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Community Empowerment for Creative Innovation

CECI UGANDA GROUPS' CAPACITY ASSESSMENT ON RENEWABLE ENERGY ADOPTION IN BIDIBIDI REFUGEE SETTLEMENT AND YUMBE DISTRICT UNDER THE SUSTAINED PROJECT

SUBMITTED TO:
Community Empowerment for Creative Innovation
(CECI Uganda)

REPORT BY:
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Acknowledgement

This assessment was made possible through the collaboration and contributions of many individuals and institutions. The consultant extends sincere appreciation to Community Empowerment for Creative Innovation (CECI UGANA) for commissioning and coordinating the study, and to the SUSTAINED consortium partners, including CARE, Mercy Corps, and Oxfam, for their strategic guidance and technical support in the development of assessment tools. Gratitude is also extended to the dedicated field team of enumerators, whose commitment and professionalism ensured high-quality data collection in both Bidibidi Refugee Settlement and Yumbe District. Special appreciation to CECI MEAL Officer, Sabo Mike, for the technical support, coordination, and mobilization of participants.

Special thanks go to the leaders and members of Village Savings and Loan Associations (VSLAs), farmer groups, and cooperatives who generously shared their experiences, perspectives, and time during surveys, focus group discussions, and key informant interviews. Their insights form the backbone of this report and provide a clear understanding of the realities, opportunities, and challenges related to renewable energy adoption in displacement and host communities.

Finally, the consultant acknowledges the contributions of local government officials, financial service providers, and energy companies who provided valuable context and information that enriched the assessment. This report reflects collective efforts and a shared commitment to strengthening community resilience, promoting inclusive energy access, and supporting sustainable livelihoods in refugee-hosting settings.

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Executive summary

This report presents findings from a capacity assessment conducted by Community Empowerment for Creative Innovation (CECI Uganda) under the SUSTAINED project in Bidibidi Refugee Settlement and Yumbe District, Uganda. The study assessed the capacities of community-based groups, including Village Savings and Loan Associations (VSLAs), cooperatives, and farmer groups, to promote the uptake and utilization of renewable energy technologies, with a focus on clean cookstoves (CCS) and the productive use of energy (PUE). The assessment employed a mixed-methods approach, including household surveys with 383 group members, six focus group discussions, and 13 key informant interviews with group leaders, project staff, and a financial service provider.

Findings reveal a high level of awareness and demand for renewable energy solutions. An overwhelming 96.3% of respondents expressed a need for energy-related technologies, particularly solar lighting and clean cookstoves. Awareness of benefits, such as cost savings, improved health, and environmental conservation, is widespread, with training sessions and group meetings serving as the main sources of knowledge. However, actual adoption remains limited: only 41.5% of respondents reported using renewable energy for productive purposes, and many households still rely on traditional stoves and low-cost, non-durable solutions.

Key challenges include the high upfront cost of products, lack of affordable financing, limited availability of quality technologies, and inadequate after-sales support. Only 24.8% of respondents accessed financial support for renewable energy in the past year, with high interest rates and low awareness acting as major barriers. Gender and inclusion dynamics also shape adoption: while women and youth actively participate in group activities and decision-making, they face barriers related to workload, lack of collateral, and limited information access. Despite these challenges, participants consistently emphasized the potential benefits of renewable energy, including reduced household expenses, improved livelihoods, and enhanced social cohesion.

The assessment concludes that meaningful uptake of renewable energy technologies can only be achieved by addressing affordability, accessibility, and inclusivity barriers. Recommendations include: (1) developing tailored loan products and installment-based financing with VSLAs and microfinance institutions; (2) establishing last-mile distribution hubs with after-sales services; subsidizing quality products to reduce cost barriers; (3) strengthening community-based training and demonstrations; and (4) ensuring gender-responsive interventions that prioritize women, youth, and marginalized groups. By leveraging community structures and market systems, the SUSTAINED project can catalyze inclusive, sustainable energy adoption in both refugee and host communities in Yumbe District.

1.0 Introduction

Community Empowerment for Creative Innovation (CECI Uganda) is a refugee-led, regional nongovernmental organization founded on May 23, 2017, to prevent violent conflicts and alleviate poverty, fostering peaceful coexistence and self-reliance in refugee and host communities. CECI is committed to locally led innovations in peacebuilding, education, livelihoods, and environmental protection. CECI empowers youth, women, and girls to prevent violent conflicts, build resilience, rebuild livelihoods, and actively participate in development. Guided by its core values of professionalism, teamwork, honesty, commitment, personal development, accountability, and transparency, CECI is committed to creating sustainable solutions that are driven by local needs and local communities. CECI is a Regional Non-Governmental Organization registered with the National NGO Bureau (Reg. Number 9031) and has been incorporated as a company Limited by Guarantee in September 2020 under section 18(3) of the Companies Act 2012 in the Republic of Uganda (Reg. 80020002697777).

This report presents findings from the capacity assessment conducted by CECI Uganda on VSLAs, cooperatives, and farmer groups in Bidibidi Refugee settlement and Yumbe district under the SUSTAINED project. The assessment was conducted during the period July-August 2025.

1.1 Background

Uganda faces a persistent challenge in achieving universal energy access, with one of the lowest per capita electricity consumption rates globally and heavy reliance on biomass fuels for cooking. Despite the country's abundant solar potential, access to reliable and affordable energy remains limited, particularly in refugee-hosting districts such as Yumbe. In Bidibidi Refugee Settlement, one of the largest in the world, the lack of sustainable energy solutions continues to undermine the well-being and resilience of both refugee and host populations. The situation is further compounded by environmental degradation, health risks from traditional cooking methods, and limited livelihood opportunities that hinder socio-economic development.

Efforts to expand access to clean and renewable energy in Uganda have been supported by private-sector growth in off-grid solar markets and by favorable policy frameworks. However, structural barriers persist across supply, demand, and the enabling environment. High costs, limited distribution networks, and weak financing options restrict uptake, while gaps in policy enforcement have allowed the circulation of substandard products, eroding consumer trust. Refugees and vulnerable households, who often lack awareness of the long-term benefits of quality energy solutions, are disproportionately affected. Meanwhile, market distortions caused by humanitarian free distributions discourage private sector investment, threatening the sustainability of interventions.

The SUSTAINED project, jointly implemented by Mercy Corps, CARE, Oxfam, and Refugee-Led Organizations such as CECI, was designed to address these pressing challenges. SUSTAINED is being implemented in collaboration with refugee-led organizations (RLO), Financial Service Providers (FSP), and Energy Services Companies (ESCO) (2 clean cooking and 1 PUE) through appropriately sequenced and intentionally integrated supply and demand side interventions informed by market needs. By applying a Market Systems Development (MSD) approach, the project aims to create inclusive, viable, and resilient clean energy markets in displacement settings. Through integrated supply- and demand-side interventions, SUSTAINED facilitates the entry of quality private-sector actors, ensures product and service reliability, and promotes financial inclusion. Its focus on gender responsiveness and youth engagement recognizes the importance of empowering marginalized groups to actively participate in energy-driven livelihoods, agricultural value chains, and community decision-making.

Community-based structures, including Village Savings and Loan Associations (VSLAs), farmer groups, and cooperatives, are central to SUSTAINED's strategy. These groups provide critical entry points for fostering financial literacy, supporting the adoption of productive use of energy technologies, and enhancing social cohesion between refugees and host communities. Strengthening their capacity not only enables households to access renewable energy products but also unlocks opportunities for income generation, education, and improved living standards. This capacity assessment, therefore, seeks to generate evidence on the readiness, challenges, and opportunities for these groups in driving sustainable energy adoption and contributing to broader resilience and self-reliance in Bidibidi and Yumbe District.

1.2 Objectives of the assessment

The Groups Capacity assessment was guided by the following objectives:

1) To assess the demand and uptake of productive use of energy (PUE) and clean cookstoves (CCS) by household members of VSLAs, cooperatives and farmer groups.
2) Assess participants' knowledge on the benefits and use of renewable energy products.
3) To identify gender considerations that could influence demand and utilization of renewable energy products.
4) To assess the participants' level of access to financial services to support uptake of renewable energy products.

