacted areas in northern Uganda](#), 2019
- 96 FAO, WBG, et al. [Assessment of Forest Resource Degradation and Intervention Options in Refugee-Hosting Areas of Western and Southwestern Uganda](#), 2020
- 97 Rusetuka, M.E. [Deforestation and its Impacts on the Population in Uganda](#), 2023
- 98 Josephat, M, [Deforestation in Uganda: population increase, forests loss and climate change](#), 2018
- 99 Garcia-Carreras, L. and Parker D.J. [How does local tropical deforestation affect rainfall?](#), *Geophysical Research Letters: Atmospheric Science*, Volume 38(19), 2011
- 100 Duku, C and Hein, H. [The impact of deforestation on rainfall in Africa : A data-driven assessment](#), *Environmental Research Letters*, Volume 16(6), 2021
- 101 Bamwesigye, D., Yeboah, E. and Safarik, D. [A Sensitive Analysis of Drivers and Impact of Deforestation in Uganda's Virgin Tropical Rainforests Using Regression Analysis: Efforts Towards Zero Deforestation by 2030](#), 2022
- 102 MWE, [Uganda's First Biennial Update Report To The United Nations Framework Convention On Climate Change](#), 2019
- 103 A definition of climate change was provided. Initially, respondents were going to be asked if they knew and could explain climate change. However, it was noted that climate change lacks a direct translation in many indigenous or local languages, necessitating a prior explanation of the term before introduction. Therefore, the question was changed so as to enquire whether participants recognised the concept once it had been explained to them, rather testing their specific knowledge by asking them to provide a definition.
- 104 NASA Global Climate Change, [Scientific Consensus: Earth's Climate Is Warming](#), n.d.
- 105 Natural Resources Defense Council (NRDC), [What Are the Causes of Climate Change?](#), 2022
- 106 While it is possible that the previous section in the survey questionnaire (relating to environmental degradation and deforestation) may have induced a bias, secondary sources such as those specified in footnote 93 do confirm deforestation as an important contributor to climate change. Further sources such as the FAO have also confirmed this issue to be especially severe in Uganda
- 107 Ritchie, H. [Who has contributed most to global CO2 emissions](#), 2019
- 108 International Energy Agency, [Africa in an evolving global context](#), 2022
- 109 This question was posed irrespective of the respondent's residence over the past decade. Its purpose is not to survey the specific climate change impacts in and around Uganda but rather to ascertain whether respondents recollected experiencing any adverse effects.
- 110 UN, As Forests Are 'Lungs of Planet', [Tree-Planting Contributes to Mitigating Climate Change Impact, Secretary-General Says at Event Commemorating International Day](#), 2018
- 111 Forrester, N. [The potentials and limitations of tree plantings as a climate solution](#), 2020
- 112 Ibid
- 113 A biodiverse forest is characterised by rich ecological diversity, a monoculture forest consists of a single tree species over a large area, and agroforestry integrates trees with agricultural activities in a way that promotes biodiversity and ecological synergy. Each approach has distinct characteristics and serves different ecological, economic and social purposes.



**U-LEARN**

---

Uganda Learning, Evidence, Accountability,  
and Research Network  
P.O. Box 12018, Kampala – Uganda.  
[www.ulearn-uganda.org](http://www.ulearn-uganda.org)

---