Uganda Learning, Evidence, Accountability, and Research Network

LIVING WITH CLIMATE-RELATED HAZARDS

Impacts on Agriculture in Nyumanzi Refugee Settlement – Adjumani District

Key Messages

- A large majority of refugees in Nyumanzi/ Dzaipi/Arinyapi (82%) have lived there for nine to ten years or more, with livelihood largely dependent on climate sensitive activities: 96% engaged in crop farming, 57% engaged in animal husbandry.
- Climate related hazards - especially extreme heat, droughts and floods - are increasingly affecting livelihoods in Nyumanzi settlement and its surrounding areas, leading to reduced crop yields, livestock losses, disrupted fishing activities and higher food prices.
- Community responses to these climate impacts include crop diversification, water harvesting, adjusting work hours and informal support networks. However, limited access to timely climate information, inputs, and financial resources continues to constrain effective adaptation strategies.

Context & Rationale

Uganda, hosting over 1.9 million refugees as of November 2025, is the largest refugee hosting country in Africa. Nyumanzi settlement, established in 2014, is one of the largest of 19 individual settlements that together form the Adjumani settlement in Northern Uganda. It is home to approximately 48,181 refugees.[1] The refugee population, nearly all from South Sudan is predominantly Dinka, while the host community is mainly Madi.[2]

Nyumanzi settlement faces considerable climate-related challenges, particularly extreme heat, drought and flooding, compounded by a heavy reliance on agriculture and constrained infrastructure capacity. In 2023, floods temporarily displaced over 4,000 people, and the region is projected to experience severe heat risks by the end of the century. [3]

Agriculture forms the backbone of livelihoods in and around Nyumanzi settlement and Dzaipi/Arinyapi sub county, with crop farming engaging nearly all households and animal husbandry supporting over half of the population. [4] However, the sector faces increasing strain from climate-related hazards such as drought, extreme heat and floods, which disrupt food production, threaten income stability, and deepen existing gender disparities in farming activities. [5]

Assessment Overview

The assessment aims to identify and analyse community-based coping and adaptation strategies to climate-related hazards and climate variability [6] among refugee and host communities in Nyumanzi settlement.

This brief focuses specifically on the livelihood sector, analysing how climate-related hazards particularly extreme heat, drought, and flooding affect crop farming, livestock and animal husbandry, and fishing. It aims to:

- Examine climate impacts on agricultural production, labour productivity, food security and household incomes.
- Document agriculture-specific coping and adaptation strategies used by farmers, pastoralists, small businesses, casual labourers and fishing households.
- Provide context-specific evidence to inform humanitarian and development programming that strengthens climate-resilient agricultural livelihoods.

Methodology

The mixed-methods assessment used an Area-Based Assessment (ABA) approach, which offers a holistic picture of climate-related challenges in Nyumanzi by examining the entire geographic area and the different sectors and population groups within it. It also draws on the Community-Based Adaptation (CBA) approach, which supports communities in identifying, designing, and leading their own climate adaptation strategies. This approach emphasizes local knowledge, existing vulnerabilities, and community-driven resilience building. The study integrated both quantitative and qualitative data collection:

- **Quantitative: 887 interviews comprising**
  - 446 refugees
  - 431 host community members
- **Qualitative: 211 participants across**
  - 29 key informant interviews
  - 16 participatory workshops
  - 2 focus group discussions.

The study area covered Nyumanzi settlement and its neighbouring communities, focusing on the experiences of both refugee and host populations. Data analysis incorporated stratification by gender and displacement status, and remote sensing techniques were used to examine hazards such as heat, drought, and flooding. Efforts were made to include persons with disabilities and older individuals to ensure their views and experiences were adequately represented.

Findings reflect the experiences of respondents in Nyumanzi/Dzaipi/Arinyapi and may provide indicative insights for similar contexts, though they are not statistically generalizable beyond the assessed population.