2.0 Methodology

2.1 Assessment Design and Approach

The capacity assessment adopted a mixed-methods design, combining both quantitative and qualitative approaches to capture a comprehensive understanding of the energy access landscape

and the capacities of community-based groups. The design was anchored in the Market Systems Development (MSD) approach to ensure that both supply and demand-side barriers were identified, while also paying attention to social inclusion dynamics, particularly gender, youth, and refugee-host relations. This triangulation of methods allowed for the generation of robust evidence that could inform improvement in the delivery of the SUSTAINED project, community and policy dialogues, and private sector engagement in the clean energy space.

2.2 Study Population and Sampling Strategy

The study population consisted of members of Village Savings and Loan Associations (VSLAs), farmer groups, and cooperatives operating within Bidibidi Refugee Settlement (Zone 3 and Zone 4) and host communities (Kululu, Odravo, Midigo and Kerua sub counties) in Yumbe District. These groups were selected for their strategic role in promoting financial inclusion, the productive use of energy, and community cohesion. A representative sample of 383 group members participated in the household survey, with a deliberate effort to ensure gender and refugee–host balance. Purposive sampling was employed to select participants for Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), focusing on group leaders, project staff, financial service providers, implementing partners, and other stakeholders with direct influence on energy access and adoption.

2.3 Data Collection Methods and Tools

A combination of data collection methods was employed. A structured household survey questionnaire configured in Kobo Toolbox was administered to capture quantitative data on demographics, energy access, knowledge, usage, and financial capacity. Qualitative data was collected through six FGDs, four mixed-gender and two female-only to provide deeper insights into perceptions, barriers, and opportunities related to renewable energy adoption. In addition, 13 KIIs were conducted with group chairpersons, project staff, local government officers and a financial service provider to contextualize findings and validate perspectives. Data collection tools were pre-tested through a dry-run, and administered by a team of ten trained local enumerators under the supervision of the Consultant and CECI MEAL Officer.

2.4 Data Analysis and Reporting

Quantitative data was imported into SPSS version 23 and analyzed using descriptive statistics to summarize demographic characteristics, energy access patterns, demand, financial capacities, challenges and inclusion factors. Graphical presentations such as bar charts and pie charts were used to illustrate findings. Qualitative data from FGDs and KIIs were transcribed, coded, and analyzed thematically to identify recurring patterns, narratives, and insights that complemented the quantitative findings. The results were integrated and triangulated to ensure validity and reliability.

2.5 Ethical Considerations

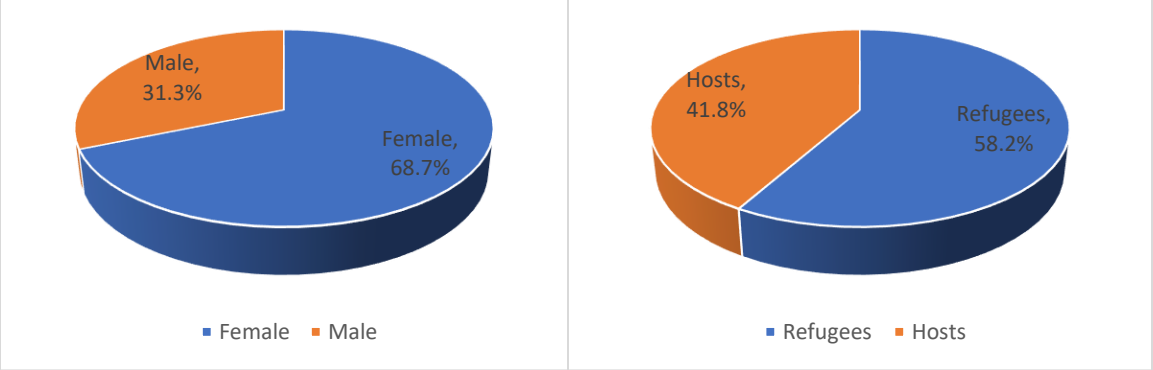
The assessment adhered to ethical standards of research involving vulnerable populations. Informed consent was obtained from all participants after clearly explaining the objectives, benefits, and voluntary nature of the study. Privacy and confidentiality were maintained by anonymizing responses and ensuring data security throughout the process. Special attention was given to gender-sensitive and culturally appropriate engagement, particularly in refugee contexts where power dynamics and vulnerabilities are heightened. Enumerators were trained on ethical conduct, including the importance of respecting participants' rights, avoiding harm, and ensuring inclusivity in data collection.

3.0 Findings of the Assessment

3.1 Participants Demographics

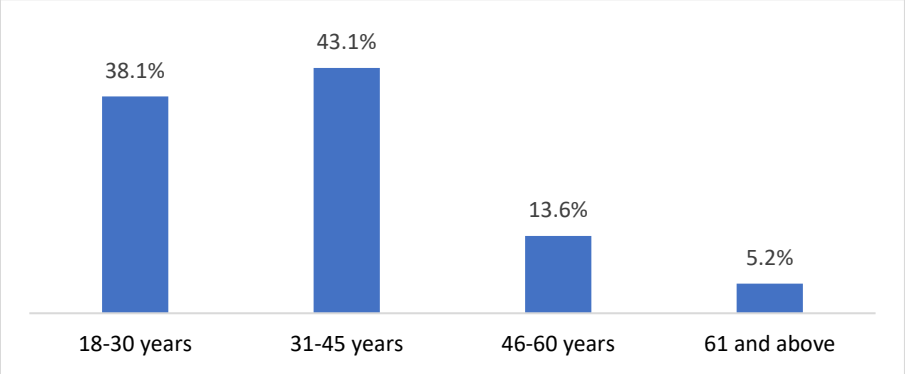
Gender and Refugee Status: Results presented in Figure 1 below show that female participants (68.7%) were more represented in the survey compared to their male counterparts (31.3%). This aligns with the nature of membership in the VSLA and farmer groups that participated in the assessment. Disaggregation of participants by refugee status reveals that host participants (58.2%) were slightly more than refugees (41.8%). Details are presented in Figure 1 below.

Figure 1: Disaggregation of participants by gender and refugee status



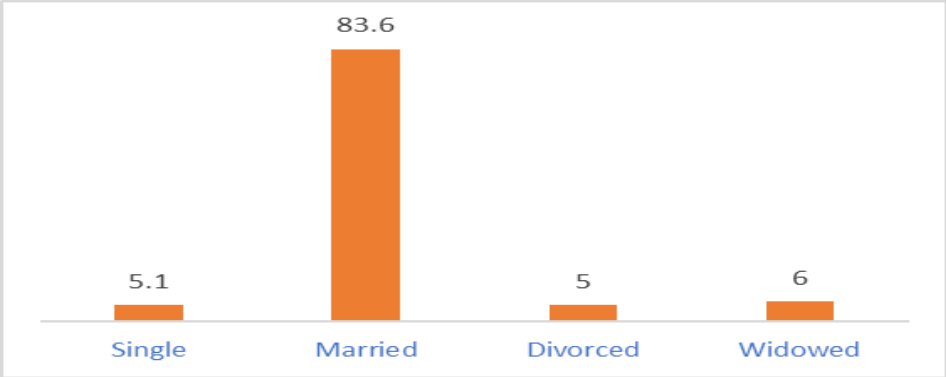
Age Group: Further analysis of participants' characteristics shows that the majority of the participants in the assessment were within the youthful age range, between 18 and 45 years. Results presented in Figure 2 show that 43.1% were in the 31-45-year age group, 38.1% were aged 18-30 years, 13.6% were aged 46-60 years, and 5.2% were aged 61 years and older.

