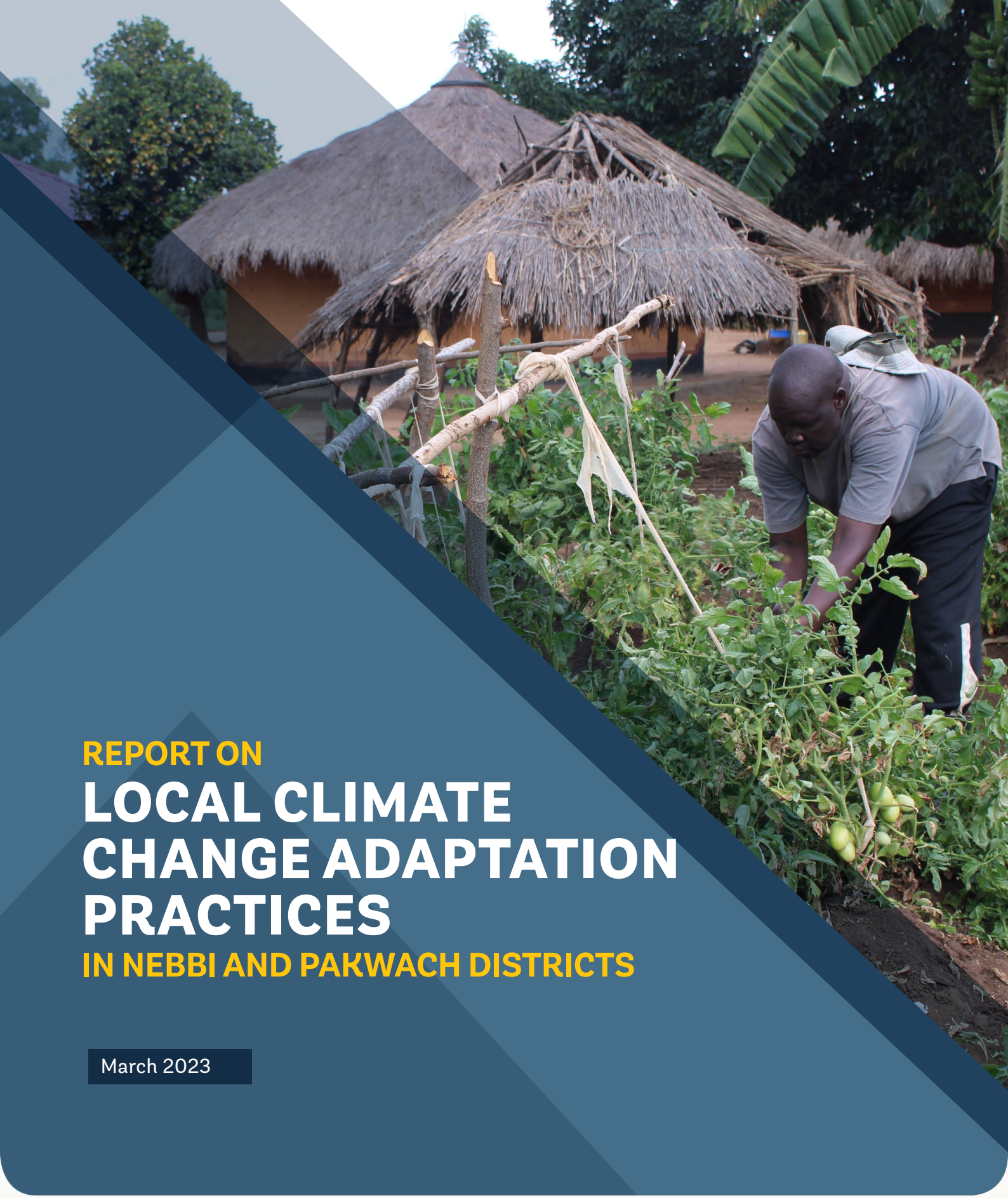

REPORT ON

LOCAL CLIMATE CHANGE ADAPTATION PRACTICES

IN NEBBI AND PAKWACH DISTRICTS

March 2023

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ACRONYMS

AFARD	Agency for Accelerated Rural Development
Abi ZARDI	Abi Zonal Agricultural Research and Development Institute
AFCE	Agency for Community Empowerment
AMREF	African Medical and Research Foundation
AVSI	International Service Volunteers Association
BMZ	German Federal Ministry for Economic Cooperation and Development
CAM	Climate Action Model
CAO	Chief Administrative Officer
CCA	Climate Change Adaptation
CCD	Climate Change Department
CMSS	Community Managed Seed Security Model
CREAM	Climate Resilient Agro-Ecosystems Model
CSCGs	Climate Smart Champion Groups
CSOs	Civil Society Organisations
CUWEDE	Community Uplift and Welfare Development
DAO	District Agricultural Officer
DCDO	District Community Development Officer
DEO	District Environment Officer
DFO	District Forest Officer
DHO	District Health Officer
FGDs	Focus Group Discussions
GALS	Gender Action Learning Systems
GBV	Gender Based Violence
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
JEEP	Joint Energy and Environment Projects
LDCs	Least Developed Countries
LRA	Lord's Resistance Army (LRA)
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
NAPAs	National Adaptation Programmes of Action
NAPs	National Adaptation Plans
NDCs	Nationally Determined Contributions
ND-GAIN	Notre Dame Global Adaptation Initiative
NURI	Northern Uganda Resilience Initiative
PME	Participatory Mapping Exercise
SHECs	Social Health and Environment Clubs
SRHR	Sexual and Reproductive Health and Rights
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children's Emergency Fund
UNISDR	United Nations Office for Disaster Risk Reduction
VHTs	Village Health Teams
VLSAs	Village savings and Loans' Associations
WHO	World Health Organization

DEFINITION OF KEY TERMS

Adaptation: This is the process of adjusting to actual or expected climate change and its effects, in order to moderate harm or exploit beneficial opportunities. (IPCC, 2012)

Climate change: It is a change of climate which is attributed directly or indirectly to human activity that alters the composition of global atmosphere and which is in addition to other natural climate variability that has been observed over comparable time periods. (UNFCCC, 1992)

Disaster: It is a serious disruption of functioning of a community or society involving widespread human, material, economic or environmental losses and impacts which exceed the ability of the affected community or society to cope with its own resources. (UNISDR, 2009).

Disaster Displacement: This refers to a situation where people are forced or obliged to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of disasters triggered by natural hazards. Such displacements can occur within a country, or across international borders.

Disaster risk reduction: Is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).

Displacement: This is forced removal of a person from his or her home or country, often due to armed conflict or natural disasters (IOM, 2011).

Early warning system: This refers to a set of capabilities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately in order to reduce the possibility of harm or loss (IOM, 2014)

Environmental change: These are changes in the physical and biogeochemical environment over a large scale, either caused naturally or influenced by human activities (Foresight, 2011).

Hazard: This is a dangerous phenomenon, substance, human, activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009). A natural hazard is a natural process that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental damage (UNISDR, 2009)

Migration: This is the movement of a person or a group of persons, either across an international border or within a state regardless of length, composition and causes. It includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification (IOM, 2011). Migration can be voluntary or involuntary (forced; it can also be temporary or permanent. Examples of temporary migration include seasonal migration, circular migration, transhumance and some labor migrations.

Nexus: This refers to a connection, relationship or linkages between things. A set of critical interlinkages between the different natural resources (Bleischwitz& Miedzinski, 2018).

Participatory mapping Exercise (PME): These are means through which researchers engage key informants through group discussions to gather information about resources, special sites and local perceptions within a shared geographical or spatial framework (Newing, 2010).

Seasonal migration: This refers to moving of each season and/or in response to labour, environmental and/or climate conditions.

Environmental Shock: Environmental shocks are unpredictable exogenous changes in the environment (including climate) that threaten livelihoods or welfare of a society or community.

Stress: This is an overwhelming situation arising from unmanageable pressures. Environmental stress is negative, subjective, psychological response to an environmental stimulus (Gatersleben& Grffin, 2017a). Stress occurs when demands of a physical environment outweigh an individuals' ability to deal with such demands.

Surveillance: This is the monitoring of behavior, activities or information for purposes of information gathering, influencing, managing or directing.

EXECUTIVE SUMMARY

Uganda is already experiencing the impacts of climate change exhibited in increase in temperatures, reduced precipitation, increase in the frequency and intensity of droughts and floods among other related calamities. Climate change is affecting agriculture, water resources, forestry resources, land and ultimately the community livelihoods. West Nile sub region too is very vulnerable to climate change and its effects due to the low adaptive capacity of smallholder farmers who form majority of the population thus further compounding household poverty, food insecurity and poor health among other challenges.

The Agency for Accelerated Regional Development (AFARD), in partnership with AWO International secured funds from the German Federal Ministry for Economic Cooperation and Development (BMZ) towards implementation of a 3½ years Climate Action Model Village (CAM) project. This project is intended to increase resilience of farmers in Nebbi and Pakwach Districts to climate change shocks.

AFARD commissioned a study on Local Climate Change Adaptation practices in the project area to inform and mainstream its interventions on climate change for local communities. The purpose of this study was to assess the traditional climate change mitigation and adaptation practices in the project area. The study was conducted using mainly qualitative research methods including review of secondary literature and a field mission that discussed the topic with stakeholders and local communities using Key Informant Interviews, Focus Group Discussions and Community Meetings. Participatory assessment tools such as historical climate trends and timeline analysis, resource mapping and vulnerability assessment, and impact hazard mapping and copping assessment were used to collect information on climate change hazards and response in the project areas of Nyaravur (Pakwach District) and Alwi (Nebbi district).

The study focused on answering five key questions, namely;

a) When (timelines) did the project target groups experience climate change in their communities? In what form and intensity did such adverse events occur?

b) What local knowledge and practices did they effectively use during these periods to mitigate and adapt to climate change while ensuring food security, income security, community health, and environment conservation and biodiversity conservation?

c) Which approaches failed or caused damage?

d) How can the CAM project replicate such proven climate adaptation and mitigation knowledge and practices to ensure locally-owned climate resilient actions in direct implementation of its Climate Action Model Village Approach and which stakeholders need to be involved?

e) How can the study findings enable the CAM approach to be adapted to fully integrate the cross-cutting issues: a) gender equality, b) sexual and reproductive health and rights (SRHR), c) inclusion (including but not limited to persons with disabilities), d) COVID-19, e) Knowledge Management and Advocacy, and f) Disaster Risk Reduction?

The study was conducted in two sub-counties of Alwi and Nyaravur. The survey was concentrated in 2 villages in Acutugeno in Alwi sub county and Acibu A in Nyaravur sub county. The study also engaged other key actors such as the district local government officials from health, production and natural resources departments, civil society actors (NGOS), academia and officials from the Ministry of Agriculture and Ministry of Water and environment-Climate Change Department.

The Agency for Accelerated Regional Development (AFARD), in partnership with AWO International secured funds from the German Federal Ministry for Economic Cooperation and Development (BMZ) towards implementation of a 3½ years Climate Action Model Village (CAM) project. This project is intended to increase resilience of farmers in Nebbi and Pakwach Districts to climate change shocks.

From the study findings, it was evident that:

- Climate change is already happening in the project area. Droughts, rising temperatures and floods and pests and diseases were reported to be already having devastating effects on food production and are continuously frustrating smallholder farmers. According to study responses, the first incidents of extreme climate events such as drought were reported in early 1980's, 1988, 1995/96, 2008/9, 2012, 2017, 2020/21 while the floods were reported to have happened around 1985, 2004, 2007, and 2011, 2019, 2020, 2021 and 2022. There are also increased incidents of pests and diseases for crops, malaria infections are increasing, occurrence of devastating thunderstorms, strong winds, among others. The frequency and intensity of these hazards was reported to have gone up after 2010 and further worsened from 2019 to 2022.
- The project areas are now experiencing shorter and more erratic rainy seasons, according to the timeline analysis and from the discussions with the elderly. The seasons have also been altered, rainy seasons are shorter and more intense, yet they used to be longer and moderate. Planting periods were reported to be shorter happening at the beggining of March, and again in July. The food scarcity period is reportedly longer than it was 25 years ago by about a month, it stretches from early March to June, the period soon after the first planting season. There is also an increase in pest and disease prevalence for crops and livestock. The fruiting period for most fruit trees has also reduced. These changes have led to crop failure and low yields, famine, water shortage, loss of livestock diseases, settlement displacement, loss of property and loss of lives which have devastated these agrarian based communities.
- Communities have over time adopted a number of adaptation, coping and mitigation practices. These practices are mostly based on local indegenous knowledge and some have been localised from previous interventions by both state and non state actors. Some of the identified local adaptation practices include the use of energy saving cookstoves, mixed farming involving crops such as sorghum, cassava, millet, legumes and small livestock such as goats, sheep, poultry and apiary, agroforestry, tree planting (woodlots), agroforestry, water harvesting techniques such as dams and water pans, soil and water conservation techniques such as mulching, micro irrigation especially for vegetable gardens, early land preparation and planting, planting fast maturing and drought tolerant crop varieties such as cassava (NASE 14, 19 and TME 204) sorghum (Epurpur, NAROSORG 3&4) among others.
- Whereas some of local climate response measures were effective, some were inefective and can be regarded as mal-adaptation, as they had negative effects to livelihoods and ecosystem health. These included; land rotation during flooding seasons that were causing land conflicts, cultivating wetlands, digging trenches within the gardens to counter floods without following the gradient leading to further soil erosion, planting eucalyptus to drain water from the lowlands and using local rituals to divert lightening and storms.

The CAM project can replicate the proven adaptation and mitigation knowledge and practices through strengthening of local structures and effectively engaging them through to address the identified climate risks and vulnerabilities through capacity building and exposure, support towards local livelihoods diversification, demonstration of best locally appropriate climate resilient agroecological practices and advocacy towards influencing Nebbi and Pakwach District Local Goverments to plan and undertake interventions for building community resilience to climate change. The identified stakeholders should be proactively engaged to ensure synergies and avoid duplication of efforts for more effective implementation. A collective vision for the target communities and all relevant stakeholders will be key to enable collective action for the realisation of the Climate Action Model Village.

Furthermore, the study findings revealed several cross-cutting socio-cultural issues such as gender inequality, sexual and reproductive health and rights, inclusion special groups such as People With Disabilities (PWDs), COVID 19, knowledge management and disaster risk reduction among others that underpin the vulnerability and low adaptive capacity at different scales. The project should systematically ensure proper analysis of all planned activities for CAM to ensure that they are responsive to the different cross cutting issues. Establishment of a multi-disciplinary task team that periodically reviews project interventions using a pre-determined checklist to assess compliance/responsiveness of different interventions to all cross cutting issues is recommended. Participatory tools such as Gender Action Learning Systems (GALS) should be promoted

throughout the project implementation.

In conclusion, it was evident from the study that much as there is generally low adaptive capacity of targeted communities to effectively respond to the current and foreseen climate change impacts, however, there are available local climate change adaptation and mitigation practices that have been proven effective by local communities and can be leveraged on by the CAM project. These can be further improved through capacity building and introduction of additional locally appropriate (cost effective and socially appropriate) adaptation practices with mitigation co-benefits. Some of the additional interventions to be considered include; strengthening management systems to enhance use of good quality improved and locally adapted indigenous seeds; promoting farmer managed natural regeneration to restore degraded landscapes; promote improved water harvesting and micro irrigation technologies; soil and water conservation techniques such as composting, contour farming, cover cropping and mulching among others; off-farm enterprise diversification including apiary, bulking, value addition and village savings and loans associations/cooperatives among others. The project should also place strong emphasis on addressing social issues affecting adaptive capacity for men and women such as domestic violence and sexual and reproductive health. Use of gender transformative household methdologies such the Gender Action Learning Systems can empower men and women to unearth and systemically address socially constructed barriers that underpin the social injustices. The study further recommends that the project draws a collective vision for the CAM village and effectively support the project team to actively engage and empower the local community structures to achieve this vision with reference to aspects identified in this study.