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1 *UNHCR, Operational Data Portal, last consulted on 30th October 2025*
2 *IMPACT, UGA2406_Climate-report, April 2025.*
3 *Monitor - Uganda, Over 4,000 refugees hit by floods in Adjumani, 2023.*
4 *REACH_UGA_2024-MSNA-Report_July-2025.*
5 *WORLD BANK, Uganda Country Profile-WEB, last consulted 16th December 2025.*
6 *Climate variability refers to natural short-term fluctuations in climate patterns such as rainfall, temperature and wind that occur over months, seasons or years rather than long term climate change.*

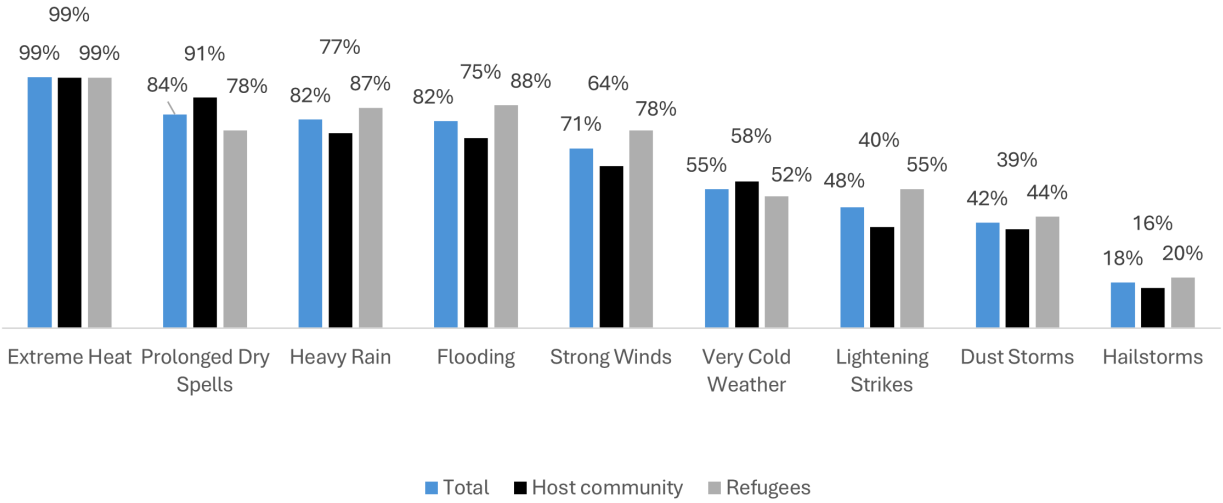
KEY FINDINGS:

SECTION 1:

Overview of Identified Climate Hazards.

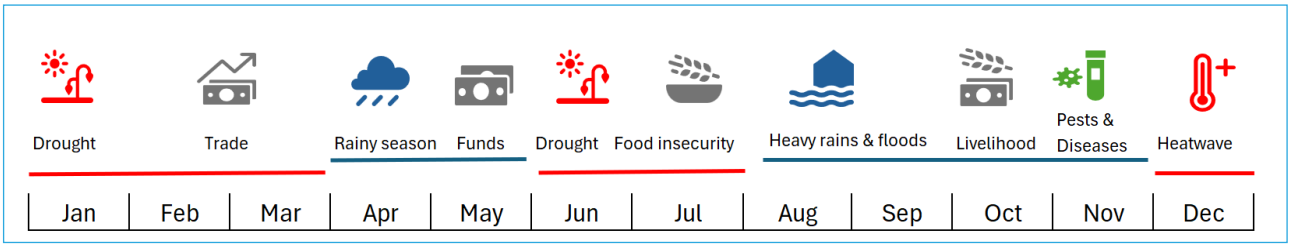
Over the past five years, the population of Nyumanzi faced important climate-related impacts, with **99%** experiencing extreme heat, **84%** enduring prolonged dry spells and **82%** affected by heavy rains and flooding. While these climate events affected both refugees and host communities, they were particularly pronounced among refugees, exacerbating their vulnerabilities.

Climate related hazards reportedly experienced in/around Nyumanzi in the past five years by % of the population N=877