Figure 2: Participants' Age Group



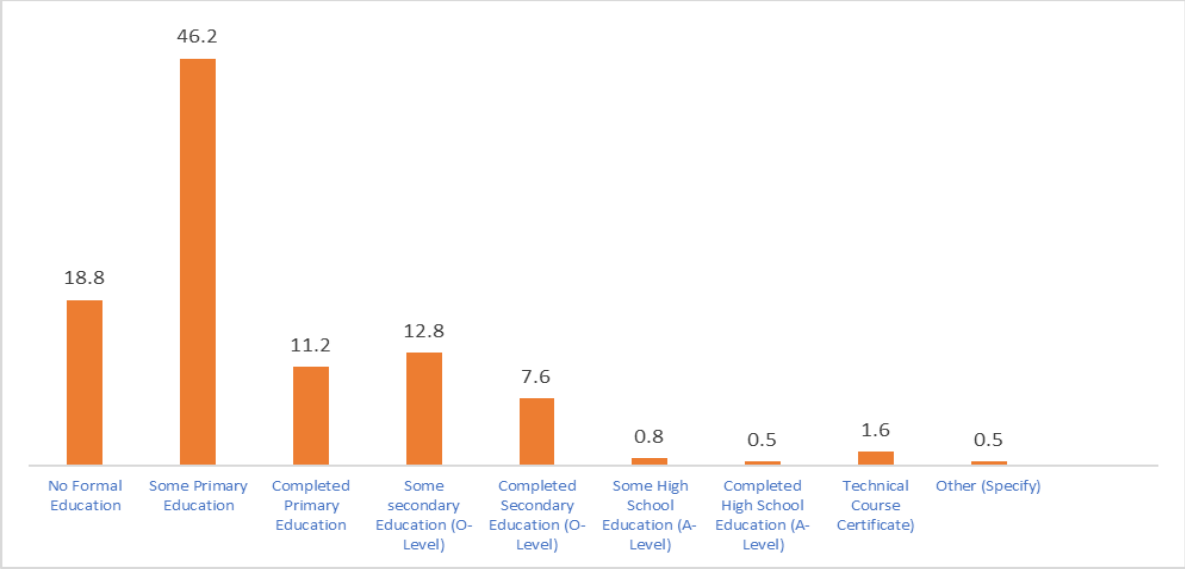
Marital Status: The results show that the majority of respondents (83.6%) were married, indicating that most participants live in family units and possibly share household responsibilities. A small proportion were separated (6.0%), divorced (5.0%), or single (5.5%). This suggests that marital status may influence household decision-making and the capacity to invest in renewable energy technologies, given that married households may pool resources more easily compared to single or divorced individuals.

Figure 3: Participants' Marital Status



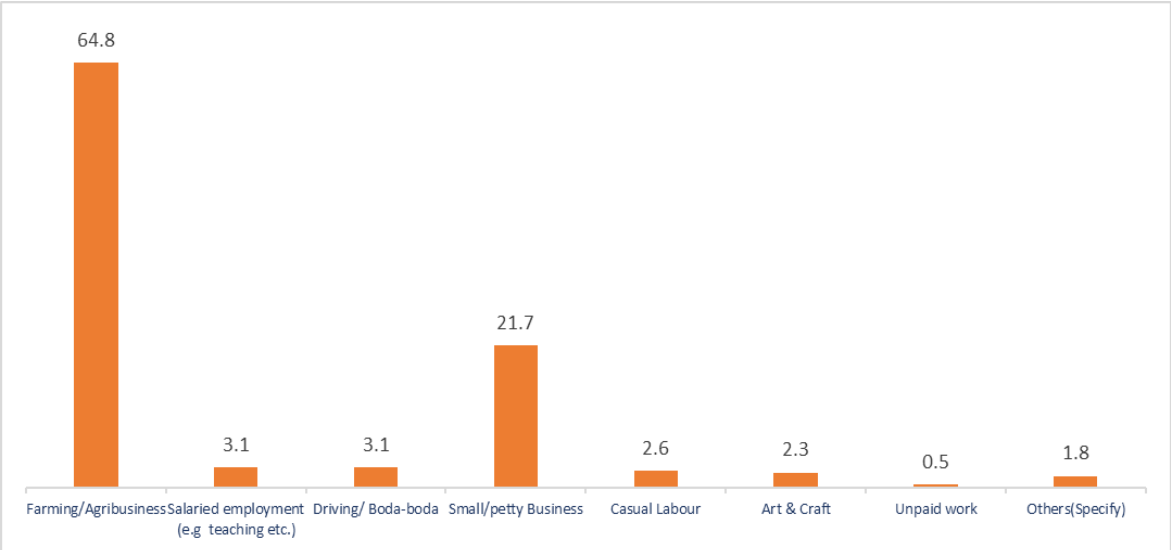
Highest Education Level: Findings reveal that nearly half of the participants (46.2%) had some primary education, while 18.8% reported no formal education. Only a small percentage had attained higher levels of education, such as completed secondary (7.6%), high school (0.5%), or technical certificates (1.6%). This suggests that most group members have limited formal education, which may affect their ability to access information, interpret technical information, and make informed decisions about adopting renewable energy technologies.

Figure 4: Educational Attainment



Employment Status of Participants: Most participants (64.8%) reported farming and agribusiness as their main source of livelihood, followed by small or petty business (21.7%). A few engaged in salaried employment (3.1%), transport services such as driving or boda-boda riding (3.1%), casual labor (2.6%), or crafts (2.3%). The dominance of farming highlights the reliance on agriculture in both refugee and host communities, and also presents opportunities for integrating renewable energy into agricultural practices, such as solar irrigation and value addition.

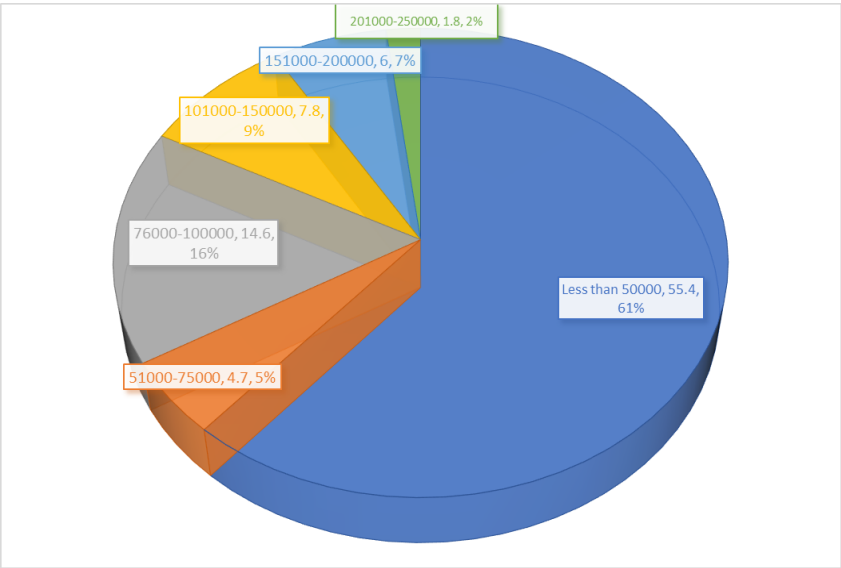
Figure 5: Employment Status of Participants



Average Monthly Income: The findings show that more than half of the respondents (55.4%) earn less than UGX 50,000 per month, while 14.6% earn between UGX 76,000–100,000. Only 5.2% reported earning more than UGX 300,000 monthly. This low-income profile indicates

limited purchasing power among the majority of participants, which poses a significant barrier to adopting renewable energy technologies that often require substantial upfront investment. It also highlights the importance of financial support mechanisms such as subsidies, flexible payment models, and microfinance products.