CONSULTANT PROFILE

Mr. Joshua Aijuka is an Agroecologist by profession and practice with over 14 years of working experience in the field of agroecology, climate resilience (spearheaded the development of the Climate Resilient Agroecosystems Model- CRAEM), farmer managed seed systems (spearheaded development of Community Managed Seed Security Model -CMSS), gender justice (Gender Action Learning Systems- GALS champion), project management and monitoring and evaluation. He has undertaken several studies including those on climate change, youth engagement, natural resources management and engaged in policy drives such as organic agriculture, agroecology strategy development, tree planting campaigns and advocating for farmers rights to seeds and other production resources. The consultant takes personal and full responsibility for the report.

1. INTRODUCTION

1.1 Background

Uganda is already experiencing the impacts of climate change considering the occurrences of natural disasters and extreme weather patterns. Average temperatures have increased by 1.3°C since the 1960s, minimum temperatures have increased by 0.5–1.2°C in this period with maximum temperatures increasing by 0.6–0.9°C[1]. The number of cold days decreased by 20 days in that period and precipitation also reduced. The average temperatures recorded since 1960's show significantly increasing trends in the number of hot days with the rate of decrease most rapid in the September, October, November season[2]. Uganda has also experienced a statistically significant reduction in annual as well as seasonal rainfall[3].

As a result, the country is experiencing an increase in the frequency and intensity of droughts and floods. Worse still, the percentage of rainfall coming the form of heavy precipitation events is anticipated to increase, which would escalate the risk of disasters weather related disasters including landslides. Indirect impacts may result from expanded ranges of vector-borne diseases and parasites. Water resources, forestry resources, land and community livelihoods are also increasingly strained due to climate change. While it is projected that precipitation will increase in some parts of the country, warmer temperatures will accelerate the rate of evapotranspiration, thus reducing the benefits of increased rainfall. With more frequent and severe droughts, leading to negative impacts on water supply, biodiversity, and hydropower generation. A potential simultaneous increase in floods poses a serious water pollution threat. Climate change has already affected the health of wetland and forest ecosystems, which provide critical ecosystem services for communities in Uganda[4].

The major sectors that are most vulnerable and have already been affected include; agriculture, health, water resources, wetlands, and forests. Temperature rises and an increase in the frequency and intensity of extreme droughts and floods has already led to reduced crop yields and caused a loss in livestock population and livestock products across the country, and these have had important implications for food security. Climate changes have also led to direct and indirect health impacts such as increase in disease in children due to malnutrition, and other diseases due to favorable climate for pathogens.

As for agriculture in particular, temperature fluctuations and erratic rainfall patterns have seen an increase in soil erosion and increased growing difficulties for many crops as well as shortened growing seasons leading to crop failure. These scenarios have also influenced the occurrence and distribution of pests[5]. Rising temperatures are expected to increase suitable conditions for crop diseases and pest infestations such as fungal and viral diseases in bananas and beans, aflatoxin in maize and coffee. Erratic rainfall has led to the increase in post-harvest storage risks as well as impacts on crops needing to be dried in the sun such as maize, beans, coffee and rice. Farmers are continuously faced with a challenge to devise mechanisms of adaptation and resilience to change in weather.

According to United Nations Framework Convention on Climate Change (UNFCCC), Least Developed Countries (LDCs) are the most vulnerable states to the adverse effects of climate change[6]. The Notre Dame Global Adaptation Initiative (ND-GAIN) Index ranks Uganda as the 170th country on the least vulnerability Index and 160th on the most-ready index to adapt to climate change, of the countries it covered for 2015[7]. Communities

1. The World Bank Group (2020). Uganda Climate Risk Profile.URL: https://climateknowledgeportal.worldbank.org/sites/default/files/2020-06/15464-WB_Uganda%20Country%20Profile-WEB_v1.pdf

2. Uganda Climate Vulnerability Profile. uganda_climate_vulnerability_profile_jan2013.pdf (climatelinks.org)

3. Adaptation Partnership, 2011. Review of Current and Planned Adaptation Action: East Africa. URL: https://www.cakex.org/sites/default/files/documents/East_Africa_Adaptation_Action.pdf

4. Ministry of Water and Environment (2014). Uganda Second National Communication to the United Nations Framework Convention on Climate Change. URL: https://unfccc.int/resource/docs/natc/uganc2.pdf

5. The Skendži´c, S.; Zovko, M.; Živkovi´c, I.P.; Leši´c, V.; Lemi´c, D. 2021. The Impact of Climate Change on Agricultural Insect Pests. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8150874/pdf/insects-12-00440.pdf

6. Progress of Implementation of the National Adaptation programs of Action (NAPA) for Uganda 2015. https://www.researchgate.net/publication/309398917_Progress_of_Implementation_of_the_National_Adaptation_programs_of_Action_NAPA_for_Uganda_2015

7. University of Notre Dame Global Adaptation Index Country Index Technical Report Chen, C.; Noble, I.; Hellmann, J.; Coffee, J.; Murillo, M.; Chawla, N. Release date: November, 2015. https://gain.nd.edu/assets/254377/nd_gain_technical_document_2015.pdf

in Uganda need adaptation options that consider the sensitivity of the agricultural sector to the climate and the high reliance of this sector on rain-fed agriculture and irrigation have important implications for Uganda[8]. Government has already devised response plans through the National Adaptation Programmes of Action and the updated Nationally Determined Contributions (NDCs) which list several plausible interventions to climate change for national level resilience and mitigation action[9]. Furthermore, the Uganda Green Growth Development Strategy 2017/18-2030/31 focuses on investments in agriculture, natural capital management, green cities (urban development), transport and energy so that there is income and livelihoods enhancement, decent green jobs, climate change adaptation and mitigation, sustainable environment and natural resources management, food and nutrition security, resource use efficiency, social inclusiveness and economic transformation. Some of these interventions are already being piloted/ implemented in different parts of the country.

The West Nile sub region experiences prevalent and pronounced lack of climate change resilience and food insecurity yet most of the households in the sub region are predominantly agrarian. Studies for understanding farmers adaptation on climatic issues are also rather scarce[10]. The September 2022 Afro barometer study[11] shows that weather patterns have changed as 57% of the respondents in Uganda (and 62% in West Nile) reported that drought and floods have become more severe in the last 10 years and 59% noted that government is doing a poor job in addressing climate change.The focus on building climate resilience is aimed at bringing together interventions that ensures low greenhouse gas (GHG) emission (mitigation) and those that reduce the negative effects of climate change (adaptation) for an inclusive and sustainable development[12].

Recent studies conducted by the Ministry of Water and Environment (Nyarwodho micro catchment management plan) with support of the Danish Embassy in Uganda's Northern Uganda Resilience Initiative (NURI) programme and AWO International (Feasibility study for BENGO project) with support from BMZ, it was noted that "the Greater Nebbi districts are experiencing the worst form of climate change with gross disruptions of the livelihoods of the population as well as negative coping mechanisms that will only continue to exacerbate the situation further." Some cultural leaders intimated that since the 1979 Amin war, rinderpest epidemic in 1980s, and the 1986 Lord's Resistance Army (LRA) war that together reduced the household income streams and forced almost all families to crop farming, the population has become economically vulnerable. With rising population, land fragmentation increased thereby lowering crop yields. During community consultation for this project, the smallholder farmers noted that the more pronounced weather variability set in from 1991 to date. They also pointed out that there are no longer two rainy seasons but one season that oscillates unpredictably between March to July in one year and August to November in another year. An elder said, "now, no one knows when it will rain enough to have a harvest." The rising duration of prolonged drought is also often faced with a short period of heavy rainfalls typically characterized

8. The National Adaptation Plan for the Agriculture Sector in Uganda. 2019 https://www.agriculture.go.ug/wp-content/uploads/2019/09/National-Adaptation-Plan-for-the-Agriculture-Sector-1.pdf

9. Uganda Green Growth Development Strategy 2017/18-2030/31. https://www.ndcs.undp.org/content/dam/LECB/docs/pubs-reports/undp-ndc-sp-uganda-ggds-green-growth-dev-strategy-20171204.pdf

10. Nampereza P. 2021. Farmers' perception and adaptation to climate change in west Nile sub region of Uganda. Undergraduate Dissertation. Makerere University Kampala

11. https://www.afrobarometer.org/wp-content/uploads/2022/09/AD547-Ugandans-want-action-on-climate-change-Afrobarometer-dispatch_4sept22.pdf

12. (USAID)Working Paper on Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems. URL:https://www.usaid.gov/sites/default/files/2022-12/Systemic-Solutions-for-Climate-Change-Adaptation-and-Mitigation-WORKING-PAPER-Oct-2022.pdf; Strengthening adaptation-mitigation linkages for a low-carbon, climate-resilient future. URL: https://www.oecd-ilibrary.org/deliver/6d79ff6a-en.pdf?itemId=%2Fcontent%2Fpaper%2F6d79ff6a-en&mimeType=pdf

by floods, hailstorm, and strong destructive winds that all destroy crops, trees, and housing units making life deplorable and any environmental conservation initiative "a daring act" as poor people ask, "must we or the trees die from this climate change that has made us unable to feed our families?

The deplorable results of this situation include widespread Food and nutrition insecurity. According to a study by EPRC, University of Cardiff and UNICEF (2018), about 48% of children are food deprived[13] as households eat two meals a day during the reliable season and only one meal a day in the lean period. And the typical meal is cassava flour bread with beans that is too insufficient in both quality and quantity (<3,000Kcal) for a productive living. Secondly, the extreme poverty level is estimated at above twice the national average of 21%;[14] Secondary data shows that between 2015 to 2019, 14% of the households moved out of poverty, 17% slipped back and 24% were chronically poor[15]. This means that the region may only catch up with the rest of Uganda over 30 years[16]. In addition, environmental (and biodiversity) degradation is at its peak. A recent study estimated that between 2016 and 2019, West Nile region lost 2,650 km2 of savannah grassland and 434 km2 of tree cover[17]. This has manifested in increased adverse incidences of crop pests and diseases; livestock parasites; human diseases; and loss of soil fertility. The high pressure on natural resources resulted into enormous environmental degradation (only 3.3% of the land is now forested; wetlands are encroached, forests and water catchments are degraded). Without action, it is estimated that temperature will continue to rise by 2 - 2.5oC and rainfall decline by 20% with gross negative impacts on agriculture, water, infrastructure, and energy sectors worth an annual 2-4% decline in GDP or US$ 3.2 – 5.9 billion[18].

However, several stakeholders are now taking action to support communities to adapt. The Agency for Accelerated Regional Development (AFARD), in partnership with AWO International secured funds from the German Federal Ministry for Economic Cooperation and Development (BMZ) towards implementation of a 3.5-year Climate Action Model Village (CAM)project. This project is intended to increase resilience of farmers in Nebbi and Pakwach Districts to climate change shocks.

The CAM Project will directly target 3,190 people of whom 60% will be female and at least 10% individuals with special needs, about 15% will be younger than 14 and about 80% will be poor or extremely poor. The project intends to empower the population of at least ten villages in Nyaravur and Alwi sub-counties to transform their villages into Climate Active Model Villages through the establishment of 15 Climate Smart Champion Groups (CSCGs), 05 School Health and Environment Club (SHEC) and capacity development of the established civil society structures on sustainable and resilient agricultural intensification, income generation and management, gender equality, Sexual and Reproductive Health and Rights(SRHR), preventive public health, environmental conservation, biodiversity and climate change mitigation. A cooperative will also be formed with members from at least 06 CSCGs to drive inclusive and sustainable value-added market participation.

13. EPRC, University of Cardiff, and UNICEF Uganda (2018) Child Poverty and Deprivations in Refugee Hosting Areas: Evidence from Uganda 2018. Kampala: UNICEF Uganda.

14. UBOS (2019) Statistical Abstract 2019. Kampala

15. http://library.health.go.ug/sites/default/files/resources/UBOS%20Statistical%20Abstract%202020.pdf

16. Oxford Policy Management (2014) Northern Uganda Economic Recovery Assessment.

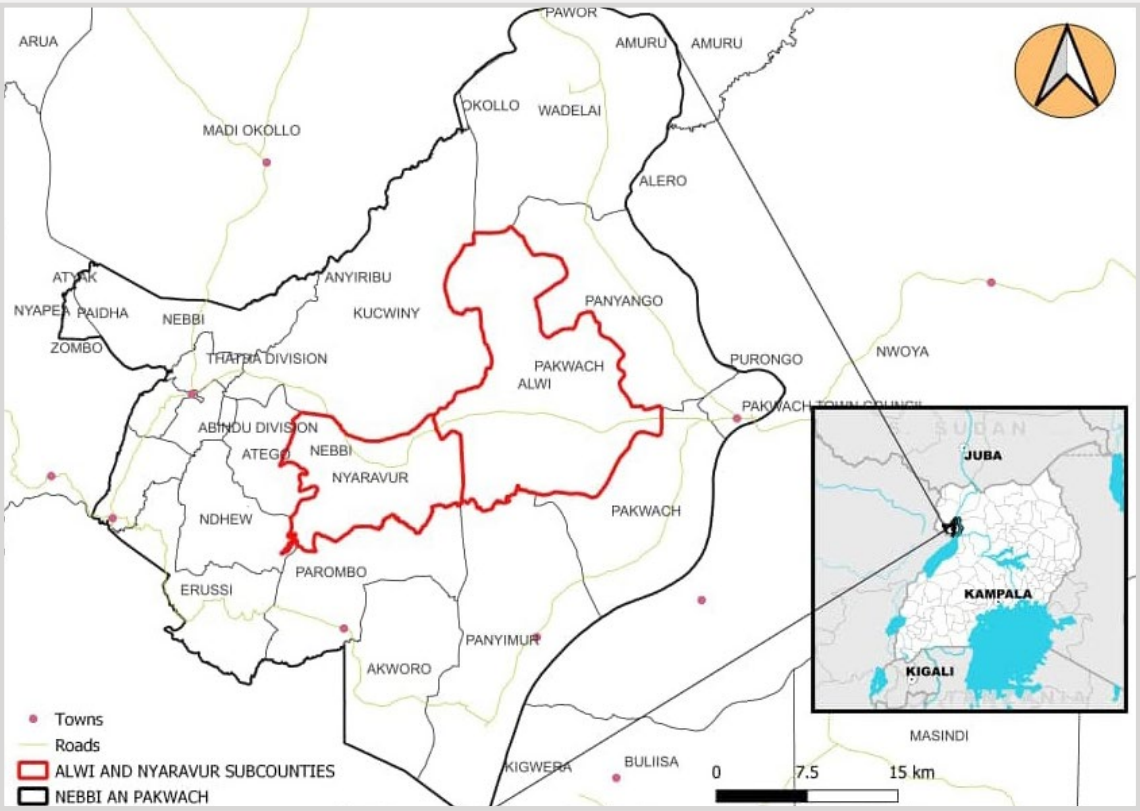
17. Barasa, B., Mwiru, A., Turyabanawe, L., Nabalegwa, W.M, and Ssentongo, B. (2020) The Impact of refugee settlements on land use changes and vegetation degradation in West Nile sub-region, Uganda. Geocarto International. DOI: 10.1080/10106049.2019.1704073

18. Irish Aid (2017) Uganda Climate Action Report for 2016.

1.2 Purpose And Scope Of The Study

The current status of people in Nebbi and Pakwach districts is characterized by extreme poverty and a high dependence on traditional subsistence agriculture that is highly susceptible to climate change. The high pressure on natural resources has resulted in enormous environmental degradation (only 3.3% of the land is still forested). The CAM project therefore seeks to strengthen the resilience of communities in Nebbi and Pakwach in regards to climate change, health and livelihoods. To do so in a locally-sensitive manner, the project commissioned this micro-level study to assess the local climate change mitigation and adaption practices in the project area. The findings of the study are to provide AFARD and AWO International with relevant information on the existing and effective local mitigation and adaptation practices that should be integrated in capacity building of the targeted community structures (CSCGs, SHECs, cooperative).