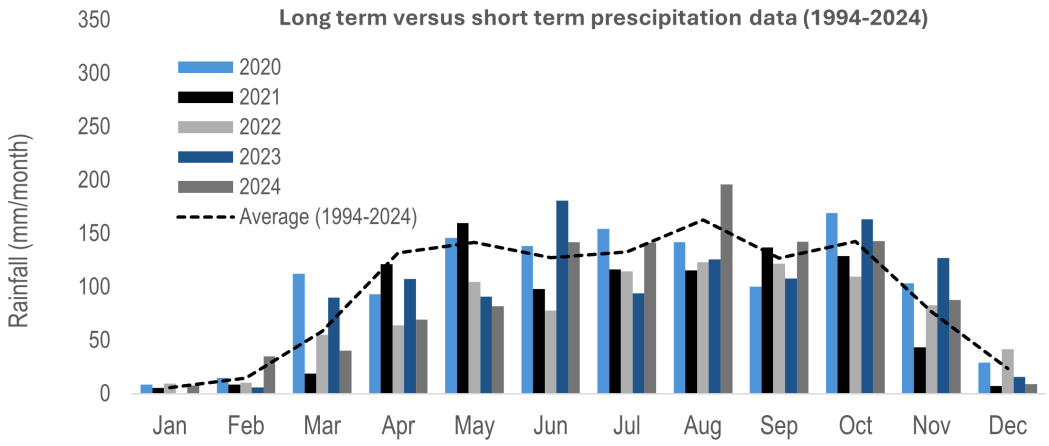
Seasonal Calendar for Nyumanzi Settlement.

The seasonal calendar was created from information gathered through a participatory workshop conducted with both refugees and host community members in Nyumanzi settlement/ Dzaipi/Arinyapi.



Based on the seasonal calendar, agricultural activities begin when the rainy season starts in April and the second season begins from August, but garden preparation begins earlier. In contrast, June and July show heightened food insecurity, driven by drought conditions that reduce agricultural production, limit market availability, and increase dependency on purchased food. The crops commonly grown include vegetables like eggplants, okra, tomatoes and 'Osobi' [7].

[7] *Osobi: a leafy green crop grown in Uganda including many household compounds. Also known as Egobe or Eboo.*



Comparing the Seasonal Calendar (SC) for Nyumanzi with both long-term and recent precipitation data reveals clear shifts in rainfall patterns and growing variability. The SC shows that agricultural activities usually start with the onset of rains in March-April, which broadly aligns with historical rainfall trends. However, June-July, identified in the SC as a period of drought and heightened food insecurity, contrasts with precipitation data that indicates relatively higher average rainfall during these months. This discrepancy likely reflects increasing rainfall unpredictability in recent years, including irregular distribution, shorter rainy spells, and longer dry breaks, which reduce the reliability of rain for agriculture despite higher totals.

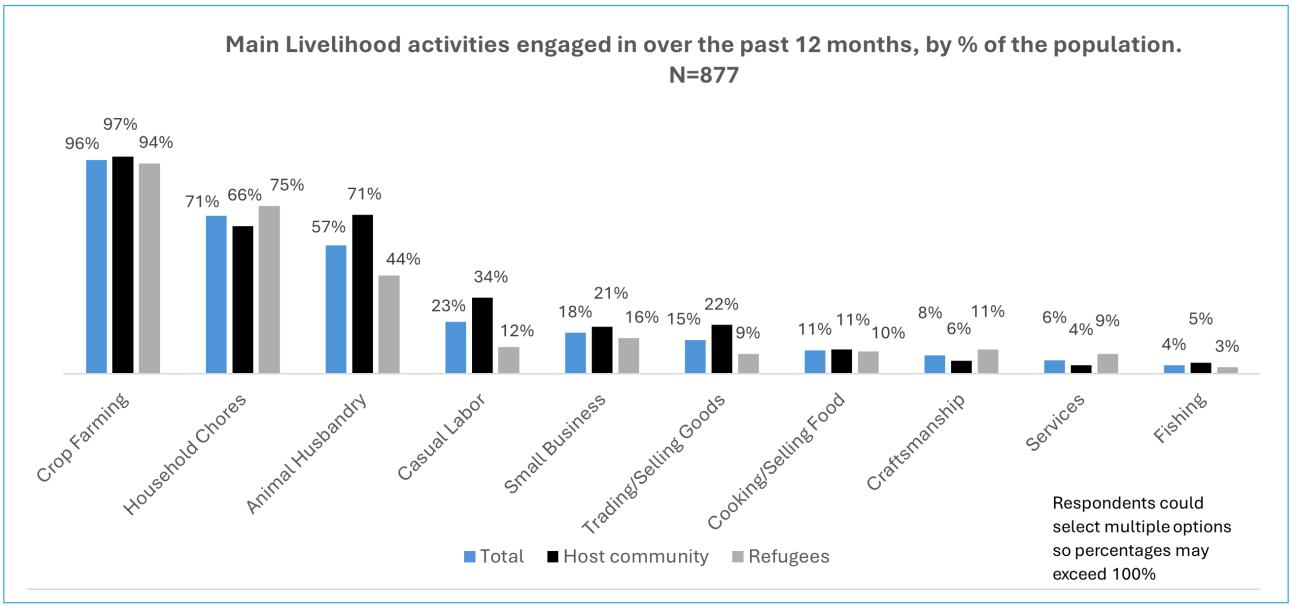
The SC further indicates August-October as a period of heavier rains and flooding, which corresponds closely with precipitation data showing higher average rainfall during these months. Together, these patterns suggest that while overall rainfall may not have declined uniformly, its timing, intensity, and consistency have shifted, contributing to agricultural disruption and food insecurity in/around Nyumanzi settlement.