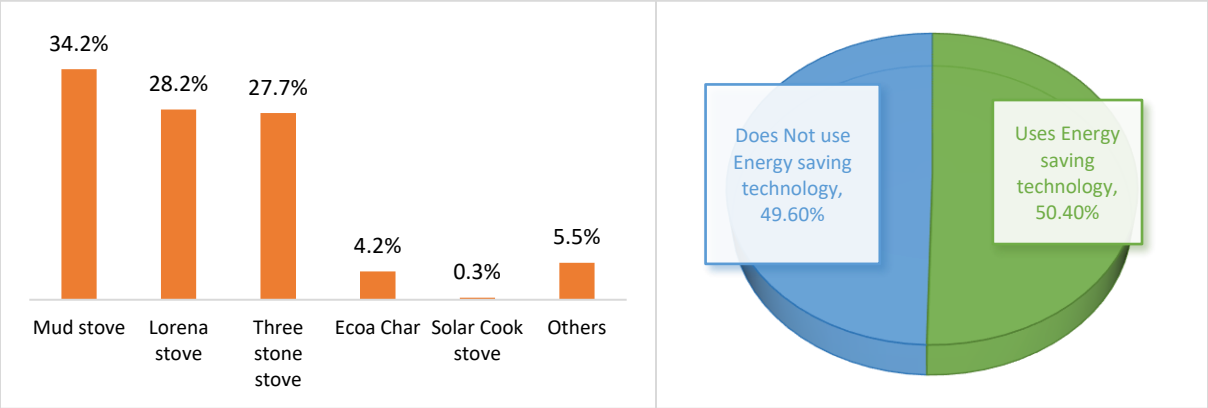
Figure 6: Average Monthly Income



3.2 Household Use Energy Saving Technologies

The findings reveal that the majority of the households interviewed use a mud stove (34.2%), followed by households that use Lorena (28.2%), three stone stove (27.7%), and Ecoa Char (4.1%). One household reported that they solar cook stove (0.3%). Overall, at least 50% of the households surveyed were using energy-saving technology for cooking. Details are presented in Figure 7 below.

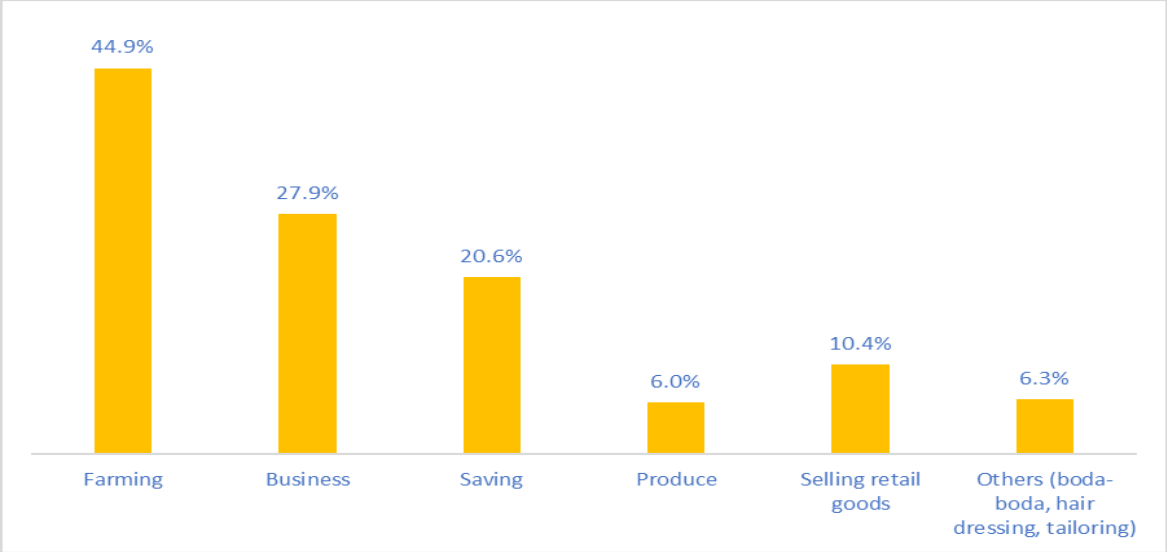
Figure 7: Type of Energy Saving Technology Used in the Household



3.3 Involvement in Any Kind of Enterprise/Value Chain

The majority of respondents (77.5%) reported being engaged in some form of enterprise or value chain, mostly farming, agribusinesses, and some retail businesses, while 22.5% were not involved in any economic activity. This demonstrates that most participants are economically active and could potentially benefit from renewable energy technologies to improve productivity, reduce costs, and enhance income. However, the notable proportion of those not engaged in enterprises also highlights a vulnerable segment that may need targeted support to participate in energy-driven livelihoods. Details are presented in Figure 8 below.

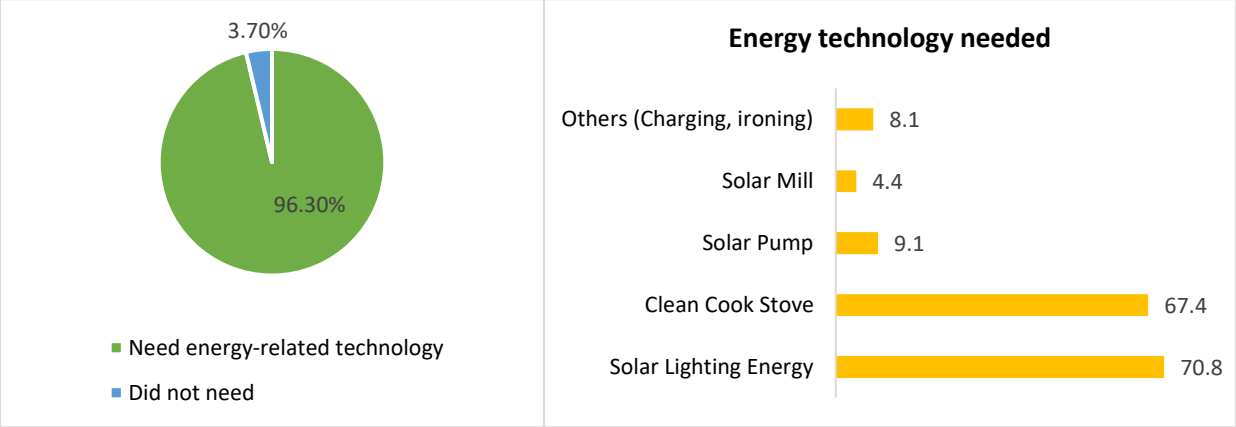
Figure 8: Type of Enterprise or Value-Chain Engaged In



3.4 Need for Energy-Related Technologies in the Households

In findings, 96.3% of the participants expressed a need for energy-related technologies in their households. When asked which energy technologies they need, solar lighting and clean cook stoves were most frequently reported, followed by solar pumps, as shown in Figure 9 below.

Figure 9: Need for Energy-Related Technologies in Households



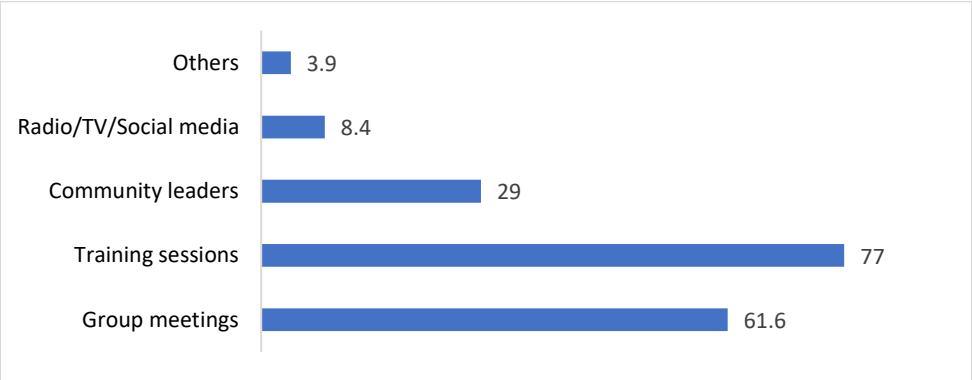
Participants from FGDs and KIIs frequently expressed a pressing need for solar lighting, clean cookstoves, and small-scale productive energy appliances. This was driven by challenges with current energy sources, including health hazards from smoke, high charcoal and firewood costs, and the unreliability of traditional lighting methods. One participant noted, *"I learned about solar and clean cooking stove but I have not acquired it because of limited money."* Another emphasized, *"After acquiring the cook stoves… a bag [of charcoal] is now taking… two months… households are able to save and increase their share values."* These insights highlight both the strong willingness to adopt cleaner technologies and the clear financial benefits when adoption occurs.