Figure 1: Map of Nebbi District with her old boundaries including Alwi and Nyaravur Sub counties



Nebbi district located in the West Nile sub region of Uganda. It is bordered by Arua district to the north, Zombo to the northwest, DRC to the southwest and Pakwach to the south–east. Nebbi district has a total area of about 985.00 Sq. Kilometres and average population density of 296.1. Nebbi district has population of 238,757 (114, 732 males, 124,025 females) people (UBOS, 2014). There are 8 sub counties in the district including Akworo, Nyaravur, Kucwiny, Ndhew, Atego, Nebbi, Erussi, Parombo. Whereas Pakwach is bordered by Nebbi district in the West, Nwoya and Amuru districts in the East, Democratic Republic of Congo (DRC) in the South West, Arua in the North West and Buliisa to the South. Pakwach has 5 sub counties including Alwi, Pakwach, Pakwach TC, Panyango, Wadelai

According to the 2014 Uganda Population and Housing Census, Pakwach is estimated to have a population of 158, 037, with more females (51.7%) than males (48.3%).

Literacy levels are low in both districts, in Pakwach 30% of persons aged 18 – 30 years were illiterate as well as 61.5% of those above the age of 60. Whereas in Nebbi 22% of male aged 18 and above were illiterate while their female counterparts Male aged 18 years and above who are were 22.4% in 2014 whereas their Female counterparts were 56.6% (UBOS Census 2014). Both districts have over 80% households that depend on subsistence farming.

The project is focusing on two sub-counties of Alwi and Nyaravur, and for each sub-county, 5 villages were sampled for the survey. The study was conducted basing in 2 villages of Acutugeno in Alwi sub county and Acibu in Nyaravur sub country. These are the areas where physical interactions with the representative community stakeholders in project villages took place. There was also specific interest in local government stakeholders such as production department, natural resource department and health department and national level stakeholders such as Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and Ministry of Water and Environment (MWE), Climate Change Department (CCD). Other stakeholders such academia and local civil society organisations were also engaged.

The study was guided by the questions below:

- When (timelines) did the project target groups experience climate change in their communities? In what form and intensity did such adverse events occur?
- What local knowledge and practices did they effectively use during these periods to mitigate and adapt to climate change while ensuring food security, income security, community health, and environment conservation and biodiversity conservation?
- Which approaches failed or caused damage?
- How can the CAM project replicate such proven climate adaptation and mitigation knowledge and practices to ensure locally-owned climate resilient actions in direct implementation of its Climate Action Model Village Approach and which stakeholders need to be involved?
- How can the study findings enable the CAM approach to be adapted to fully integrate the cross-cutting issues: a) gender equality, b) sexual and reproductive health and rights (SRHR), c) inclusion (including but not limited to persons with disabilities), d) COVID-19, e) Knowledge Management and Advocacy, and f) Disaster Risk Reduction?

2. APPROACH AND METHODS

2.1 Approach

The general approach to the assignment was based on two main principles defined in 2.1.1 and 2.1.2 below.

2.1.1 Effective stakeholder engagement

The study involved both state and non-state actors, including local governments technical and non-technical staff, non-governmental organisations, farmer groups at the lowest level, Local Council Leaders, farmers, religious leaders, People with Disabilities (PWDs), the elderly, the youth, women and the Ministry of Water and Environment, Climate Change Department staff, Ministry of Agriculture Animal Industry and Fisheries, academia and local civil society organisations. The choice of sample audience was to enable the team generate robust information on the community mitigation and adaptation practices as well as the underlying social, cultural, technological, economic and political factors influencing the adoption (or non-adoption) of the practices.

2.1.2 Strong technical oversight and quality assurance

Quality control approaches were employed to ensure validity and reliability of content, whose recommendations can be relied upon. At the inception stage, consultations were made with the client to ensure comprehensiveness in understanding the task. The tools for data and information collection were pretested and adjusted during a pre-study entry meeting with the client. At each engagement a team of at least 4 and up to 7 people was deployed to help pick information on the study and to support the supervision. Local Research Assistants were recruited for effective communication and to that on the ground data and information collection is accurate. Data cleaning, editing, and verification were conducted. Daily debriefs and a study exit meeting were also conducted to help bring out key issues on the study to staff and to effectively support the consulting team.

2.2 Methods

The consultant employed mainly qualitative research methods to conduct the study. Data collection was mainly through primary and secondary sources. The primary data was gathered through organized discussion and interviews of selected community representatives, key informants from relevant Local Governments, cultural, religious and opinion leaders and elders in the project area, representatives of civil society organizations within the project areas, and ministry officials from Ministry of agriculture and the Climate Change Department staff. The secondary sources were mainly review of literature especially the online document reviews, relevant government policies, UNFCCC documents and other institutional documentation that relate to climate change adaptation and mitigation. Detailed steps on how these were done are hereunder.

2.2.1 Preliminary Discussions with the Client

Discussions with the project team at AFARD and AWO International Uganda Country Office were conducted to further understand the task and terms of the work, the team also provided relevant document briefs for the consultant's reference.

2.2.2 Literature review – Desk reviews

Literature focusing on climate change, livelihoods and agriculture in Uganda in general, West Nile region (Nebbi and Pakwach districts in particular) was reviewed. Literature was mainly got from online sources, from government websites, FAO and UNDP websites as well

The primary data was gathered through organized discussion and interviews of selected community representatives, key informants from relevant Local Governments, cultural, religious and opinion leaders and elders in the project area, representatives of civil society organizations within the project areas, and ministry officials from Ministry of agriculture and the Climate Change Department staff.

as Research Gate on climate change adaptation options in the country, around the region (West Nile) and the specific project areas. The team also reviewed the National Climate Change Policy (2015), the National Adaptation Programme of Action, the updated Nationally Determined Contributions (NDCs), National Adaptation Plan for Agriculture (NAP-Ag), Agriculture sector Strategic Plan and 3rd National Development Plan (Vision 2040) among other documents.

2.2.3 Key Informant interviews

In-depth interviews with 22 respondents were conducted. The respondents included District Local Government technical staff (CAO, DFO, DHO, DPO, DCDOs) among others, in the project area, 3 non-governmental organizations provided information to the study, at the national level, MAAIF, MWE-CCD staff and academia representative were engaged in the study. The elderly, youth representatives, women leaders and religious leaders were also some of the study key informants.

2.2.4 Focus group discussions

Field information collection started with village level Focus Group Discussions (FGDs) to elicit complex contextual information about the mitigation and adaptation techniques in the project area. FGDs were attended by project beneficiaries' representatives from the 10 villages. Some of the categories included; the elderly, the youth, women groups, Local Council leaders, religious leaders, cultural leaders and project staff. A checklist (see annex 4) was used to guide the discussions and the sessions were translated and sometimes conducted in local language in the local language. A total of 3 FGDs were conducted and they were attended by over 120 participants from the two sub counties of Alwi (Nebbi) and Nyaravur (Pakwach).

2.2.5 Community dialogue

Two community dialogues were conducted at the end of the community engagement exercise to validate and seek further input into the information that was collected from the FGDs and KIIs using various participatory tools. Community vision mapping tool was applied to gather key information on the ideal futuristic visual impression (maps) of a climate resilient model village. These maps were developed in response to the climatic hazard mapping and vulnerability assessments conducted in FGDs. The dialogues targeted community members, especially the elderly and community members that have resided in the community for a long period of time to share about the historical perspectives and the changes (climatic, environmental and socio-economic) overtime. Other participants included, project focal persons, opinion leaders, special interest groups and farmers. During the community dialogues, the following tools were also used to collect information on climate change hazards.

2.2.5.1 Historical Trends Analysis

A participatory timeline analysis tool was used during FGDs to establish the historical trends (social-cultural, ecological, economic and political factors) and also to identify factors that can be linked to contributing to the micro climate alterations and factors that influenced the adoption of climate change adaptation and mitigation practices. A participatory assessment tool was also applied to establish the effectiveness and sustainability of the coping, adaptation and mitigation practices adopted across the agreed upon timeline.

2.2.5.2 Resource/climatic hazard mapping and vulnerability assessment

A community resource and hazard mapping tool were used together with targeted communities to identify/draw their community resources and the prevalent hazards affecting their livelihoods. Communities were engaged to draw their maps as a basis for identifying the appropriate adaptation and mitigation practices. This method helped to identify the historical trends on adaptation, their efficacy and sustainability. A participatory vulnerability assessment tool was also applied to identify the key livelihood resources affected, the identified hazards and their magnitude.

2.2.5.3 Hazzard-Impact-Coping Strategy Assessment

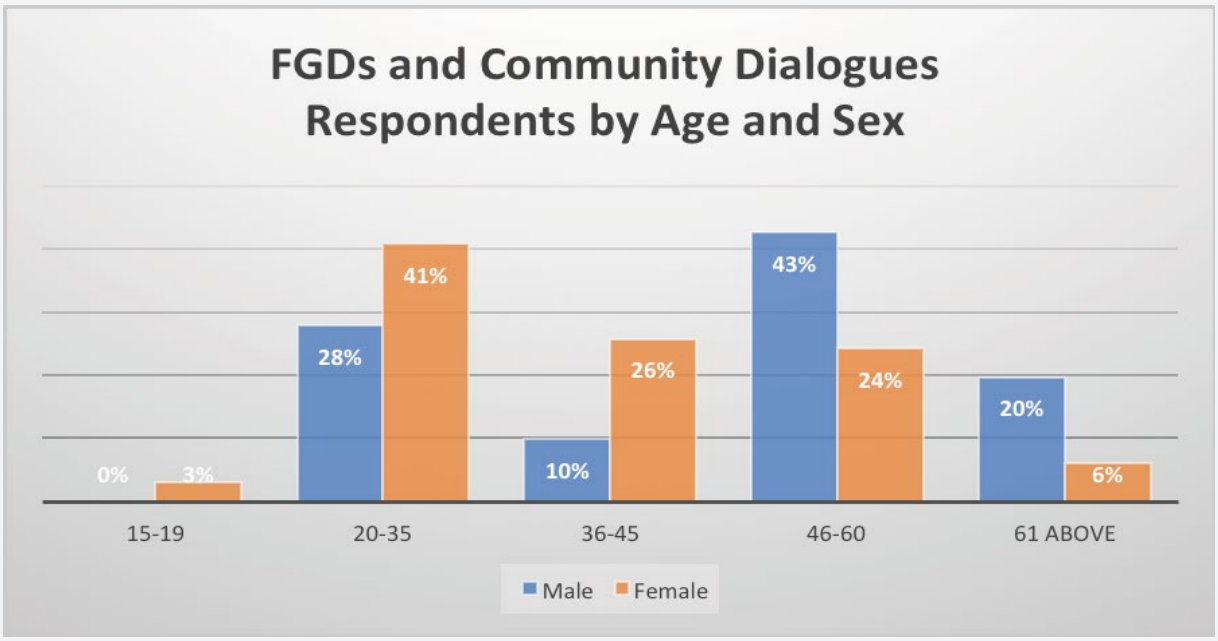
A hazard impact copping strategy assessment tool was also applied to identify the existing coping strategies and their effectiveness in addressing the identified hazards and vulnerabilities. With this tool, the community listed the sustainable and effective climate change adaptation and mitigation (co-benefit) practices to be promoted in the climate action model villages.

3. STUDY FINDINGS

3.1 Study Participants

As per the design, the study involved a wide range of participants, both within the community and outside; Study engaged a total of 152 respondents, 130 of these were from the targeted project areas (Alwi and Nyaravur subcounties). Of these 27 participated in the FGD in Alwi, 29 were in Nyaravur FGD whereas there were 41 participants in the Community Dialogue in Nyaravur and 33 participants in the community dialogue in Alwi. The age and sex distribution in general for these participants is reflected in the graph below.

Figure 2: Study respondents by age and sex



There was a fair representation of youth, mid age and elderly persons. 3% of the total participants were below 20 years, 28% of male were 20-35 years, 10% of the males were 36-45, 43% were between 46-60 years while the 20% were 61 and above. In general most of the male participants were in the ages 46-60 and but only 6%age were under the elderly category or 61 years and above. The female numbers/participants reduced with age, the biggest being at 41% in the youthful age, showing a great interest of young women in climate change and livelihoods issues, and this diminished with age to only 6% being in the elderly category.

3.2 Climate change and its manifestation in the study areas

3.2.1 Major climate change events – 1980 to present (Historical analysis)

A timeline analysis was conducted to establish historical trends and effects related to climate change for the last 30 years. A historical trends analysis was used to establish these relationships (now and then) during the 2 community dialogues held in Alwi and Nyaravur Sub counties. This participatory exercise stongly relied on input of the elderly (55 years and above) men and

women respondents who had a wealth of experiences to share across the timeline. From the interaction with the respondents, it was evident that the target communities have been experiencing several climate change related incidents over the years. The 1980's is a decade of incidents with the first drought reported in 1980, pest infestation is 1983, floods in 1985, and a major drought after 1986 with hazards becoming more frequent after the mid 1990's and intensifying in the 2000's. After 2010, climate change hazards are reportedly having greater impact than never before and their occurance is now considered the new normal. These changes have significantly affected several livelihood related activities and disrupted people's well being. Table 1 below, present some of the catstrophic events experienced in the sub counties of Alwi and Nyaravur sub counties that are a linked to climate change directly or indirectly. The specific events are also explained further below;

Table 2: Historical analysis of climate events and trends

Key events 1980 - 90	Key events 1990 - 2000	Key events 2000 - 2010	Key events 2010 - 2020	Key events 2020 – present
• 1980 drought that led to crop failure. • 1983 Locust invasion reported as 'grasshoppers' that destroyed crops and vegetation for close to one month. • Flooding of River Oraa and River Nile around 1985. • 1985, a strange disease wipped out most of the animals in Alwi sub county • Prolonged drought arround 1988 – 1990.	• Thunderstorms led to death of people around 1995. Fatalities reported in households and fishermen. • In 1995 there was wide spread cassava mosaic disease that destroyed majority of farmers' fields leading to famine. • Prolonged drought in 1996 that led to serious water shortage and crop failure.	• Flooding of river nile and oraa reported in 2004 and 2007. • Another prolonged drought between 2008 and 2009 causing massive crop failure and famine • 2009 Cassava brown streak virus outbreak afffecting household food security.	• Floods in 2011 causing destruction of infrastructure • Drought incindent in 2012 affecting crop and livestock productivity. • Drought incident in 2017 in both project areas • Floods in 2019 reported in Pakwach leading destruction of crop land and infrastructure. • Drought incident followed in 2020 devastating farmers fields and livestock.	• Prolonged Drought in 2021. • Floods reported in 2020, 2021 and 2022 causing major infrastructure damage. • Hail and thurnderstorms in 2022 mostly affecting farmers fields. • In 2020 COVID-19 induced lockdown saw an increase in Agriculture activity/ cultivation • 2021 introduction of piped water system in Alwi that has facilitated micro irrigation among others. • Cassava disease infestation in 2020

The 1980's is a decade of incidents with the first drought reported in 1980, pest infestation is 1983, floods in 1985, and a major drought after 1986 with hazards becoming more frequent after the mid 1990's and intensifying in the 2000's.