> We used to know when to plant. Now the rains come late or not at all."
> - *Refugee farmer Nyumanzi settlement.*

SECTION 2:

Impact of Climate related hazards on Livelihoods

This section discusses the different livelihood activities done by the community in and around Nyumanzi settlement and Dzaipi/Arinyapi and how climate related hazards impacts them. Over the past 12 months, 96% of the total respondents reported being engaged in crop farming, 71% engaged in household chores, 57% were engaged in animal husbandry while 23% and 18% respectively were engaged in casual labour and small businesses, respectively. A small percentage (5%) reported being engaged in fishing activities. This implies that this is a community reliant on agriculture and therefore vulnerable to climate shocks.

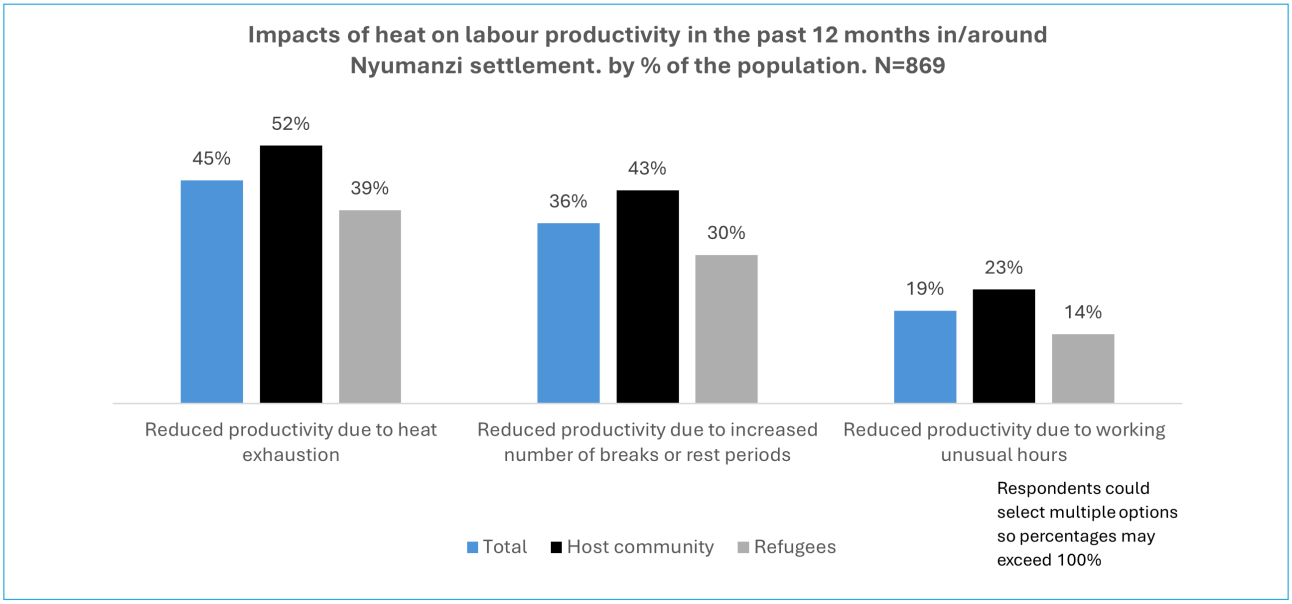


The graph above shows notable differences between host and refugee communities across different livelihood activities. Crop farming is widely practiced by both groups, with almost no difference, 97% of hosts and 94% of refugees engaged in it reflecting its role as the main livelihood for everyone in/around Nyumanzi settlement. However, the patterns shift significantly in the next activities. In household chores, refugees report slightly higher involvement (75% compared to 71%), which may reflect differences in household composition or labour roles within refugee households. The biggest disparities appear in animal husbandry and casual labour. Hosts are far more engaged in animal rearing (71% vs. 44%), likely linked to better access to land, grazing areas, and livestock assets. Similarly, hosts participate much more in casual labour (34% compared to 12% among refugees), suggesting that host community members have greater access to local employment opportunities, mobility, and social networks. These differences highlight how resource access and socio-economic conditions shape livelihood choices between the two groups.

Labour Productivity

A Research conducted by International Labour Organization (ILO) and World Bank (WB) shows that extreme heat negatively affects labour productivity, labour supply, and worker safety, a trend reflected in the reported experiences of workers in/ around Nyumanzi settlement and Dzaipi/Arinyapi sub county. [8,9]

In Nyumanzi, 45% of the total respondents reported reduced efficiency due to heat exhaustion, 36% experienced productivity losses due to the need for more frequent breaks, and 19% struggled with reduced output because of working during unconventional hours.



Host community members consistently reported higher reductions in productivity due to heat compared to refugees. Over half of host respondents (52%) experienced reduced productivity from heat exhaustion, compared to 39% of refugees. A similar pattern appears in the need for additional breaks or rest, where 43% of host respondents reported productivity loss, against 30% of refugees. Host community members also reported slightly higher disruption due to working unusual hours (23%), relative to 14% among refugees. Overall, these findings indicate that host households experience more pronounced declines in productivity during high-temperature periods than refugee households.

i) Crop Farming