The consistency between qualitative and quantitative results underscores the critical role energy access plays in improving household welfare, reducing fuel costs, enhancing health, and creating opportunities for income generation. The theme demonstrates that households view access to renewable energy not as a luxury but as a necessity for survival, dignity, and socio-economic resilience.

3.5 Knowledge About Energy Saving Technology

The findings show that 96.6% of the participants have heard about the energy-saving technology. The common sources of knowledge reported by participants were training sessions, group meetings, and community leaders, as shown in Figure 10 below.

Figure 10: Source Of Knowledge About Energy-Saving Technology



Findings from FGDs with group members reveal that awareness of clean cooking and solar solutions is high and generally positive. Participants described tangible savings and convenience: *"I learned that clean cookstove saves charcoal… and keeps ash"* (FGD participant, female). Several participants already use basic energy saving options *"I use Lorena energy saving stove which is made out of mud for cooking"* (FGD participant, male) and recognize hygiene and environmental benefits: *"There is hygiene at home from clean cooking… [and] reduced deforestation because clean cookstove uses small charcoal."* (FGD participant, female). These perceptions reinforce the survey finding that 96.6% have heard about energy-saving technologies, often through training sessions and group meetings.

3.6 Use of Renewable Technology for Productive Purpose

Results of the assessment show that 41.5% of the participants were using renewable energy for productive purposes. Most common purposes reported were lighting (28.2%), cooking (20.9%), irrigation (3.9%), and processing (1%). Participants who are not using renewable energy for productive use (58.5%) reported that available energy solutions are very costly/unaffordable and that the technologies are not readily accessible/available.

Figure 11: Whether Household Uses Renewable Energy for Productive Purpose

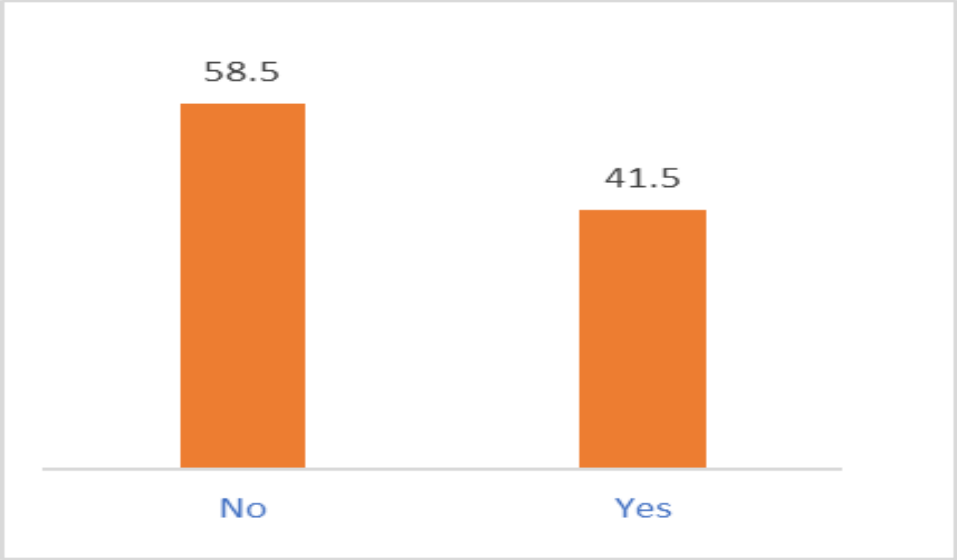
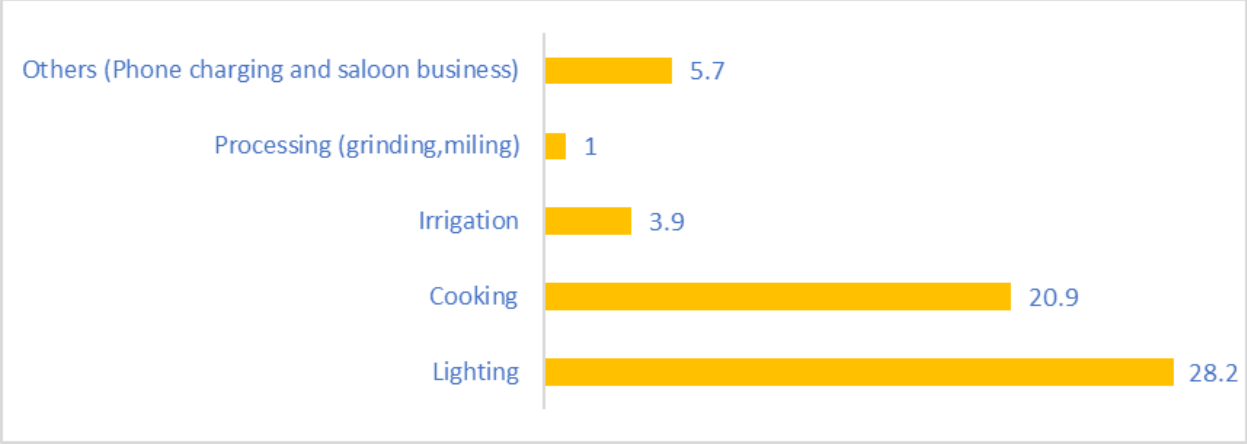


Figure 12: Purpose of using Renewable energy technologies

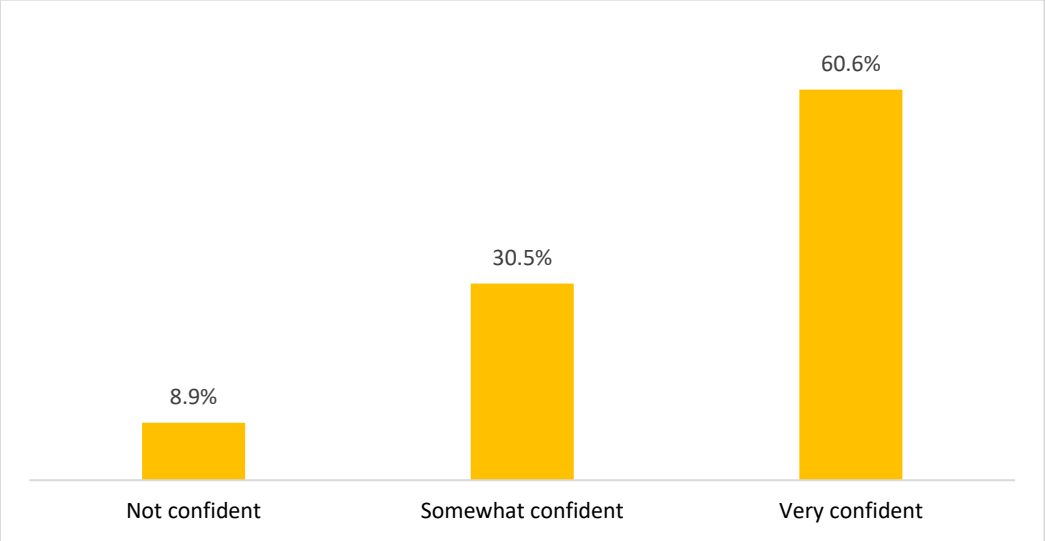


While many households own or improvise energy-saving stoves, adoption of more advanced products and PUE remains limited. FGD and KII Participants cited reliance on entry-level solar for lighting/charging—"I use Sun King light… I use it for charging during the day and lighting at night" (FGD, mixed group)—but also noted seasonal reliability issues: "When weather is rainy the renewable solar energy is disappointing to me." (FGD participant). Key informants confirmed that, at group level, "there are no groups actually utilizing renewable energy for productive purposes," despite awareness of solar irrigation and milling options; price and water-source constraints were highlighted. This aligns with the quantitative result that only 41.5% use renewable energy for productive purposes, with high costs and availability cited as barriers.

3.7 Confidence in Ability to Use Renewable Energy Technologies Effectively

The findings show that the majority of the participants (60.6%) were very confident in their ability to use renewable energy technologies effectively, 30.5% were somewhat confident, while 8.9% were not confident.