As highlighted in table 1 above, there have been several events and hazards that have been linked by local communities to climate change either directly and indirectly. Its evident that the occurrence of these events is increasing overtime with more devastating effects to farmers livelihoods. These events and some of the local responses and explained further below;

There was a major drought reported between 1980 and 1981 which led to deaths of animals, starvation of people and their death. This reasonates well with a 1999 report of the Framework for National Programme on combating desertification in Uganda that listed West Nile as one of the areas to have suffered a severe drought in 1988[19]. According to the respondents, dry spells are usually intense and immediately follow rainy seasons, sometimes finding their crops still in garden thus destroying them. This caused widespread hunger in the region (including Alwi and Nyaravur) and led to humanitarian response through distribution of food and other relief items by the Red Cross. Most recent drought was reported in 2021, this is supported by literature analysis with the Daily Monitor, a national newspaper reporting Nebbi to have some of the highest temperatures recorded in the country at 38.50C way above the national average of 32 degrees in January 2021[20]. It was reported that apart from the usual crop damage and water stress, the drought incidents had pushed both day and night temperatures higher making it very uncomfortable for people to sleep in their houses. People increasingly supplemented their diets with wild edible plants such as Carissa edulis (Forssk.) Vahl (Acoga), Sclerocarya birrea (A. Rich.) Hochst. (Nunga), Amaranthus hybridus L. subsp. cruentus Thell. (Dodo), Cleome gynandra L. (Akeyo), Tamarindus indica L. (Chwaa) and hunting for edible rats and guinea fouls among others. Farmers also increasingly resorted to bush burning to facilitate hunting activities and to enable new new pasture to sprout. This practice has increased overtime leading to loss of biodiversity and emergence of non palatable fire tolerant species of vegetation. In early 2000s, agroeforestry was promoted in the region mostly by NGOs such as Caritas Nebbi, AFARD and CEFORD. Some of the common agroforesty trees incude grivellea, ficus and giant lira among others.

- In 1985 there was a "strange" disease (local respondents could not ascertain the disease) that wiped out domestic animals, Farmers reported losing over 80% of livestock in Nebbi. In 1989 government started an animal vaccination programme at village level. This initiative has since been adopted as the most effective way for preventing viral diseases among livetock. Farmers also further diversified their livestock options to include more disease tolerant ones such as sheep, goats, local poultry and domestication of guinea fowls.
- Another major drought was reported to have occured around 1985/88 - 1990 which led to deaths of animals, starvation of people and their death. The Bishop of West Nile intervened by carrying out a borehole drilling campaign in the region around 1991. Some of these boreholes were drilled in the project area. The drought between 1985/88-1990 also saw the first digging of dams by government to create water sources for people and livestock. This has also become a common practice since and is promoted by both local government and non state actors (NGOs and faith based organisations). Farmers also increasingly adopted drought tolerant local crop varieties such as cassava ((Nyamata and Nyarukeca), millet (Anya Eka and Anya Emve), sorghum (godo and akindi) and fast maturing crops varieties such as beans (asikua and gombili). In 1988 there was also distribution of seed including cassava stems and sorghum by government in Nyaravur in response to the prolonged drought spell. In 2020 there was extension of piped water to households by Alwi dry corridor water project, a project expected to serve rural communities of Nebbi and Pakwach districts through gravity flow water scheme. The piped water has helped reduce water stress and enable beneficiary households to access clean water for domestic use, livestock and smallscale irrigation for seedlings and high value crops such as tomatoes. Its important to note that piped water remains costly for majority households despite the subsidies.
- Floods were reported in 1980 that led to people abandoning settlements in low lying areas and opting for higher altitude areas. This has been the case since then, farmers also adopted planting of eucalyptus in low lying and water logged areas (including wetlands). This practice has effect has however had negative effects on land productivity and ecosystem health. After 2015 flooding has been more frequent, leading to destruction of infrastructure thus affecting access to services and markets. Prolonged torrential rainfall in the districts of

19. https://www.unccd.int/sites/default/files/naps/uganda-eng2000.pdf
20. https://www.monitor.co.ug/uganda/news/national/country-dries-up-as-drought-hits-harder-1684414

Nebbi and Pakwach as well as the Democratic Republic of Congo caused flash floods on River Oraa and other tributaries of River Nile around 1985, cutting off roads and destroying homes, gardens and property. More recently in 2019 to 2022 the incidents of floods have been causing devastating impact on farm land and road networks. This is supported by several reports in the media such as the indipendent online news report for 2022[21] and several other newspaper articles reporting on the flooding of River Tangi near Pakwach bridge that ususally cuts off traffic flow along Karuma-Pakwach highway. Other floods were reported in 2004 and 2007, these are also in line with the Flood Modeling and Mapping Report for the Horn of Africa that analyses flood incidents in the countries since 1985[22] .

- In response, the district local governments and UNRA have supported ungrading of feeder roads and better road infrastructure to minimise distruptions and damage. Around 2018 Total E&P started road works in Muchison Falls National Park which helped with maintenance of smaller bridges to create alternative access routes during flooding. Farmers have also responded by digging trenches in the gardens to trap excess running water and allow it to slowly percolate thus minimising downstream flooding. The practice is however not yet well scaled up to allow for more significant results. The CAM project should therefore consider watershed restoration and water conservation practices both on-farm and at catchement level.
- The 1985-86 hailstorms led to loss of crops which led to creation of food markets of cassava and sweet potato in Pakwach which were delivered from Soroti by train, some households were able to barter trade with fish to get the food they needed. Barter trade is still locally existing to date especially among women, though they reported scarcity of fish and reduced yields is affecting the practice thus affecting household nutrition and social resileince. The established markets are also still in existence and used by farmers to sell their produce.
- In 1995, there more increased incidents of thunders and lightening that led to loss of lives in Alwi and Nyaravur. The government responded to these lightening events by installing lightening conductors on schools and medical centres and other government buildings from 1996 – 1999. This practice has been copied by private sector and households that are able, it is also a requirement for public buildings.
- Also, around 1995 there was reported cassava mosaic disease infestation that wiped out farmers gardens of cassava. Initially farmers responded by cutting or destroying cassava affected by the cassava mosaic disease in response to the infection, a strategy that proved futile. Government and NGOs responded by availing improved cassava varieties such as PME 204 (locally known as longe) among others. This practice increased variety diversity thus availing more options to the farmers. However more emphasis on newer varieties has overtime led to reduced cultivation of local varities such as nyaruchanda, ongagare, angaruba, amua, nyoeroli, nyamuto and nyamukere among others. Its therefore important to map, reintroduce and conserve some of previously cultivated cassava varieties to widen the genetic base for more resilience and food security.
- The 2009 cassava brown streak infestation saw the intervention of Research Officers from Abi Zonal Agricultural Research Development Institute (Zardi) who instructed farmers to destroy infected plants and introduced more tolerant and improved varieties of cassava. Several improved varieties of cassava (NASE 19 & 14, NAROCAS 1&2) and sorghum (NAROSORG 3&4) among others have been introduced and promoted among farmers leading to a relatively wider adoption of the varieties by Abi-ZARDI since then. Select farmer groups have been trained and supported to multiply and sell clean cassava cuttings for improved cassava varieties. This has bridged the gap for access to high quality planting materials since private sector players such as seed companies are not interested. Farmer seed entrpreneurship is a very important component for CAM project to consider replicating.
- Around 2005 – 2010, the increasing incidences of harsh climatic conditions further pushed farmers, especially out of agricultural production due to the higher risks and low profitability. These resorted to environmentally destructive practices such as charcoal burning as an alternative livelihood option. This has led to massive loss of tree cover, including high value tree species such as shea nut and tamarind which have good economic and

21. https://www.independent.co.ug/floods-cut-off-karuma-pakwach-road/

22. https://drought.unl.edu/archive/Documents/NDMC/Workshops/539/Pres/GHA2_Policelli-floods-1.pdfm

food security benefits to the community and economy at large. Several response measures have been promoted by various actors including promotion of tree planting, promotion of of energy saving cookstoves by different organisations including AFARD, Caritas Nebbi, DLGs and GIZ among others. Most recently, Farmer Managed Natural Regeneration (FMNR) was introduced and being promoted Pakwach Natural resources department. This practice has proved very effective for regerating degraded natural vegetation and trees as compared to tree planting due the harsh climatic conditions that causing poor survival rate (below 50%) of planted seedlings.

- In 2020, the COVID-19 pandemic and related management measures such as movement restrictions/ curfews led to major socio-economic disruptions and further increased vulnerability of farming systems to climate change effects. On the positive side however, COVID 19 led to more people engaging and investing agriculture, more people appreciated and relied more on local environment for natural remedies to boost their imunity. The pandemic highlighted importance of building local resilience and self reliant food systems, including farmer managed seed systems and other inputs, local market development, promotion of neglected and underutilised plant and animal species and agroecology among others. CAM project should therefore further strengthen local resilience strategies to better manage uncertainties beyond climate change.

3.2.3 Effectiveness of Local responses to climate change

The study assessed a number of the identified local responses to cope with or adapt to climate change effects/ impacts. The coping strategy matrix engaged community respondents during the dialogue to assess the effectiveness (the extent to which the practice is able effectively address the effects of the climate change hazards) and sustainability (the extent to which the local response is social, economically and environmentally sound). Practices that score highly on both effectiveness and sustainability, can only be considered as adaptation practices. Whereas the rest (those that score less on either of the 2 parameters) are categorized as coping practices. After the appraisal, the copping and adaptation mechanisms were discussed with the communities and are presented in table 2 below (those highlighted green were considered to be effective and sustainable). The results are also further expounded in the following sections.

Figure 3: AFARD Community Health Officer summarizes responses to Climate Change in Nyaravur

In 2020, the COVID-19 pandemic and related management measures such as movement restrictions/ curfews led to major socio-economic disruptions and further increased vulnerability of farming systems to climate change effects. On the positive side however, COVID 19 led to more people engaging and investing agriculture, more people appreciated and relied more on local environment for natural remedies to boost their imunity.

Table 2: Assessment of local responses (coping and adaptation) to climate change

Scale: 0=Poor; 1=Fair; 2=Good; 3= Very good

HAZARD	IMPACT	LOCAL RESPONSES	EFFECTIVENESS	SUSTAINABILITY
Drought	Crop failure/ low yields	Micro irrigation	2	2
		Soil and Water Conservation (contours and trenches)	2	2
		Diversification of livelihoods	3	2
		Drought tolerant crops (sorghum, cassava	2	2
		Early planting and land preparation	2	2
	Famine/ hunger	Fast maturing crops	3	3
		Borrowing food from neighbors	1	0
		Buying from market	0	0
	Water shortage	Dams and wells	2	2
		Boreholes	1	2
		Use of tap water	1	2
		Cutting grass	1	0
		Planting grass/pasture	2	3
		Buying grass	1	0
	Fuel wood shortage	Use of energy saving cookstoves	2	3
		Increasing labor for firewood collection	2	0
		Walking long distances to collect firewood	2	0
		Planting of trees	2	3
	Livestock diseases	Vaccination	3	3
		Treatment (including local remedies)	2	2
		Migration	1	0
Erratic rains/ seasonal changes	Crop failure/ poor yields	Buying food	1	1
		Labour for food	1	1
		Migration	0	1
		Bylaws prohibiting cutting trees		
		Borrowing from neighbor	0	1
		Barter trade	1	2
		Selling livestock and household assets	1	1
Increased crop pests and diseases	Poor yields	Spraying	2	1
		intercropping	2	3
		Crop rotation	2	2
		Planting resistant varieties	2	2
	Drying of crops	Use treated seeds	3	3
		Mulching	2	2
Flooding	Destruction of farm land	Use of contour lines	2	2
		Land rotation	3	1
		Planting eucalyptus in water logged area	1	1
	Loss of property and settlement displacement	Creating water channels	1	1
Heavy winds	Crop/farm destruction	Planting of trees/ wind breakers	3	3
	Destruction of houses	Uphill construction prohibited	2	2
		Bi-laws and ordinances to prohibit charcoal burning and cutting of indigenous trees	2	2
Hailstorms	Destruction of crops	Use of local rituals to prevent hailstorms	0	0
	Killing of livestock	Construction of strong shelters for animals	2	2
Lightening	Human deaths	Lightening conductors	2	1
		Planting of trees	1	0

**The most effective and sustainable practices according to the community respondents are highlighted green.*

3.2.4 Effective and sustainable practices

From the table above, the following practices were considered the most effective and sustainable practices in their local contexts. It is however important to note that the level effectiveness is dependent on level of understanding and quality of intervention/ implementation of practice or technology being assessed. We explain some of the recommended effective and sustainable practices that can be considered for replication by the CAM project;

Planting drought tolerant and fast maturing crop varieties
Due to fluctuating and short rainy seasons, planting of fast maturing and drought resistant crops emerged as one of the most effective and most sustainable response mechanism. According to most study participants there is adoption of climate-resilient crops and varieties to cope with stresses such as drought, heat and flooding. There were reported to be new varieties of cassava (NASE-19 and TME 204, locally known as Longe) and sorghum such as NAROSORG 3&4 that were being promoted by the District Agricultural Services and Non-Governmental Organisations. Farmers reported that some of these crops were affected by pests and diseases as well, in some cases worse than the traditional crops. They also said that in some cases they cannot withstand prolonged drought and that they are not a big solution to climate change hazards. A newer variety of cassava NAROCAS 1 was recommended by the sub county Agriculture officer for Nyaravur.

Early planting and land preparation
Based on the knowledge of their agro-ecological conditions by local people and expectation of a good rainfall season (based on indigenous indicators) crops are planted as soon as the first two rains fall. Phenology of plants which are used by the smallholder farmers over the study area as predictors of changes in the rainfall season. The study participants observe that plant species such as Erythrina abyssinica flowers at the onset of the rainy season whereas some Ficus species dry up show the onset of the dry season. Early planting was reported to be very effective for crops such as maize and beans with short rotation.

Diversification of livelihood options
Communities reported that farming presents so many vulnerabilities to shock from climate change those other enterprises such livestock rearing, non-farm enterprise and paid employment do not. As a result, there was diversification. The project can undertake such proven interventions such as beekeeping (also to counter bush burning), support households with livestock, support the creation of village SACCOs to give farmers small loans to help women start alternative incomes. Diversification can also be within agriculture by planting high value crops and integrating livestock into the faming system.

Tree growing/planting & agroforestry
Tree growing was reported as a new but effective and sustainable practice by the communities in the project area. The major reason provided for planting of trees was for windbreak, however, trees were also considered important for soil amenity, firewood and poles. There was evidence of planted trees of mainly exotic species including Grevillea robusta, Eucalyptus and Gmelina arborea around peoples' homes. There was also evidence of fruit trees including Artocarpus heterophyllus that is not common in the region. But community members reported a lack of having challenges of access to seedlings, roaming animals and late delivery of seedlings from the partners that were supporting tree planting initiatives. In Nyaravur there was preference for indigenous tree species, this is very uncommon. Community members reported that most exotic species except commercial species were not performing well. Tree planting is still at a low scale in the project area and wide patches of land are bare and some indigenous trees species were reported threated or extinct in some communities. Indigenous species such as Crateva adansonii and Afzelia africana have been reported extinct in some parts of Pakwach and Nebbi.

Figure 4: Adoption of agroforestry started around late in 2000's. Seen above Grevillea robusta trees in Acutugeno, Alwi.

Figure 5: A local fuel wood cook in Acutugeno village, Ayila Parish, Alwi

Use of energy saving cook stoves

There has been promotion of saving cook stoves by the government and civil society organisations (including) and communities have embraced the technologies. Different types of stoves were reported to be used by the community with the main one being Rocket Lorena stove. The stoves can be made using locally available materials and are suitable for energy-poor communities. However, some community members reported having challenges with maintenance of the stoves and others said they were labour intensive to construct and did not have the skill to construct them. Their prevalence in the project area is still low.