Farmers in Nyumanzi and Dzaipi/ Arinyapi reported that extreme weather conditions, including drought, excessive heat, heavy rainfall, and floods, have had profound effects on crop farming, fishing, livestock management and other livelihood activities. These challenges impact not only food production but also financial stability, storage and processing capacities, physical and mental health of the farmers, and overall coping strategies.

Several respondents noted the following as the impact of the extreme weather conditions on crop farming.

- Delayed/late planting.
- Increased pest infestations.
- Prolonged dry spells and heat stress have led to reduced crop growth and yields.
- Flooding caused waterlogging, soil erosion and temporary loss of cultivable land

These climatic impacts translated into both direct and indirect losses for the farmers. Including.

- Crop damage,
- Reduced harvest
- Food spoilage contributing to food shortages
- Increased production costs
- Poor roads during floods which increase transportation costs limiting farmer from delivering produce to the markets hence reduced income.
- Increased costs of drought resistant seeds to cope unreliable rainfall.

Requested Support

- Farmers highlighted the need for timely and reliable weather information to guide planting decisions and reduce climate-related risks.
- Access to affordable climate-resilient seeds, pest management support, and basic agricultural tools were also identified as a priority.
- Improving road infrastructure and market access would help reduce transport costs and post-harvest losses.
- Training in climate-adaptive farming practices, including mixed cropping and soil management, was seen as an opportunity to strengthen resilience and sustain crop production under increasingly variable climate conditions.

> *We are forced to carry our produce on our heads to the market which is time consuming and burdensome especially when the products are wet*
>
> *– Refugee Farmer, Nyumanzi settlement*

ii) Unpaid Household labour

Household labour in Nyumanzi settlement is largely unpaid and disproportionately done by women and girls, with tasks such as water collection, cooking, cleaning and caregiving becoming more demanding due to drought, extreme heat and flooding. Climate hazards increase time burdens, physical strain, health risks and exposure to insecurity while reducing opportunities for rest and income generating activities. For more information on the Impact of Climate Hazards on Unpaid Household Labour.[10,11]

iii) Livestock and Animal Husbandry

Livestock keeping is one of the livelihood activities in the area, practiced by 57% of the households. It is practiced more by the host community (71%) and less by the refugees (44%) mainly due to the easy access of land and pasture by the host communities as compared to the refugee community.

- Extreme heat and drought have been reported to cause water scarcity and pasture depletion.
- Farmers have reported animal weight loss, reduced milk production and high livestock mortality rates during drought.
- Herders travel long distances in search for water and grazing, raising living costs and separating families.
- Pasture shortages led to tensions between host and refugee communities.
- Increased diseases such as diarrhoea, foot-and-mouth disease, respiratory infections and tick infestations during heavy rains.