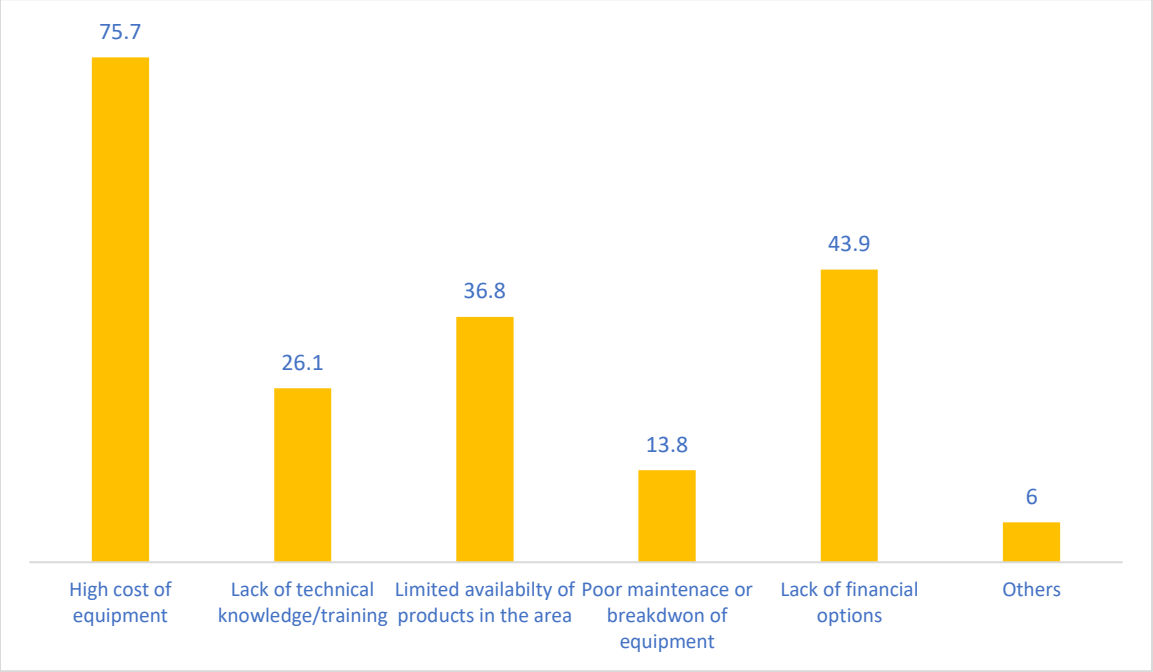
Figure 13: Confidence In Ability to Use Renewable Energy Technologies Effective



3.8 Challenges Faced in Accessing/Using Renewable Energy Technologies

The findings of the assessment show that access to and use of renewable energy technologies are hindered by the high cost of equipment, lack of financial options, limited availability of the products in the area, and lack of technical knowledge, as shown in Figure 14 below.

Figure 14: Challenges Faced in Accessing/Using Renewable Energy Technologies

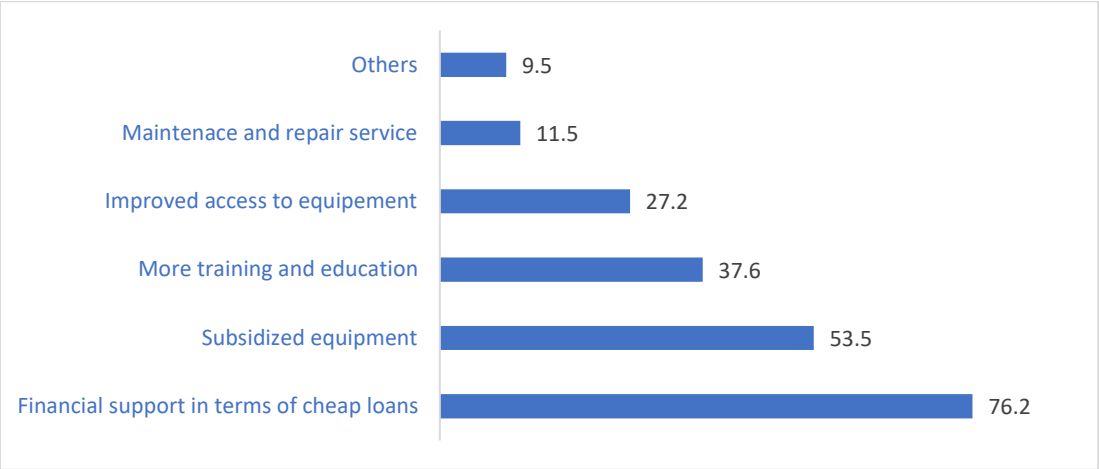


Despite the high demand and awareness of renewable energy solutions, both refugees and host community members face significant challenges in accessing and effectively using these technologies. A recurring issue across FGDs was the high upfront cost of products, which many households could not afford, given their low and irregular incomes. As one participant explained, *"I learned about solar and clean cooking stove but I have not acquired it because of limited money."* Similarly, others stressed that *"many roles like paying school fees limit financial access to renewable energy technology."* The limited purchasing power of households, therefore, restricts adoption, even when the benefits of the technologies are well understood.

3.9 Support Necessary to Use Renewable Energy Technology

When asked about the support necessary for participants to use renewable energy technology, the majority reported a need for financial support, including cheap loans (76.2%), subsidized equipment (53.5%), more training and education (37.6%), and improved access to equipment (27.2%). Results are presented in Figure 15 below.

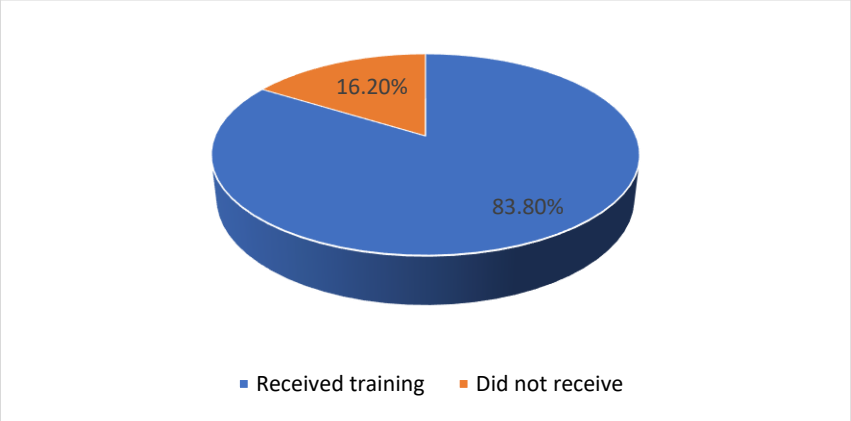
Figure 15: Support Necessary to Use Renewable Energy Technology



3.10 Training on Renewable Energy

Results of the assessment show that 83.8% of the participants had received training on renewable energy, mostly from NGOs and some from Energy service providers, while 16.2% had not received the training.

Figure 16: Training on Renewable Energy

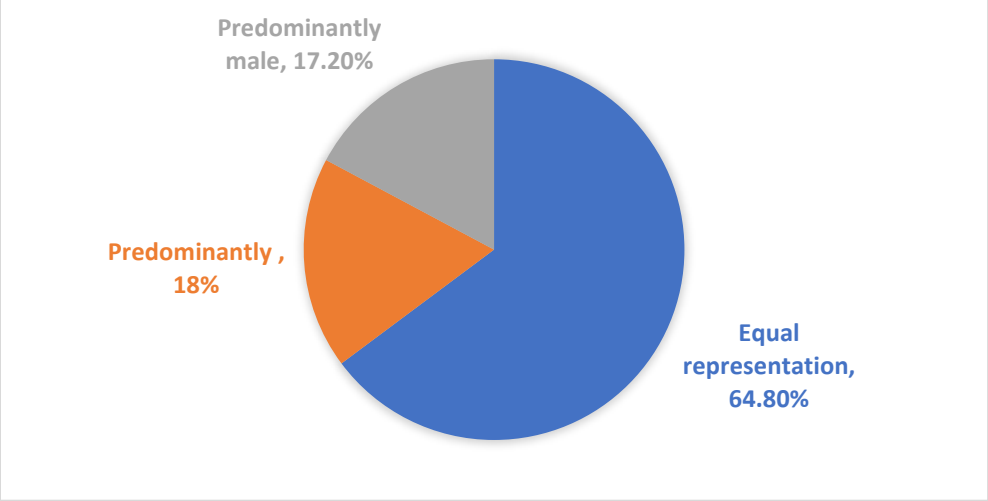


Training was cited as a primary information source and participants explicitly asked for practical, product-in-hand demos: "The exact equipment should be brought and clearly demonstrated." (FGD participants). KIIs echoed needs for user education tied to finance options (e.g., terms from Vision Fund) and for reliable after-sales and repair services; some groups struggle with storage/rooftop mounting and repairs, dampening usage. These requests align with survey evidence that 83.8% have received some training but still want more education and easier access to quality equipment.