Establishment of soil and water conservation structures

The runoff intensity during flooding and subsequent loss of top soil is preempting farmers to embrace soil and water conservation practices that are being promoted by civil society organizations and the District Extension Services. The major soil and water conservation practices are digging of trenches to retain water on farms. The number of people practicing water and soil conservation in the project area is unknown but only 05 respondents from a group of 15 members were having soil conservation structures on their land. There were complaints that the structures are tedious to construct and that farmers need some technical support on how to construct them. The project can intervene to support farmers with technical assistance to establish these structures on farm. Their implementation can help improve water retention and support livestock rearing by establishing grass bands and fodder trees on their boundaries. Other soil conservation measures such as planting cover crops, mulching for high value crops among others.

Digging of dams and wells

A few community members that have land close to wetlands have resorted to diggings springs and wells. The District Local government technical officers also reported that districts have already started plans to excavate dams to ensure that livestock are saved during the dry season in addition to plans of extending piped water to the rural households. Dams have been very effective especially for livestock during the dry conditions. Limited technology for irrigation limits the use for crop irrigation. Solar powered irrigation equipment can be promoted by the CAM project to support crop irrigation.

Planting pasture to supplement livestock feed

Until recent droughts that had effects on health of livestock in the project area, farmers had not considered pasture farming very important. Though not yet a widely spread practice, pasture growing has been adopted by farmers to supplement livestock diets especially in the dry season. Some of the pasture grown include nappier grass, green and silver leaf desmodium and calliandra among others. Pasture growing has also improved milk production for cattle thus improving on household income. The practice is slowly gaining popularity but the farmers cited limited know-how and lack of access to pasture seed as some of the barriers limiting the effective uptake of the practice.

Mulching

Mulching is increasingly practiced to increase moisture retention during the dry season and improve soil conditions for crop growth. Decomposing mulch also increases organic matter in the soil which improves aeration, water retention capacity and fertility. Some of the materials used for mulching include crop residues such as maize, beans, sorghum, sesame and cassava stalks. One of the major challenges cited was termites which destroy the mulch and sometimes end upon destroying crops.

Use of trenches and contours

Trenches have been adopted to manage water run-off on the farms, these trenches check the speed of running water, allowing it to slowly percolate in the soil, thus minimizing soil erosion and water logging/flooding in low land areas. Much as the practice was considered as effective, its not widely adopted mostly due to the labour intensity and cost for establishing such structures. There was also a challenge of limited know how that limited effectiveness of the technology, some of the farmers were not following the gradient (through use of an A-frame) and ended up creating channels that increase the speed of running water instead of checking its speed.

Ordinances prohibiting cutting of indigenous trees and charcoal burning

At district level the DFOs reported that there were local ordinances prohibiting the harvest of certain indigenous trees for any use but especially charcoal. The local policies prohibit cutting of tree species such as Afzelia africana and Vitalleria paradoxa or Shea nut that are rare, of high socio-economic value and take long to grow. Although the government through ministry of Water and Environment also suspended any cutting, transportation and sale of Shea nut and Afzeliaafricana tree logs, the high demand is increasingly putting the endangered tree species on the verge of extinction in the project area. There were very few V.paradoxa trees and no A.africana seen during the study. Interventions such as farmer managed natural regeneration are being promoted to regenerate such high value species.

Micro Irrigation

Communities are piloting drip irrigation using locally available materials like reusable plastic bottles. This system delivers water directly to the plants' root zone. Farmers said this is a relatively new strategy and is used only on high value crops like fruit trees to avoid their losses. Drip irrigation if effective can be an answer to a few crops yields and is generally considered not effective for local staple crops like maize, sorghum and cassava. The technologies used are however not effective and more interventions by CAM are needed to enable access to more effective micro irrigation technologies.

3.2.4 The copping practices that failed or caused damage

From table 2 above, some of the local coping practices were considered ineffective by the target communities. These practices were assessed on the basis of their effectiveness in response to the climate change impacts and their sustainability (social, economic viability/effectiveness and environmental sustainability). These practices have also reportedly had negative effects or caused damage to farmers' livelihoods. Below are some of the identified ineffective interventions;

Planting of eucalyptus

Eucalyptus was planted by the farmers to drain flooded or flood prone sections of farmland. The relatively faster maturity, market availability and availability of planting matarials (seeedlings) has fueled the wide adoption of eucalyptus by the farmers. However, this was seen as unsustainable especially when grown within or near the farmlands as leads to soil acidification, drains water from the fields and is alelopathetic. Technical guidance is therefore needed for proper land use planning to ensure that eucalyptus woodlots are established in non arable areas. More locally appropriate and environmentally friendly tree species such as Melia volkensii, Gmelina arboreal, grevillea, musizi, markhamia and teak can be promoted by the CAM project.

Shifting cultivation/ land rotation (communally owned land)

Traditionally, farmers were practicing shifting cultivation to allow soils to regenarate and avert some risks such as flooding and droughts in certain periods. However, this practice was said to be ineffective due to the fact that the land is increasingly becoming scarce andindividualised as opposed to being communally owned. Even for communally owned land, shifting cultivation is likely to fuel land related conflicts over the most preffered pieces of land and discourage sustainable land management. This practice therefore needs to be carefully studied.

Digging of shallow wells

Shallow wells provided water for home use and for animals during the dry season. However, this intervention was considered infective by the community because it lead to breeding area for mosquitoes and water borne diseases. The District Health records show an increase in malaira cases over the years and this also reasonated with some articles on cholera outbreak in Nebbi by the Uganda Insititute of Public Health (UIPH).[23]

Digging trenches to drain water away from the garden

Community members said that digging trenches was not an effective measure to counter floods as they instead led to increased runoff and soil erosion. This gives an insight of lack of technical knowledge on where and how to construct the trenches. Contours are usually better suitable for such landscapes and extension workers can help guide farmers on where and how to construct the contours. Use of a simple A-frame can help improve effectivess of the practice.

Migration

Migration was listed as a copping strategy especially by youth respondents. Some of the youth move to towns and cities especially Kampala in search of work. Key informants also reported that youth would prefer to seek opportunities away from their home after they have attended higher education. Some of this migration was considered seasonal where some community members went away to spend time with their relatives during prolonged droughts. The migration has a negative effect on labour availability for agriculture, thus affecting agricultural productivity and sector growth. Making agriculture attractive for the youth through promotion of high value enterprises, engagement in support services such as inputs, bulking and value addition can help incentivize youth engagement in agriculture.

Walking long distances in search of water

During drought, women, girls and children especially walk long distances in search of water for home consumption. In Nyaravur, there has been some installation of piped water at household level. But this is still unaffordable and irregular, sometimes it takes a few days to a week without flowing water. The cost of a 20 litres jerrycan of water at local rates is UGX 200, this goes up five times if a household is to fetch from a distance using a boda boda to over 1,000 UGX.

Labour for food

Some of the members of the communities in the project area offer labour for food from their neighbors or neighboring villages. This was reported to happen especially during prolonged droughts and in incidents when a family loses its

20. https://uniph.go.ug/suspected-cholera-outbreak-associated-with-drinking-unsafe-river-water-in-panyimur-and-parombo-sub-counties-nebbi-district-march-2017/

produce to harsh weather conditions. Labour for food was hard to quantify, and respondents couldn't put a clear value on the amount of food that would be rewarded for the labour or work done.

Selling of livestock and household assets

Farmers reported being forced by nature to sell their livestock especially during droughts, this robs farmers of a very key recourse as livestock would offer substantial opportunities for food security and sustainable development with appropriate adaptation to climate change. Farmers were copping with water scarcity by building shallow wells and dams, however, there were times when all these dried during the drought and thus were not sufficient to serve either animals or people.

3.2.5 Stakeholders that can support CAM project

There are regional and local level organisations and stakeholders that can collaborate with the project. These actors are doing similar activities to those of the CAM project. Below are the key stakeholders and their possible roles in the CAM project.

Table 4: CAM project stakeholder and their possible roles

Stakeholder	Possible role in CAM Village project
District Health Office • DHOs • VHTs • Health Centres • Health Management unit • Community health gate keepers	VHTs at village level can support the Nutrition and health Officer of the project to training to conduct home visits and report nutrition and health issues to inform interventions. The project can liaise with the DHOs who conduct Community Health Camps to conduct such camps in the project area and deliver an all-round message incorporating health, climate change, livelihoods and environment. The DHOs were willing and are ready to collaborate with the project to disseminate information on family planning, mindset change and nutrition. Their structures can be used by the project. Members of the Health Management Unit at all structures can be engaged in media engagements such as talk shows and community dialogues on health.
District Development Office • District Development Officers • Community Development Officers	The CDOs and subsequent CDOs in different districts and in the project area and are change agents who interface with communities at the grass-root level and are responsible for imparting non-formal skills to communities, disseminating information on available services (health, education) and employment opportunities as well as organizing communities to form development groups to engage in development activities. The structure of this Office is supporting in the implementation of the PDM and can be useful to engage them in changing.
District Natural Resources and Production Office. • DPO • DAO • DNRO • DFO	The combined technical staff are key in supporting the project. Also, there are certain ongoing initiatives such as capacity building, distribution of materials and items such as seedlings, resources from the district local revenue, upcoming projects such as LoCAL (Local Adaptive Climate Living) which will focus on Climate Change Adaptation and can complement and consolidate CAM project impact.

Civil Society and Development Partners Nebbi NGO forum • JEEP • GIZ • Action Aid • AVSI • AFCE • CARITAS • CUWEDE • UNICEF • UNFPA • WHO • Abi ZARDI • AMREF • ASHAP/AFIA • Ripple Effect	The list of potential CSO or NGO partners is long and there are several working the project area on the issues of environment, health, climate change and development. African Christian Heath Network was mentioned as one of those that work in a unique field – WASH and SRH, JEEP is working around the same sub counties on health JEEP is supporting communities on sustainable energy and most are on livelihoods. AFARD can explore further complimentary engagements for partners in the project area through partner consultative engagements by the Project Coordinator. Abi ZARDI is key on providing quality planting resilient crops, supporting research on pest and diseases that have been resilient to multiple local solutions of late.
Local leaders (LC1 – LC3)	Local leaders will be key in mobilization of communities to implement the project. Also, they will be responsible for providing information and linking the project with other partners and government initiatives.
Cultural, religious leaders	This group of stakeholders will be key in passing on information to the project beneficiaries, especially on sensitization of key but controversial issues such as GBV, gender issues, health and nutrition messaging among others.
Media	It is expected that media will be used to amplify the voices and advocate for change. Low-cost radio talk shows can be mobilized in partnership with the RDCs office to take advantage of the free radio airtime given to government related programmes and those of CSOs that focus on key community issues and development such as those for CAM project.
Law enforcement	The police may be a key stakeholder in addressing GBV, support for implementation of bylaws and related legal issues.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusion

From the study findings, climate change is already seriously manifesting in the in the CAM project areas. Droughts, rising temperatures, pests and diseases, heat waves, floods and fires were reported among the major climate change effects with devastating effects to farmers livelihoods and are continuously frustrating smallholder farmers in Alwi and Nyaravur sub counties. According to the timeline analysis and from the discussions with the elderly, the frequency and intensity of hazards was reported to have gone up since 2010, becoming worse in 2019 to 2022. The project areas are now experiencing shorter, but erratic rains, the seasons have been altered; rainy seasons are shorter and more intense, yet they used to be longer with moderately distributed rains. There are more occurences of extreme and prolonged dry spells and flooding incidents due to short but intense rains. Planting periods were reported to be shorter happening at the beggining of March, and again in July. The scarcity season is longer and streching a month than in the past; from early March to June, the period soon after the first planting season. There's also an increase in frequency and intensity of disease prevalence and lesser fruiting seasons.

These changes have led to crop failure leading low yields; famine; water shortage; fuel wood shortage; livestock diseases; crop failure/ poor yields; loss of property and settlement displacement; death of people and animals that have devastated these agrarian based communities. Overtime, communities have devised some local adaptation/coping and mitigation measures to withstand the changing climate. Some of these include; use of energy saving cookstoves, diversification of livelihoods, agroforestry and tree planting, early land preparation and planting, planting fast maturing and drought tolerant varieties. Important to note also, there are some adaptation strategies that reportedly did not work as expected (mal-adaptation) and caused some damage to livelihoods and ecosystems health. These included among others; land rotation during flooding seasons that reportedly fueled lad related conflicts, digging trenches in the farmland to counter floods without folowing the gradient leading to more erosion, planting eucalyptus trees to drain water in the low lands and using local rituals to divert lightening and storms.

The CAM project can therefore build on existing local experiences/ knowledge and replicate and improve already existing local adaptation strategies such as the use of improved cook stoves that requires training of local artisans to help in their construction, diversifying livelihoods by supporting women on farm enterprises, growing, bulking and marketing high value crops, training in VLSAs among others. For tree planting, regeneration of indigenous species using the FMNR model can help reduce losses and even the cost of tree planting. Early planting was reported to be an effective strategy though there is risk of losing seed if the rains are characteristically erratic. The project can work in close collaboration with Abi ZARDI on promoting effective drought tolerant crop varieties while also piloting the multiplication of resistant indigenous seed. Intercropping can also be promoted to maximize benefits guards against shocks and increase return per unit area for the farmer.

A list of stakeholders that can support the CAM project is discussed in the previous chapter. These work on issues such as livelihoods, climate change, SHRH, agriculture, women empowerment among others. strategic engagement of these stakeholders is required, this may be done by forming a consortium of actors on climate change in the region that can meet once every quarter to discuss progress, share insights and to help improve service delivery and avoid duplication of efforts.

In the project areas there exists traditional sociocultural constraints that have long limited women's participation in the economy and their access to resources. CAM project can target this by intentionally support women led initiatives through economically empowering them, but also encouraging active participation of their male counterparts in the project. Harmonious family relations can help reduce the rate of GBV and domestic violence and even household income. This can be achieved through training communities on gender mainstreaming using the GALS methodology which can also be a powerful tool in reducing poverty and promoting SHRH. The issues of early pregnancy and school dropout, HIV/IDS, WASH, COVID-19 among others can be solved through counselling sessions with young people with support from the District Health Management unit and the stakeholders.