Requested Support

- Respondents highlighted the need for improved water access for livestock and pasture management support as this will reduce on the movement of pastoralists from one place to another in search of pasture and water.
- There is need for veterinary services to prevent and manage climate-related diseases.
- Respondents also emphasized the need for interventions that promote shared resource management between host and refugee communities to reduce conflict and improve livestock sustainability under changing climatic conditions.

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[10] *U-Learn Resource Centre: https://ulearn-uganda.org/u- learn-resource-centre/*

[11] *Resource Centre | Impact: https://www.impact-initiatives.org*

iv) Casual Labour

Casual labour is a livelihood activity done in and around Nyumanzi settlement particularly among refugees, women, and youth who rely on daily wages from physically demanding, outdoor work such as digging, construction, roadwork, and field labour. Climate-related hazards, especially extreme heat, drought, and floods have increasingly undermined the safety and reliability of this livelihood in the following ways.

- Extreme heat has reduced the availability of casual labour opportunities as physically demanding tasks become unsafe or unmanageable during peak temperatures.
- Workers report fatigue, dehydration, dizziness, and heat-related illnesses, forcing late arrival at worksites, early departure, or complete withdrawal from work.
- Flooding is reported to block access to job sites due to muddy and impassable roads.
- Prolonged flooding has forced some workers to temporarily migrate to other locations or suspend work for a certain period.
- Casual labourers have experienced direct income losses due to missed workdays, reduced productivity and suspension of work.
- Increase in transportation costs to and from the workstations due to floods making the roads impassable.

Requested Support

- Provision of protective gear (hats, umbrellas, raincoats, gumboots) to reduce exposure to heat and flooding.
- Improve access to clean water through boreholes, water points, and storage containers to support hygiene and hydration during droughts.
- Support adaptive work conditions, including flexible hours, shaded rest areas, water points, and temporary shelters at worksites.
- Expand skills training and livelihood diversification into less climate-sensitive activities (e.g. tailoring, salon work, technical trades) to strengthen long-term resilience.

v) Small Business

Extreme weather in Nyumanzi settlement and surrounding areas disrupts market supply chains, damages infrastructure, and affects vendors' health, leading to missed market days, reduced operating hours, and income losses. Seasonal shocks drive price volatility, scarcity and high transport costs raise prices during dry spells, while floods and extreme heat reduce customer access and demand, further constraining vendors' livelihoods. For more information on the impact of climate hazards on small business and markets. [12,13]

vi) Fishing and Aquatic Resources

Fishing is a limited livelihood activity in and around Nyumanzi settlement reported by 5% of the host community members and 3% of the refugees, despite low level of participation, climate related hazards have directly affected fishing activities and the households that depend on it.

Extreme weather events, particularly flooding, heavy rainfall, and extreme heat, have changed the water conditions in rivers and streams. Floods increase water contamination and turbidity, while extreme heat raises water temperatures, affecting fish behaviour and survival. Strong currents during heavy rains and floods have also increased risks for fishermen operating in these water bodies.

- Lower catches and reduced species diversity have been linked to flooding which contaminates the rivers and streams with waste and sediments leading to fish mortality.
- High temperatures during drought cause water levels to drop forcing the fish to hide in mud or die, which reduces supply chains and contributes to higher fish prices in local markets.
- Boat losses, accidents, and drowning incidents increase during periods of heavy rains and flooding which makes fishing a dangerous activity.
- Heavy rains/winds damage fishing nets, boats and gears leading to more frequent repairs and higher maintenance costs for fishing equipment.
- Temporary improvements in fishing during the rainy season was reported when moderate rainfall replenished the water bodies, increasing the fish availability.

Requested Support

- Fishermen identified the need for early warning information on floods and extreme weather to reduce safety risks.
- Support with durable fishing equipment, safer access points to rivers, and basic protective gear to reduce losses and accidents during extreme weather conditions.
- Water quality monitoring and environmental protection measures were also highlighted as opportunities to sustain fish stocks and protect livelihoods for the small number of households reliant on fishing.