3.11 Gender Composition of Decision-Making in Households

The findings show that 64.8% of the households have equal gender representation in decision making, 18% and 17.2% reported decision making to be predominantly female and predominantly male, respectively. When asked whether women and youth actively participate in decision-making processes in households, the majority of the participants (68.1%) reported that they very actively participate, 18.8% reported that they somewhat actively participate, 7% reported rarely, while 6% said they do not participate at all.

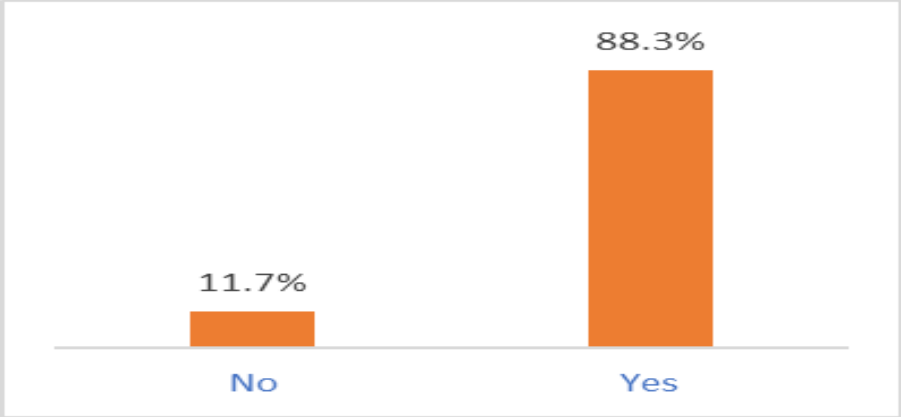
Figure 17: Gender Composition of Decision-Making in Households



3.12 Men Support for Participation of Women and Youth in Decision Making

In the findings, 88.3% of the participants agree that men support the participation of women and youth in decision-making, while 11.7% do agree. The main barriers reported by participants included: traditional gender roles, limited awareness about gender inclusion, and resistance to sharing gender roles.

Figure 18: Whether Men Support For Participation Of Women And Youth In Decision Making

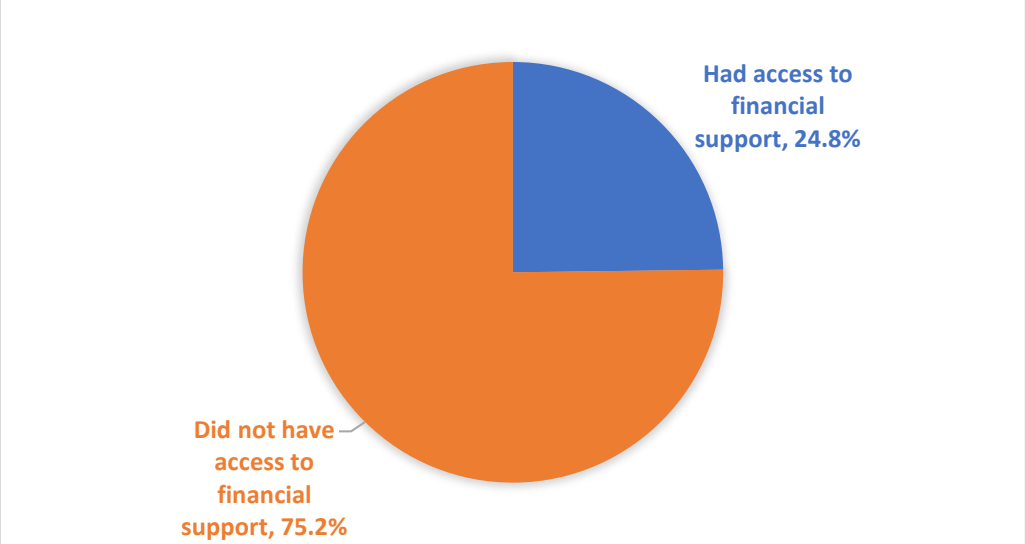


Qualitative findings show that groups widely involve women and youth in operations- *"Women count money in my group… security head is a youth"* and some report women in leadership (FGD participants). However, multiple intersecting barriers, such as heavy domestic workloads, lack of collateral, under-representation/mentorship gaps, and limited information access, reduce women's participation in PUE and purchasing decisions. (FGD participants). Notably, most men reportedly support women/youth participation in decision-making, though traditional roles and low awareness still impede progress—consistent with survey patterns.

3.13 Access to Financial Support for Renewable Energy

The assessment findings indicate that only 24.8% of the participants had access to financial support for renewable energy technologies in the past one year while 75.2% did not have access.

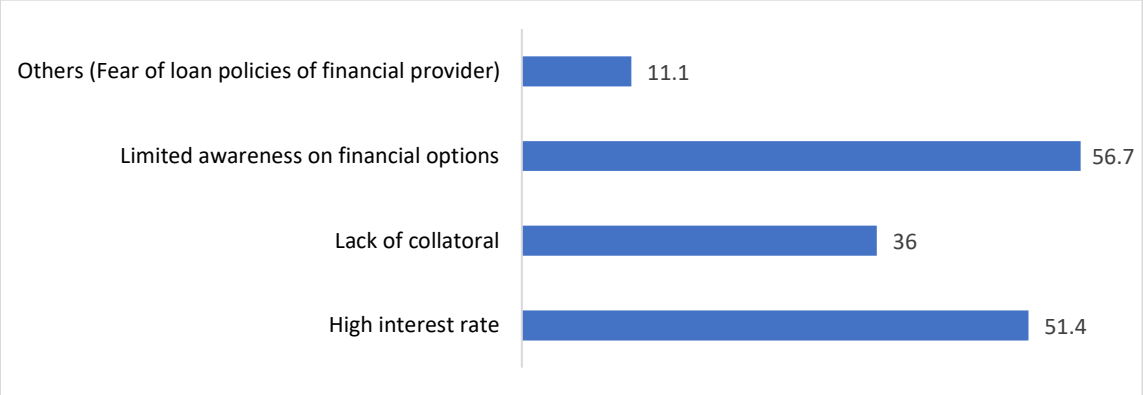
Figure 19: Access to Financial Support for Renewable Energy



3.14 Challenges Faced in Accessing Financial Support for Renewable Energy Technologies

The findings reveal that a lack of awareness of financial options (56.7%) and high interest rates (51.4%) are common barriers to accessing financial support for renewable energy technologies.