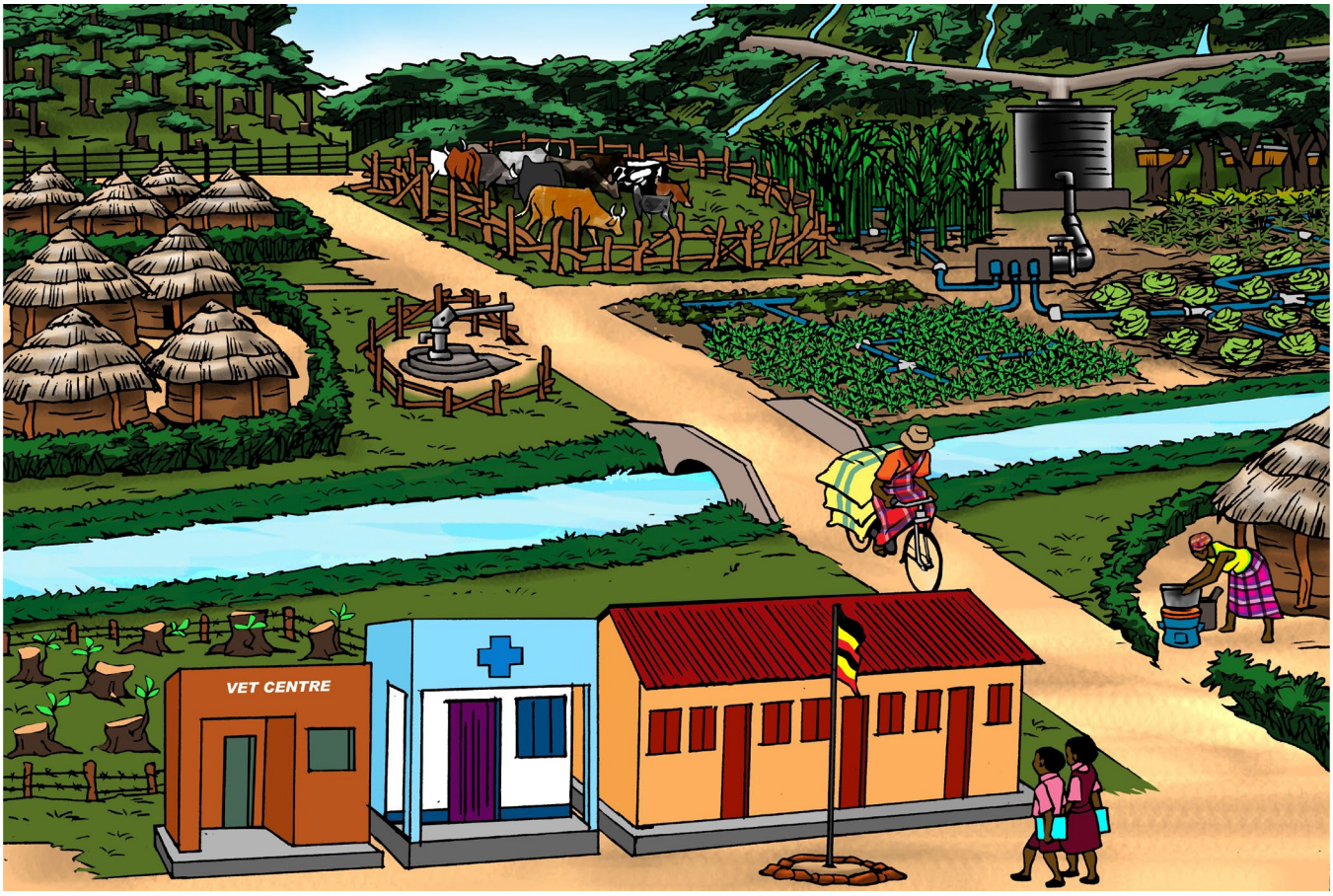
The CAM Climate Change Adaptation study provides insights into the impact, coping adaptation mechanisms used by smallholder farmers in Nyaravur and Alwi and their constraints. The study identified key coping, early planting and land preparation, crop irrigation, digging of dams and mechanisms as planting of trees; diversifying on farm income streams such as livestock rearing, livelihood diversification (apart from agriculture), use of energy saving cook stoves, agroforestry, small and barter trade. The most effective copping and adaptation mechanisms were outside agricultural production such as brick laying, trade and bodaboda riding. On farm practices such as agroforestry, soil and water conservation were thought effective but unsustainable practices. The results of this study show that the communities are struggling to find coping mechanisms and agriculture is gradually being abandoned for other more lucrative and enterprises that are considered more resilient to climate and absorb weather shocks better yet very disastrous to the environment.

4.2 Recommendations for the CAM Project

4.2.1What the CAM Project should replicate

During the dialogue process, selected community respondents were engaged in a participatory visioning exercise of a Climate Action Model village. Community vision mapping tool was applied to gather key information on the ideal futuristic visual impression (maps) of a climate resilient model village/ community. Participants in the study were asked to give an impression of what they would like the CAM model village to look like. The desired outlook of the village is green, has not bush around homes, has no water trapping ditches, has runoff harvesting, is food secure, has access to clean water, has access to medical services, has no teenage pregnancy, reduced cases of diseases, less GBV, no drug and alcohol abuse, has access to family planning, is fuel wood secure, has trees around homes and in the agricultural fields. A visioning exercise for project staff about the model village is necessary, the staff can take this information down to the project collaborators who can help in implanting certain targets to achieve the vision.

Figure 6: Envisioned CAM Village



Natural regeneration of indigenous trees

There is a considerable preference for indigenous trees. The communities seem to have noticed their advantage over exotics species. Some of these trees are hard to propagate, their seed is very hard to germinate and some of them have very short viability periods. Also, there were numerous mentions of fruit trees such as mangoes and jackfruit. The mango trees in this area are grown and some are diminishing in production. There can be a deliberate effort to multiply such indigenous mangoes collecting and raising seedlings from available mango stands or deliberate dispersal of mango seeds in selected locations before the rainy season.

Addressing GBV and gender disparities

In the project area there's widespread GBV and gender inequalities. women said that in farming, their role stopped at planting, management of the crops and harvesting. The men control the proceeds from the harvests and the biggest issue was that they were not accountable, but used the resources to destabilize the family unit by marrying off other women and drinking alcohol. Women in the project area operated a non-cash economy and they engaged in barter trade and trading in remnant agricultural harvests to meet basic needs. Their male counterparts need to be sensitized on the importance of family farming and planning, since farming is the major economic activity in the project area. Women proposed by laws that prohibit their men from drinking alcohol on the early hours since to the women, alcohol was the catalyst of abuse, GBV and several other economic issues. Local law enforcement, cultural and religious leaders will be key stakeholders in addressing these issues.

Food and nutrition education

There was reported to be a fair variety of foods available for the population in the project area. However, there are issues of malnutrition that are escalating disease occurrences in the project area. The DHOs of both districts said that infection rates would be low for non-communicable diseases if the communities were feeding better. The project can provide technical support to communities to increase awareness of the importance of feeding well, foster food environments that enable healthy food choices and build the capacities of individuals to adopt food and nutrition practices that promote good health.

Mindset change

The communities in the project area are battling several challenges especially poverty. To some they consider it as a curse. The climate change catastrophes have made poverty worse and the local smallholder farmers are utterly frustrated there is need to have efforts intentionally put in place to change attitudes and mindsets of people regarding their plight. According to the DHO of Nebbi, a Native of Nyaravur, the morale of people even to just 'live' is very low, they are frustrated by the way of life and climate change incidents have left them worse off. There are situations that most people thought that they could not do anything about but pray for especially those related to weather and subsequent crop failure. Deliberate campaign in the project areas need to discuss issues related to change in mindsets through local media, barazas, counseling and training sessions. A large-scale shift in attitude is required by the project for its success. Mindset change can also be achieved through conducting community health, livelihood and environment camps where key households in the project area can be often gathered to discuss plans and interventions for change.

Conducting exchange visits

Exchange visits were proposed to enable peer-to-peer interaction, as one means of promoting participatory processes that empower people to improve their own lives. Visits can be used to motivate project beneficiaries to improve on their own performance and initiatives. They can also be an important tool in mindset change.

Livelihood activities

Under the CAM project AFARD has taken a four thronged approach to adaptation including, forestry/environment, agriculture and health. Under agriculture there are some initiatives related to livestock which the communities appreciate. There were more calls for other nature enterprises especially beekeeping and planting of high value crops and intensively managing them. Vegetable growing and crops such as beetroot were reported by women to fetch more than most of the staples. Women also requested the project to organize them under VLSAs and teach them more about entrepreneurship to start small businesses run parttime to enable them absorb shocks.

A list of crops provided includes; cassava, sorghum, bananas, sweet potatoes, sesame, beans, ground nuts, maize and pumpkin. For fruits they proposed paw paws, mangoes, guavas, jackfruits, oranges and for vegetables; cabbage, onions, tomatoes, okra, eggplants, and kale were proposed. Although the project may not grow everything proposed, effort can be made to have the communities integrate these crops to diversify their farm production. Improved drought resistant cassava and sorghum varieties have been proposed.

Tree growing and agroforestry

Woody plant resources continue to disappear in the project area and there is a lot of consequences due to this scenario. As a result, trees are seen by all stakeholders as a major output from any climate change interventions especially the CAM project. To slow down further loss of these resources requires the collaboration of farmers in tree planting in agroforestry systems. Tree planting interventions with the collaboration of farmers require a good understanding of tree management practices as well as trees that best satisfy farmers' needs. We interviewed farmers on the most preferred tree species and challenges to tree planting. The challenges to tree planting included;

- Late delivery of seedlings
- Low survival of tree seedlings
- Drought that affects tree planting
- Trees competing with crop farming
- Delivery of undesirable or what they considered 'useless' tree species

We discussed preferred tree species for each of the project sites and the following is a list of species given by the community.

Figure 7: A satellite image of Alwi showing the trading centre and nearby places depicts a very dry environment devoid of trees.

Tree planting interventions with the collaboration of farmers require a good understanding of tree management practices as well as trees that best satisfy farmers' needs. We interviewed farmers on the most preferred tree species and challenges to tree planting.

Species/Botanical Name	English name	Local name	Uses
Nyaravur list			
Citrus sinensis	Orange/sweet orange	Mucungwa	Fruit tree
Citrus reticulata	Tangerine	Madalena	fruit tree
Annona muricata	Soursop	Adunde	Fruit tree, medicinal
Eucalyptus spp	Eucalyptus	Kalatusi	Poles, firewood, timber, medicinal
Tamarindus indica	Tamarind	Cwaa	Fruits, medicine, timber, shade, poles
Melia volkensii	Melia	Lira	Soil amenity, timber, firewood, pest repellant, poles, agroforestry
Combretum spp	velvet bushwillow	Oduk	Poles, firewood, local medicine
Artocarpus heterophyllus	Jack fruit	Fene	Fruit tree
Alwi list			
Balanites aegyptica	Desert date	Thoo	Food, timber, agroforestry (boundary), glue and gum
Celtis midbraedii	Natal white stinkwood	Okweng	Construction poles, firewood
Terminalia spp	Afara	Opok	Poles, firewood, shade
Melia volkensii	Melia	Lira	Soil amenity, timber, firewood, pest repellent, poles, agroforestry
Mukandwa	Not confirmed	Mukandwa	Firewood, poles
Gmelina arborea	White teak/ beachwood	Komanyoko	Poles, firewood, timber
Mangifera indica	Mango	Mango	Fruit tree, shade
Azadrichta indica	Neem	Neem	Medicinal, pest repellent, poles, timber, agroforestry
Tectona grandis	Teak	Teak	Poles, timber
Ficus spp	Fig		Soil amenity, fodder, poles, firewood, agroforestry, medicine
Grevillea robusta	Silky oak	Mbeni	Poles, timber, soil amenity/agroforestry

In both sites there was a mix of tree species requested included a good combination of indigenous trees. Eucalyptus was especially preferred for its fast-growing nature and ability to provide firewood in a short period of time. Melia volkensii can do well in both areas an there may be no need for eucalyptus. Local seed collection and multiplication of indigenous trees and fruits is possible in both areas. For indigenous trees, the project should consider boundary planting. Ficus was the only browsable tree proposed, and yet the project will focus on livestock as well. Trees like calliandra and sesbania for animals and soil amenity may also be planted.

4.2.2 What the project should avoid

Centralised procurements of items

Stakeholders especially the district technical team proposed local procurement of project supplies especially those that are available on the local market such as seed and seedlings. Apart from procurement of seedlings, it may also good to build local capacity to establish community nurseries supervised by the project staff to raise seedlings for the project. Seedlings raised near project sites make it easy for them to adapt to the agroecological environment when planted after

hardening off. Transported seedlings on the other hand face a lot of stress and disturbance and may struggle to adapt to local climate conditions.

Avoid late planting of trees

The seasonal calendar by the community members indicates that the second season is the longer season and more reliable for crop growing. This is also the season that should be targeted for tree planting. The project can utilize the rest of the year to prepare the beneficiaries, dig pits on time and plant when 03 strong rains occur in the second season. This will lessen losses from prolonged drought because by the time January drought comes the seedling will have established. Planting can also be done in march, but this has proven futile in the past because first season rains have often been unstable.

Avoid duplication of work

It is commendable that the CAM project is currently avoiding "spreading thin" with only 02 sub counties and 10 villages. This gives it a very good opportunity to engage a wide range of stakeholders to maximise its impact. There are already ongoing engagements by stakeholders especially at district level. These engagements encompass some components of the CAM project. These include tree planting initiatives by the DFS, extension services for model farmers by the DAOs and other extension staff, Health Barazas, the Local Adaptive Climate Living Project that will also address climate change issues, supply of agroforestry trees to households, soil fertility management, energy saving technologies, there are Civil Society Partners such as GIZ who were reported to be working on climate change and livelihoods initiatives and some others that many be identified along the way. A list of identified stakeholders is detailed in the previous section. CAM project can look at how it can leverage on these and avoid duplication of efforts. Other stakeholders such as the DHS, the DFS and their structures at lower levels have welcomed the project and are willing to collaborate with the project. Quarterly stakeholder meetings for providing updates on the project and synchronizing workplans to maximize project outputs by taking advantage of available resources that can supplement the project team. This will also improve communication and maintains support for the project while gathering more information for AFARD.

Avoid venturing into livelihood project before conducting market surveys

A simple market survey on feasibility of apiary and apiary products may be conducted to assess the local market as well as the feasibility of vegetable growing as proposed livelihood options. Farmers should ensure that production of items from the selected enterprises is scalable.

4.2.3 How the Study findings can enable CAM approach to integrate cross-cutting issues

Supporting income generating activities for women

In the project areas there exists traditional sociocultural constraints that have long limited women's participation in the economy and their access to resources. This sturdy reaffirmed that women provide unpaid on farm family labour and were reportedly not allowed to engage in financial decisions. Their role on the farm stopped at harvesting. Apart from sensitization of their male counterparts, women may be directly supported to have IGAs with the support and help of their husbands.

Forming VSLAs and encouraging men participation

Credit services in the project area are very limited. Both men and women have no access to credit services. Community members had ambitions to start small farming enterprises that could be profitable but had limited access to credit. Supporting them in training and formation of VSLAs would ease credit access and help awaken entrepreneurial skills.

Training communities on gender mainstreaming using the GALS methodology

Gender Action Learning System is a community led empowerment methodology that uses principles of inclusion to improve income, food and nutrition. The GALS methodology has been used to successfully empower smallholder farming households to create their visions and roadmaps to get out of poverty, improve household relations and create harmony in communities working in coalition. It could be a powerful tool to solving so many issues related to poverty, GBV, SRHR among others.

Promoting and strengthening family farming

Joint management and ownership are some of the key elements of family faming that can be promoted by the project. This can be done through joint engagements that may include the husbands, wives and their children to strengthen ties and responsibility of family stakeholders and promote harmony at households.

Conducting counselling and guidance sessions for young people

Early marriages, teenage pregnancies and drug and alcohol abuse were some of the key social issues discussed together with the community and the District Health Officers. The

rate of completion of Primary Level education for girls is also low (reported to be below 40% in Nebbi since 2015) , the project can team with schools and other organisations working on SRH to conduct guidance and counselling sessions for young in and out of school children and youth to discuss health issues such as HIV/AIDs, teenage pregnancy and their impacts. This can be done with the support of the District Health Management structure up to VHTs at village level. A higher Primary School completion rate for girls in households engaged by the project may be a good indicator at the end of the project.

Taking advantage of the existing networks and structures
COVID-19 led to strengthening of local response capacity to pandemics. There were already existing structures in Uganda's health services, but we saw the strengthening of the village health teams (VHTs), grass root structures that comprise volunteers that deliver basic health services and education. VHTs can be supporting the project to do surveillance and reporting. This is also true for the agriculture and environment, where the work of the Local Environment Committees that were established by the National Environment Act, Cap 153 can be mobilized to support the project on several aspects.

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6. ANNEXES

Annex 1: Terms of Reference

Consultancy to conduct local climate adaptation and mitigation practices study

1. Introduction

The Agency For Accelerated Regional Development (AFARD) is a local non-denominational NGO operating in West Nile regions, Uganda. Our vision is a prosperous, healthy and informed people of West Nile. AFARD in partnership with AWO International secured funds from the German Federal Ministry for Economic Cooperation and Development (BMZ) to implementation a 3.5-year (Oct. 2022 – March 2026) Climate Action Model Village (CAM) Project. The overall project goal is, "Communities in Nebbi and Pakwach Districts are resilient to climate change, health and economic shocks" and its specific objective is, "Targeted communities in Nebbi and Pakwach districts have food and income security and serve as replicable examples for Climate Action Model Villages by March 2026." The key project results and performance measures are detailed in Annex 1.