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[12] *U-Learn Resource Centre: https://ulearn-uganda.org/u-learn-resource-centre/*

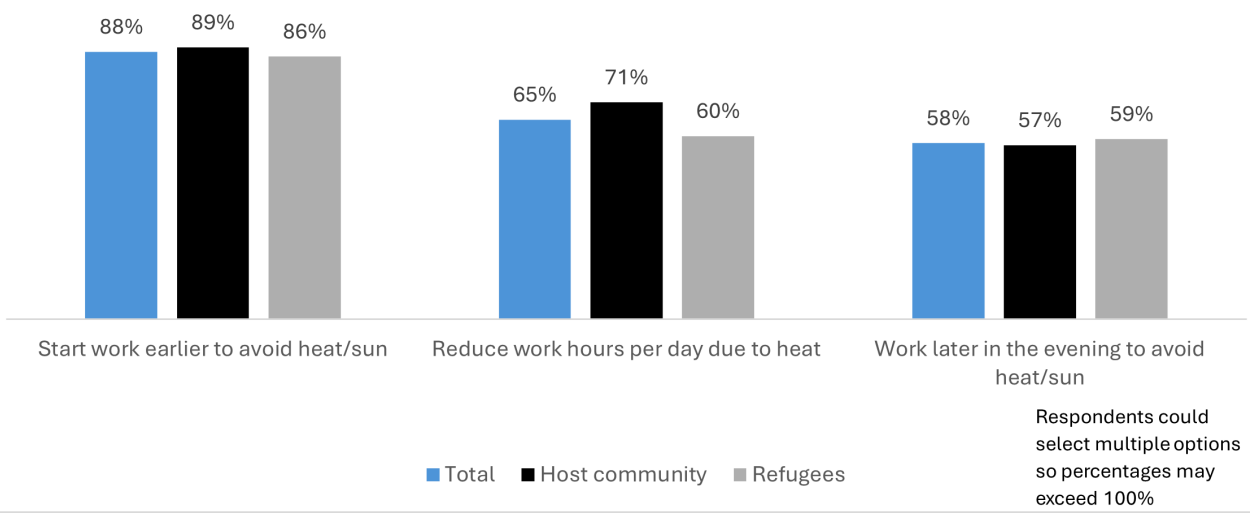
[13] *Resource Centre | Impact: https://www.impact-initiatives.org*

SECTION 3:

Community Responses

Amidst the increasing impacts of extreme weather in and around Nyumanzi settlement, both host and refugee communities have adopted similar coping strategies, particularly in response to extreme heat. A large proportion of respondents reported adjusting their work schedules to reduce heat exposure, with 89% of host community members and 86% of refugees starting work earlier than usual. In addition, 71% of host community members and 60% of refugees reduced the number of hours worked per day, while 57% of host community members and 59% of refugees shifted work to later evening hours. These parallel adaptations highlight that extreme heat is affecting both populations in comparable ways, disrupting daily routines and constraining productivity across communities.

Reported impacts of heat on work hours in the past 12 months in/around Nyumanzi settlement, by % of the population. N-869



Respondents could select multiple options so percentages may exceed 100%

Recommendations

- **Promote improved irrigation systems**, drought-resistant crops and livestock breed and veterinary care for heat related diseases.
- **Expand access to cold storage and better transport systems** to reduce spoilage of perishable goods and improve facilities for agricultural products.
- **Provide skill-building programs** in tailoring, soap-making, and hairdressing, as well as small-scale business development to create financial resilience.
- **Disaster Preparedness & Early Warning Systems:** Strengthen flood and hazard early warning systems, emergency relocation plans, and community awareness campaigns on disaster response through accessible channels.
- **Policy Advocacy & Government Engagement:** Support stronger climate adaptation, water, sanitation, and disaster risk reduction policies through active community involvement.
- **Strengthen extension support:** Expand agricultural extension services to help farmers plan and adapt to changing weather conditions.
- **Offer climate-smart agriculture training:** Support farmers with skills in mixed farming and other resilient farming practices.
- **Increase access to basic farming tools:** Supply essential tools (hoes, pangas, watering cans) and protective gear such as raincoats and gumboots.

> *"Support should be provided in the form of business capital as majority of the vendors are small business owners and are always affected by climate hazards".*
>
> – Market vendor in Nyumanzi settlement

For more information: https://ulearn-uganda.org/living-with-climate-related-hazards-impacts-and-community-responses-among-refugees-and-hosts-in-nyumanzi-settlement-adjumani-uganda/