Figure 20: Challenges Faced in Accessing Financial Support for Renewable Energy Technologies

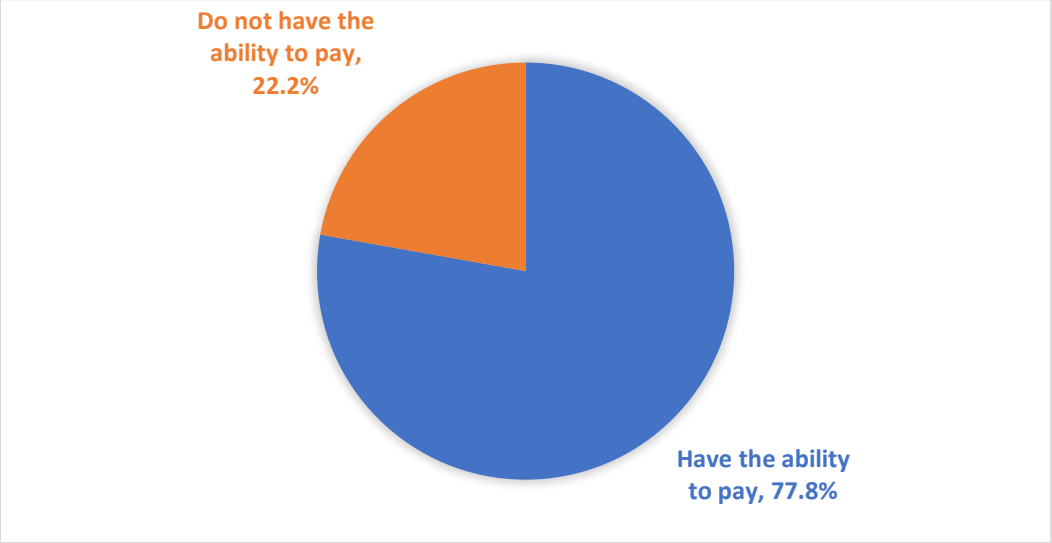


In all FGDs, affordability dominates the discussion. Even when interest exists, "limited money and support," especially among women and youth who "mostly get little money from casual labour," constrain purchases (FGD participants). The findings also reveal that households favor savings-led acquisition: "Group members are saving willingly to buy clean cookstove at the end of the year." (FGD participant, male). Participants repeatedly requested installment plans and price reductions—"need to payment in installments… [and] reduce the price of the ecoca" (FGD participants)—and called for clearer purchase terms. This mirrors survey findings: only 24.8% had access to financial support for energy in the past year; the most needed support is cheap loans (76.2%) and subsidies (53.5%), with high interest rates and low awareness as major barriers.

3.15 Ability To Pay For Renewable Energy Technologies

Approximately 77.8% of the respondents reported that they have the ability to pay for renewable energy technologies, while 22.2% said they are unable to pay.

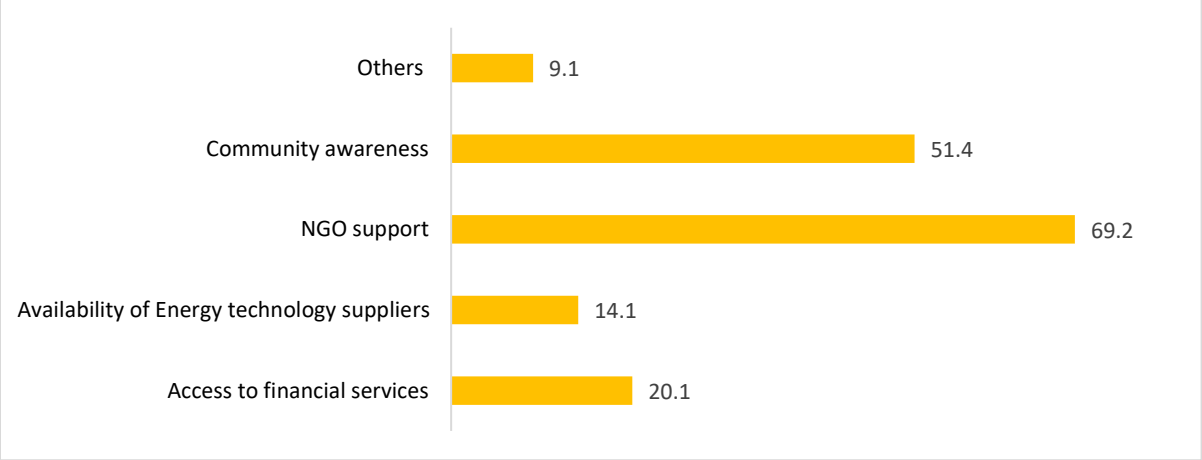
Figure 21: Ability To Pay For Renewable Energy Technologies



3.17 Supportive Environment To Adopt Renewable Energy Technologies In The Community

About 94% of participants affirmed that there is a supportive environment in their communities for adopting renewable energy technologies, while 6% reported that there is no supportive environment. When asked what would make the environment more supportive, the majority emphasized the need for NGO support (69.2%), community awareness (51.4%), and improved access to financial services (20.1%).

Figure 22: Way To Make Environment Supportive To Adopt Renewable Energy Technologies



Participants and KIIs identified clear PUE opportunities if constraints are addressed: solar irrigation (where water sources are nearby) could unlock off-season horticulture; solar milling for cassava shows promise but needs product refinement and financing. At the household level, low-cost, durable cookstoves (Lorena, Ecoa) and reliable entry-level solar for lighting and

charging are seen as immediately beneficial. Quantitative data corroborates demand: 96.3% of respondents expressed a need for energy tech, chiefly solar lighting and clean cookstoves.

> Selected illustrative quotes
> *"I learned about solar and clean cooking stove but I have not acquired it because of limited money." (FGD participant, male).*
> *"Many roles like paying school fees limit financial access to renewable energy technology." (FGD participant, female).*
> *"Need to support with half of the money and we pay the remaining by installments." (FGD participant).*
>
> *"After acquiring the cook stoves… a bag [of charcoal] is now taking… two months… households are able to save and increase their share values." (KII, Project Officer).*

4.0 Conclusion and Recommendations

4.1 Conclusion

Based on the findings of this assessment, communities know and value clean energy, reflected in strong demand for solar lighting and clean cookstoves, yet up-front cost, credit constraints, and seasonality impede adoption, especially in PUE. The findings also indicate that groups save and are willing to buy, but require installments, clear terms, and lower effective prices. Women and youth contribute across roles, yet domestic workload, collateral gaps, and information asymmetries limit equitable uptake and leadership in energy decisions. It is also noted that PUE potential is real but contextual. Solar irrigation and milling can boost incomes where water access, product reliability, and finance align; otherwise, households default to basic uses (lighting/charging, clean cooking). Training helps; after-sales and product access are critical in enhancing the adoption of clean energy. Practical demos, proximate distribution, and repair/warranty services are paramount for confidence and sustained use.

4.2 Recommendations

Based on the findings of the capacity assessment, the following actionable recommendations are proposed to improve the uptake and effective utilization of renewable energy technologies by group members:

1. Engage the Financial Service Providers, such as Vision Fund, SACCOs, and VSLAs, to develop and roll out inclusive, affordable, and tailored loan products to enable members to acquire renewable energy technologies. Repayment installment plans and grace periods should be tied to harvest cycles, since most participants are farmers.

2. Energy Service Providers should establish last-mile distribution "energy corners" within markets/VSLA hubs in Bidibidi and Yumbe, and should ensure that spare parts and on-site technicians are easily accessible to the users.
3. There is a need for Energy Services Providers to prioritize the supply of proven, durable cookstoves and entry-level solar kits (lighting/charging), with clear performance guarantees; offer rain-season usage guidance and safe mounting/storage support.
4. Collaborate with government and development partners to provide subsidized or co-financed energy-saving products such as clean cookstoves and solar kits to reduce cost barriers.
5. There is a need for implementing partners in partnership with the energy service provider to conduct product-in-hand demos (cooking challenges, "try & buy" for lights), coupled with user-friendly finance onboarding (e.g., Vision Fund terms). Schedule sessions around peak farm days (Sun/market days). Conduct regular community-based training and demonstration sessions on the use, maintenance, and benefits of renewable energy technologies, targeting both men and women.
6. Continue with targeted communication strategies to increase awareness about the availability, affordability, and benefits of PUE and CCS technologies, using trusted local channels such as community leaders and group meetings. Pilot solar irrigation only where reliable water access exists; pair with agronomy and market-linkage support to monetize off-season production.
7. Facilitate multi-stakeholder dialogues involving the private sector, NGOs, local government, and FSPs to create synergies for scaling up renewable energy solutions and ensuring sustainability.
8. Train group members on budgeting, savings, and loan management with a focus on renewable energy investments to build their confidence and ability to pay for such technologies.