The CAM Project, directly targeting 3,190 people of who 60% will be female and at least 10% individuals with special needs, about 15% will be younger than 14 and about 80% will be poor or extremely poor, is planned to empower the population of at least ten villages in Nyaravur and Alwi sub-counties to transform their villages into Climate Active Model Villages through: 1) the establishment of 15 Climate Smart Champion Groups (CSCGs) and 05 School Health and Environment Club (SHEC); and 2) capacity development of these civil society structures on sustainable agricultural intensification, income generation and management, gender equality, Sexual and Reproductive Health and Rights (SRHR), preventive public health, environmental conservation, biodiversity and climate change mitigation. A cooperative will be formed with members from at least 06 CSCGs to drive inclusive and sustainable value-added market participation.

2. Objective and use of the study

The living situation of people in Nebbi and Pakwach districts is characterized by extreme poverty and a high dependence on traditional subsistence agriculture that is highly susceptible to climate change. The high pressure on natural resources has resulted in enormous environmental degradation (only 3.3% of the land is still forested). The CAM project therefore seeks to strengthen the resilience of communities in Nebbi and Pakwach in regards to climate change, health and livelihoods. To do so in a locally-sensitive manner, the project seeks to conduct a microlevel study to assess the traditional climate change mitigation and adaption practices in the project area. The findings of the study will provide AFARD and AWO International with relevant information on the relevant local mitigation and adaptation practices that should be integrated in capacity building of the civil society structures (CSCGs, SHECs, cooperative).

3. Methodology

The study, adhering to high research ethics and data privacy law of Uganda, will use a mixed method design approach that draws on quantitative, qualitative, participatory, photographic and historical narrative and life story methods as is indicated, but not limited to, below:

- Desk review and trend analysis of relevant information on climate change trends in the project areas (including approved proposal, log frame, and other project documents)
- Field mission for data collection using tools agreed upon with AFARD and AWO International.
- Data triangulation and analysis for report elaboration.

During the inception phase, the final methodology will be defined jointly by the Consultants and the team of AFARD and AWO International. Dialogue and Transparency is considered important throughout the process to create ownership and stimulate acceptance and application of the study results.

4. Scope of Work

4.1.1. Focus of the study

The study will be conducted in Pakwach and Nebbi districts, West Nile, Uganda especially in the project sub counties of Alwi and Nyaravur. It will run from November 5th – December 12, 2022 and will cover all the project stakeholders (smallholder farmers, local and district government officials, cultural, opinion and religious leaders, school teachers, pupils, parents, and school management committee members, private sector representatives and national actors like Ministries, NGOs, and universities).

4.1.2. Guiding questions

The study shall be guided by the questions below that must all be answered:

- When (timelines) did the project target groups experience climate change in their communities? In what form and intensity did such adverse events occur?
- What local knowledge and practices did they effectively use during these periods to mitigate and adapt to climate change while ensuring food security, income security, community health, and environment conservation and biodiversity conservation?
- Which approaches failed or caused damage?
- How can the CAM project replicate such proven climate adaptation and mitigation knowledge and practices to ensure locally-owned climate resilient actions in direct implementation of its Climate Action Model Village Approach and which stakeholders need to be involved?
- How can the study findings enable the CAM approach to be adapted to fully integrate the cross-cutting issues: a) gender equality, b) sexual and reproductive health and rights (SRHR), c) inclusion (including but not limited to persons with disabilities), d) COVID-19, e) Knowledge Management and Advocacy, and f) Disaster Risk Reduction?

5. Schedule

Indicative activities	Deliverable	Responsible	Target Date
Issuance of Call for proposal	Publishing of TOR	AFARD	November 5, 2022
Deadline for submission of proposal	Proposal	Consultant	November 14, 2022
Assessment of proposal and online interviews	Review and discussion	AFARD	November 15, 2022
Notification of award with selected applicant	Via email	AFARD	November 15, 2022
Signing of Contract	Contract	AFARD	November 16, 2022
Submission of Inception Report	Inception report	Consultant	November 21, 2022
Discussion of Inception report and agreement in tools, timelines, etc	Online meeting	AFARD/ Consultant	November 22, 2022
Field mission for data collection	Travel to Pakwach and Nebbi	Consultant	Nov 23 – Dec 3, 2022
Submission of draft report and presentation of findings online	Draft report to be presented to AFARD	Consultant	December 9, 2022
Submission of final report	Final report	Consultant	December 12, 2022
Internal presentation	PowerPoint	Consultant	December 12, 2022

6. Assignment days

The assignment will cover a total of 20 days as below:

- 2 days for preparation incl. inception report, and a Kick-Off / Q&A session
- 10 days for implementation at field level including travels and briefing/debriefing
- 6 days for draft report writing
- 1.5 days for final report writing and submission
- 0.5 day for internal presentation to AFARD staff

The final report should be complete and submitted by December 12th.

7. Deliverables to be elaborated

- Inception Report with the study design and methodology, analysis methods, data collection instruments and table of content for the draft report (incl. checklists and questionnaires)
- Kick-Off Meeting with Power Point Presentations to discuss/review the Inception Report
- Draft study report no more than 25 pages excluding annexes for review and feedback.
- Final study report (short and full version as word and pdf document) in English including annexes, data sheets, photos and relevant documents.
- Internal presentation of findings for learning of all AFARD staff

Requirements:

- The Reports shall be submitted in English language as a word and pdf document.
- The study report must include the following contents:
    1. A statement on the independence of the expert who conducted the study (with CV attached as Annex);
    2. An executive summary;
    3. The objectives and use of the study;
    4. The methodology used and the participants;
    5. Findings of the study from the analysis of the data collected;
    6. Conclusions and specific recommendations – for implementation in the project sites and replication through the Climate Action Model Village approach.

Note: If the study does not comply with the requirements, it will be rejected.

8. Profile of the consultant

- One independent Ugandan consultant with expertise in climate change mitigation and adaptation, livelihoods, disaster risk reduction / preparedness and management, profound knowledge of the Pakwach and Nebbi districts and fluency in Alur/Jonam/Luo local language and English.
- A minimum of Master's degree in a relevant field e.g., Agriculture, Environmental Science, Rural livelihoods, Development Studies, and a minimum of 10 years working experience in applied research as clearly reflected in the CVs.
- Research expertise in the field of climate change adaptation, livelihoods, food security and nutrition, and gender equality is mandatory. The expertise shall be described in the application.
- Strong network with relevant Ugandan stakeholders in the Climate Change sector and familiarity with matter-related national and international laws and regulations, proven and failed approaches and practices and a good understanding of the West Nile climate challenges.

9. Payment modalities

Payments will be made against invoices to a Ugandan bank account with the following modalities:

- 30% upon signing the contract
- 40% upon the submission of draft study report
- 30% upon approval of the final study report and internal presentation to AFARD staff.

10. Application

Interested person/firm should send her/his technical and financial proposal (in Ugandan Shillings indicating professional fees, travel costs and per diem (meals and accommodation, if required), curricula vitae (in the annex) and a copy of similar works to AFARD latest November 14, 2022 to afard@afard.net

Polite Note.

- Only complete applications shall be accepted and considered for review.
- Only shortlisted candidates will be contacted.
- Proposals will be assessed taking into account the technical expertise, experience and financial offer.
- Women are strongly encouraged to apply.

Disclaimer: AFARD does not ask for fees for job opportunities. Whoever pays any such fees does so at their own risk. AFARD shall not be liable in anyway. The public is encouraged to report any such illicit solicitation to the police and AFARD authorities.

Annex 2: Key Project Results

Results	Performance measures
Outcome: Targeted communities in Nebbi and Pakwach districts have food and income security and serve as replicable examples for Climate Action Model Villages by March 2026.	O-1.1: 75% of target households are food secure by 2025. O-1.2: 65% of target households are income secure to withstand climate, health, and economic shocks by 2025. O-1.3: 45% of households plan their family size by 2025. O-1.4: Disaster preparedness interventions of Climate Smart Champion Groups (CSCGs) and School Health and Environment Clubs (SHECs) have resulted in a 25% decline of infectious and vector-borne diseases (malaria, covid-19, cholera, diarrhoea, and gastrointestinal worms) by 2025 O-1.5: By 2025, residents of the climate action model villages use the forest planted on 15 acres for their own food (e.g., mangoes and oranges), food preparation (firewood), and health (shade, and utilization of the bark, sap, or leaves for medicines). O-1.6: 8 climate action villages serve as models for replication through knowledge sharing with local governments, networks of AFARD, universities & partners of AWO International in Uganda.
Outputs 1 - Climate-smart and sustainable agriculture intensification *375 vulnerable smallholder households (60% female headed and 10% with persons with disabilities) adopt climate smart agriculture and produce and consume diversified foods for healthy diets for all household members.*	OP-1.1.1.: By 2023, 15 CSCGs are established, registered and strengthened, and operate according to their constitution. OP-1.1.2: From 2023 to 2025, 45 agro-ecology champions (i.e. 30 trained and equipped lead farmers (crop) and 15 trained and equipped poultry paravets) support CSCGs to establish and implement their annual production calendars. OP-1.1.3.: 375 households use their start-up agro-inputs (hand hoes, watering cans, spray pumps, rubber boots, tarpaulins, improved seeds and seedlings, and chickens) to sustainably intensify their agricultural activities starting in 2023. OP-1.1.4.: By 2023, 75 oxen handlers trained in Animal Traction Technology use the purchased oxen, ox ploughs, and ox carts to provide services to members of the CSCGs and beyond. OP-1.1.5.: By the end of 2025, the target groups (CSCGs), trained in over 300 sessions on climate-smart agriculture and digital weather forecasting, apply their knowledge in agricultural practice.
Outputs 2 - Livelihood Diversification *15 CSCGs and 01 Cooperative actively contribute to economic diversification of livelihoods and to healthy living without (gender-based) violence.*	OP-2.1.1: 50% of target households save at least 10,000 UGX per week by 2025. OP-2.1.2: 85% of targeted households have increased ownership of income generating activities by 2025. OP-2.1.3.: One functional cooperative society is promoting cassava agribusiness by 2024. OP-2.1.4.: 50% fewer women in target households report gender-based violence by the end of 2025.

Outputs 3 - Strengthening community health and disaster preparedness *15 CSCGs and 5 SHECs promote improved community health through disaster preparedness and gender sensitive interventions.*	OP-3.1.1.: 85% of targeted households adopt safe practices to keep everyone healthy by 2025 (use of sanitation facilities, use of hygiene measures in food preparation and cooking healthy meals, family planning, protective measures against contracting COVID-19). OP-3.1.2.: In 2024, 375 households use health kits (mosquito nets, face masks, solar lamps, gum boots, hand washing devices) for sustainable disaster preparedness at household level. OP-3.1.3.: 80% of targeted school children (11 to 14 years) are aware of relevant health practices by 2025 to better protect themselves, their peers and their families from diseases (sanitation, hygiene measures in terms of nutrition, SRHR, COVID-19).
Outputs 4 - Environmental and Biodiversity Conservation *Environment and biodiversity conservation is promoted in 10 villages to improve livelihoods and climate resilience*	OP-4.1.1: 85% of CSCG members use improved energy saving stoves by 2025. OP-4.1.2: 05 schools have functional SHECs by 2024. OP-4.1.3.: 15 food forests of each 1 acre (comprising of 100,000 fruit, shade and medicinal trees) are reforested by 2025. OP-4.1.4: 12,750 fruit, medicinal, firewood and timber tree seedlings for CSCGs are planted by 2023.

Annex 3: Vulnerability assessment of key resources in Alwi and Nyaravur SC

Type	LIVELIHOOD RESOURCES	HAZARDS												
		Drought	Floods	Seasonal fluctuations	Wind	Hailstorms	Pests$ diseases	Water stress	Human diseases	Earth quakes	Invasive plant species	Fires	TOTAL (Out of 30)	RANK
Natural	Farm land	3	3	2	3	3	3	3	0	0	3	2	25	6
	Grazing land	3	3	2	2	3	3	2	0	2	3	3	26	4
	Wetlands	3	2	1	2	0	1	3	0	0	0	1	13	16
	Communal forests	3	3	2	2	3	3	3	0	3	3	3	28	2
	Wildlife	3	2	2	2	3	3	2	0	0	0	3	20	10
	Streams/ springwells	3	2	2	3	0	0	1	0	0	0	3	14	14
	Tree plantations	3	2	2	3	3	3	3	0	2	2	3	26	4
	Hills/rocks/sand	0	0	0	0	0	0	0	0	2	0	0	2	20
Physical	Roads	2	3	2	0	0	0	0	0	2	0	0	9	19
	Settlements/houses	2	3	2	3	3	0	0	0	3	0	3	19	11
	Boreholes	3	2	2	0	0	0	3	0	2	0	2	14	14
	Dams	3	2	2	0	0	0	0	0	3	0	2	12	17
	Bridges	2	3	2	0	0	0	0	0	3	0	2	12	17
Economic/ financial	SACCOs	2	3	0	0	1	2	0	3	0	2	3	16	13
	VSLAs	2	2	1	0	1	2	3	3	2	3	3	22	7
	Markets	3	3	2	2	2	3	2	3	2	3	3	28	2
	Farming&livestock	3	3	2	2	3	3	3	3	2	3	3	30	1
	Paid work/ labour	3	3	2	2	3	2	1	3	0	0	3	22	7
Social/ human	Schools, churches, health care, family, farmer association	2	2	2	3	3	0	0	3	3	0	3	21	9
	Security	2	2	1	2	3	0	0	3	2	0	2	17	12
TOTAL SCORE (Out of 60)		50	48	33	31	34	28	29	21	33	22	47		
RANK		1	2	5	7	4	8	9	11	5	10	3		

Annex 4: Tool for focused group discussion

CONDUCTING A STUDY ON LOCAL CLIMATE CHANGE ADAPTATION PRACTICES IN NEBBI AND PAKWACH DISTRICTS

Guide for conducting Focus Group Discussions *(4 HOURS)*

The interview facilitator describes climate change adaptation and allows the community to form a definition of climate change adaptation in their own language. As preamble, discussions focusing on experiences of the different participants on CCA and the facilitator are discussed, so too will the impact and trends of climate change *(30 minutes).*

Key Words to define: Climate change, adaptation, mitigation, livelihoods, natural resources management practices, resilient communities, food and nutrition security.

Explain the objectives of the Climate change adaptation study exercise:

i. This micro-level exercise will help AFARD execute her project 'Climate Action Model Village' (CAM) project which seeks to strengthen the resilience of communities in Nebbi and Pakwach in regards to climate change, health and livelihoods.

ii. To assess the traditional climate change mitigation and adaption practices in the project area.

iii. The findings of the study will provide relevant information on the relevant local mitigation and adaptation practices that should be integrated in capacity building of the civil society structures (CSCGs, SHECs, cooperative).

iv. Describe the project area and the importance of such a study to effective project implementation. Describe the support needed by the consultant and the organization, and the data required for the report (30minutes).

Climate change manifestation

1. To which extent do you consider climate change or extreme weather events to be a problem in your community
2. How has climate change manifested itself in your area and daily activities?
3. Which extreme weather or climate related events have impacted your daily work and livelihoods?
4. When did you start noticing these changes?
5. List the major climate change hazards (if any) in the past 20 years in their order of significance.
6. How have these hazards affected your livelihood and way of life?
7. Which category of groups or individuals are most affected by the identified hazards in your community?
8. How does climate change or extreme weather affect the following groups of people in your community?
   a) Women
   b) Men
   c) Youth
   d) Children
   e) Persons with disabilities

Adaptation

9. What local mechanisms/ practices have you adopted to cope or adapt to the climate change hazards/ effects experienced?
10. Which of these adaptation/ coping measures do you consider effective, with good value for money and why?
11. What adaptation/ coping approaches did you try and did not work?
12. Why do you think those approaches did not work out well?
13. What negative effects did those approaches have on your household and the community at large?
14. How can the CAM project replicate the proven climate adaptation and mitigation knowledge and practices to ensure locally-owned climate resilient actions in direct implementation of its Climate Action Model Village Approach?
    - Which stakeholders need to be involved in the implementation of the Climate Action Model approach?
    - How can the CAM approach to be adapted to fully integrate the cross-cutting issues such as:
      a) gender equality
      b) sexual and reproductive health and rights (SRHR)
      c) inclusion (including but not limited to persons with disabilities)
      d) COVID-19
      e) Knowledge Management and Advocacy
      f) Disaster Risk Reduction

Annex 5: Key Informant Interview Guide

1. Current Situation (about Climate Change, stakeholders, mitigation)

1.1 Describe the key climate catastrophes in the project area in the past 20 years.

1.2 How have the communities in the project area been responding to these catastrophes?

1.3 Mention some of the local and national stakeholders that have been key to supporting communities respond to climate change?

1.4 What kind of support is being provided to communities to support their adaptation and mitigation efforts to climate change?

1.5 To what extent would you consider these interventions to be effective and why?

2. Rationale for action (why should there be different intervention measures - Rationale for action; Why is there need to do things differently?)

2.1 In your opinion, what do you think needs to change to facilitate effective adoption of mitigation and adaptation practices at community level?

2.2 How do you think these changes can be systematically effected?

2.3 What government and non-government interventions are you aware of that can facilitate communities to effectively adapt and mitigate climate change in their livelihood interventions?

2.4 Are there previous interventions that did not work well? And what caused them not to work?

2.5 Which stakeholders should be involved in the CAM interventions and how should they be involved?

2.6 What other resources/ interventions can CAM leverage on during its implementation to enhance its effectiveness?

Annex 6: Participatory tools for community dialogues

Participatory tools for Climate and Disaster Risk Assessment used during community dialogues

a. Hazard mapping

Participants were be guided to draw a map of their respective villages, indicating the areas and livelihood resources put at risk by certain climate, natural or human-made hazards, and discuss the changes in the type, extent, frequency and intensity of these hazards. The objectives of this exercise are to: Identify important livelihood resources and assets in the community, identify areas and resources at risk from climate, natural or human-made hazards, Analyse changes in areas affected and types of hazards seen.

The facilitators asked participants to share their knowledge so that local knowledge can complement the general knowledge developed in the literature review and focused group discussions. The map also provides knowledge for further analysing vulnerabilities of livelihood assets of the community. The facilitator will explain to the participants that they will be drawing a map of their community in two phases – the first focuses on boundaries, settled areas, facilities and resources, and the second on hazards. The facilitators ask the participants to start by drawing the locations of: Roads and facilities such as places of worship, health clinics, schools and wells Resources such as forested areas, water bodies, agricultural land, fishery zones, pastures and settlements. The facilitator will ask the participants in drawing the maps to: Use symbols to represent facilities, resources and other map entries and create a legend for the symbols used on the map. Among the hazards to consider are: Extreme weather events such as frequency and intensity of floods, heatwaves, droughts, Wildfires, earthquakes as well as Human-made hazards such as deforestation, wetland reclamation and poor waste management among others.

Upon completion of the hazard map, the facilitator will converge the separate groups (men, women and other special interest groups to discuss the identified hazards using the following guising questions;

1. Where do the maps agree, and how do they differ?
2. Are the hazards different now than they were 10, 20 or 30 years ago?
3. Are the hazards changing in frequency and intensity?
4. Who is most affected by them?
5. Do the hazards cause or increase conflicts between groups (e.g. farmers and livestock keepers)?
6. Who has access to and control over community livelihood resources?

The analysis of these results together with the literature review will help establish the hazards associated with climate change, provide insight into how these hazards have evolved over time and establish a basis for considering the potential linkages between and among hazards. They are also likely to reveal important differences in the perceptions of women, men and minorities.

b. Timeline analysis using seasonal calendar

In this exercise, participants will make a seasonal calendar indicating important events in the year – particularly periods of stress due to natural or human-made hazards – and discuss how the frequency, intensity and timing of the hazards have changed. The exercise objectives will be;

1. To understand the main community activities and events
2. To identify periods of stress, hazard, disease, hunger, debt and vulnerability
3. To analyse changes in seasonal activities and events and their links to climate change

This exercise will complement the knowledge developed in the hazard map exercise, and develops additional local knowledge to consider alongside the scientific knowledge on climate change and disaster risk generated in literature review.

Participants will be separated in different groups (men, women, minority groups etc), provided with colored marker pens and flipcharts or manilas. The facilitator will guide groups to draw a table indicating months of the year across the top of the table and the left most column for listing community events or activities. Facilitators will also explain how to develop a seasonal calendar to show key events and activities that occur during the year. Among the common items

to consider for placement on the list are: Rainy and dry seasons Crop seasons – clearing, burning, planting, weeding and harvest, livestock keeping and fishing seasons, typical timing of weather or climate hazards such as typhoons or cyclones, floods, drought and wildfires, periods of stress (food scarcity, water shortage), pests and diseases, hunting and firewood collection among others.

As the participants list each event, they mark the timing of the events by drawing lines through the box under the appropriate months, working from left to right for each event before moving on to the next event. Where the timing of events has changed over time, the participants will distinguish the time frames by marking the table with different colored markers to indicate the changes in timing. In this way, the calendar will show shifts/ changes over time such as changes in the rainy season, or an increase in dry periods. This exercise will pay keen interest in ensuring that the elderly are actively consulted in the process as they have good understanding of the changes over longer period of time (20-30 years).

When the participants have completed their calendars, the facilitators bring together the female and male groups and minorities into a single discussion of the respective results using the following guiding questions;

- Where do the calendars agree, and where do they differ?
- What are the differences in the timing of seasons and events as compared to 20 or 30 years ago?
- What could be the reasons for these changes?

The facilitator will further guide participants to summarize the knowledge gained in the map and calendar exercises, draw conclusions and identify the hazards most relevant for their communities. This will also contribute to creating a common understanding of the main hazards affecting the community, highlight changes and trends in hazards, determine possible explanations and create a common understanding of the differences in who is most affected.

The facilitator will make sure the hazard maps and seasonal calendars are well displayed for all to see, manillas or flipcharts and sticky notes will be provided for ranking the identified hazards. Facilitators help participants summarize the findings by asking the following questions:

- Which hazards relate to difficult moments for the community?
- How often do these hazards occur and what is their intensity?
- How severely are we affected by the hazard?
- What changes and trends related to hazards and vulnerable periods are apparent, and what are possible explanations?
- Who is most affected? By which hazards?
- What are the most relevant or threatening hazards?

The facilitator will help the participants make connections between hazards and periods of stress, identify patterns, propose and evaluate explanations for their observations and draw conclusions about what their assessment means to them.

c. Vulnerability matrix

In this exercise, participants develop a matrix that lists the resources and assets most important to the community's livelihoods against the hazards prioritized in Exercise above. Participants then evaluate the level of impact of the hazards. The objectives of the exercise are to:

1. Identify the community's most important resources and assets
2. Identify the vulnerability of the assets and resources to the hazards
3. Determine which assets and resources are most at risk
4. Determine which hazards are most harmful to the resources and assets

This exercise builds on the hazard map, the seasonal calendar and the prioritization of hazards from the activities undertaken earlier as explained above.

As in the hazard map and seasonal calendar exercises, facilitators will provide markers in multiple colours and a flip chart or manilla paper. Facilitators will prepare these sheets in advance in a matrix. Facilitators ask the participants to identify the main livelihood assets and resources in each of the categories listed below;

- Natural resources on which people rely for income, food, medicine, protection, fuel and other sustenance. For example; forests, water, air and soil
- Physical resources – infrastructure for transport, water management, energy and communications such as roads, hospitals, dwellings and water tanks
- Economic and financial resources such as income from the sale of agricultural products and handicrafts, casual work and remittances
- Social resources such as local councils, churches, cooperatives, trade unions and family
- Human resources – the skills, knowledge, capacity and good health important to the pursuit of livelihoods, including agricultural and leadership skills and gender-specific knowledge

Facilitators list the prioritized hazards horizontally across the top of the matrix. Participants then rate the impact of every hazard on the resources using the following scoring system: ***3 = high impact on the resource 2 = medium impact on the resource 1 = low impact on the resource 0 = no or positive impact on the resource***

The participants start with the first hazard and work vertically down the column. For each hazard, the participants decide on the degree of impact that each of the hazards has on each of the resources, and note the score in the appropriate box.

The note takers document key points of discussion that lead to the assigned scores, and record any disagreements on the scores. Facilitators add the numbers vertically and horizontally to determine which livelihood resources have the highest horizontal sum and are thus most vulnerable, and which hazard has the highest vertical sum and thus has the highest impact on the identified livelihood resources.

When the participants have completed the vulnerability matrix, the facilitators will bring together the female, male groups and minorities into a single discussion of the results. The following questions will be used to guide the discussion on the vulnerability matrix:

- Where do the matrices of men and women agree, and where do they differ?
- Which assets or resources are most affected, and which are not affected?
- What does it mean to the community when the basic assets or resources of the most widespread livelihoods are affected the most?
- Are any groups – the landless, handicapped people, the elderly, children, youths, migrants or indigenous people – more affected than others?
- Why are some hazards more harmful than others?
- Where and how has the vulnerability of the community increased in recent years?

d. Review and evaluation of local responses (Hazard-impact-coping strategies)

In this exercise, participants complete a matrix that lists hazards, their related impacts on livelihoods and the local responses that people in the community currently use to lessen the negative impacts. Facilitators will then guide the participants in the evaluation of these responses. The facilitators will provide markers and flip charts. The facilitators will also prepare these sheets in advance in a matrix. Facilitators select the two or three hazards with the strongest effects on livelihood resources from the vulnerability matrix and write the first hazard in the matrix. Participants then identify the direct negative impacts of this hazard, and the facilitators list the impacts in the second column. The third column lists the strategies or practices the participants report that they or someone else in the community use in response to this impact. As each response is added to the matrix, participants evaluate the responses on the effectiveness of the measures (column four) and their sustainability (column five) by ranking the measures on the following scale: +++ = High ++ = Medium + = Low 0 = Not effective or not sustainable Participants work across the matrix, completing the responses to each impact and the rankings before moving on to the next impact.

Facilitators will keenly guide participants to appreciate the differences between hazards and their direct and indirect impacts. Hazards may include droughts and storms, for example. Their direct impacts include crop and property damage; indirect impacts may include hunger and loss of income. The ranking for effectiveness answers the question of how well the response is working to deal with the identified impact, and the ranking for sustainability answers the question of whether the response will work in the long term without compromising other aspects of livelihoods.

After completion of the matrices, facilitators bring the different groups back together. When analyzing the results, participants can focus on where the strategies come from and on how well the local responses work in dealing with the existing impacts. The following questions will be used to guide the discussion;

1. Where do the matrices of men and women agree, and where do they differ?
2. Which local responses are only identified in one of the matrices?
3. Do some people face obstacles to using responses others are using?
4. Which responses relate to direct impacts, and which to indirect impacts?
5. In light of the rankings, what conclusions can we draw as to effectiveness and sustainability?
6. Which responses are satisfying, and which are weak?
7. Where do the responses have to be improved?

At the end of the discussion, facilitators will note the effective and sustainable responses that can contribute to adaptation within the community on separate cards that will be used to develop adaptation strategies/ actions for consideration in the climate action model villages.

e. Community adaptation goals, strategies and vision mapping

In this exercise, participants will identify short- and long-term adaptation goals for the community. As in previous exercises, the facilitators will conduct the exercise in separate groups of men and women, and minorities. Each of the group will be tasked to identify a common goal for the Climate Action Model village. After each group has defined their goals, the facilitators bring together the men and women into a single discussion of their respective results. Facilitators will provide pencils or markers in multiple colours and smaller paper cards of various colours. Facilitators prepare large sheets of papers on which participants will develop adaptation paths during the exercise. Based on the hazard-response-action table, facilitators prepare one sheet for each hazard and its related impacts where the table indicates a high need for action (e.g., flood and drought). For each group (men, women, minorities). The facilitators will explain that a goal is a situation we want to see in the future, and that the task here is to develop goals that take into account the observed and projected changes due to climatic impacts in the community, village and region. Participants form groups of 2–3 people, and each group identifies goals related to the impacts of the priority hazards on one of the sheets prepared by the facilitators. The groups will be guided to distinguish between short-term (1-3 years) and long-term (10 years) goals, and work for 20 to 30 minutes writing down the goals they consider important. Then the groups will present their goals, and the facilitator arranges the goals according to hazards and impacts, clustering those goals that are similar and suggesting ways to merge similar goals. The objective is to have no more than five long-term goals in order to keep the number of goals manageable for planning. If more than five long-term goals remain after the clustering, ranking will be done to agree on the five most important long-term goals.

Thereafter, participants converge in one large group to identify adaptation strategies for making progress towards the adaptation goals, and build on the local responses identified earlier. The objective of this exercise is to: Develop additional strategies for making progress towards the identified short- and long-term adaptation goals. The following questions will be asked to guide the discussion;

- For which strategies do the groups have paths in common, and for which are the paths different?
- What obstacles stand in the way of implementing these strategies?
- Do the identified adaptation strategies have potentially negative effects? Conflicts between user groups such as farmers vs. pastoralists? Environmental impacts on people upstream or downstream of the community?
- Can the path be realized with community knowledge and resources, or is additional knowledge needed?

Obstacles and additional resources that are identified will be noted on cards and will be added to the adaptation path sheets where necessary. The main goal of the discussion will be to verify that the developed strategies target the most important climate change impacts and other hazards in the community. Facilitators should verify that gender and minority considerations are included.

Finally, selected individuals (comprising of men, women and other interest groups will be selected to re-draw a vision map indicating the model village after attainment of the long and short term adaptation goals. The map will be able to visualize the different adaptation actions/ pathways earlier agreed upon and where they will be physically implemented in the community, in response to the hazards identified in the hazard map, impact and vulnerabilities on the various resources as identified. This vision map will greatly inform the implementation of the Climate Action Model Villages.

Annex 7: Lists of participants

a. Community Dialogues Attendance List- Alwi and Nyaravur Sub-Counties

b. Community Dialogues Attendance List- Alwi

No.	Sir Name	Other Names	Sex	Age
1	Kercan	Francis	M	57
2	Wathum	A	M	52
3	Oloya	Santo	M	75
4	Oyeka	Francis	M	43
5	Mandhamungu	Daniel	M	24
6	Kitaga	Charles	M	62
7	Acan	Paska	F	51
8	Berocan	Justine	F	38
9	Acirocan	Betty	F	30
10	Agomoko	Retina	F	61
11	Canipara	Jenone	M	56
12	Rotirwoth	John	M	54
13	Anena	Charles	M	52
14	Wakunga	Ceaser	M	56
15	Bilokere	Albert	M	60
16	Awachural	Agnes	F	50
17	Acen	Joyce	F	36
18	Oyirwoth	Brian	M	30
19	Odongo	Ivan	M	39
20	Inepi	Amos	M	23
21	Cothembo	Collins	M	50
22	Ojok	Ronald	M	28
23	Ogenrwoth	Alex	M	38
24	Gimariah	Sharon	F	26
25	Ochida	Brenda	F	39
26	Afoyorwoth	Colelen	F	29
27		Hellen	F	45
28	Oryema	Gilbert	M	72
29	Ongom	John	M	52
30	Onegi	Joseph	M	50
31	Ayikoru	Robert	M	46
32	Oyirwoth	Douglas	M	26
33	Puchara	Robert	M	50
		FGD Participants Alwi		
34	David	Ocweda	M	59
35	Olama	Juliano	M	75
36	Buchala	Richard	M	52
37	Acan	Rose	F	58

38	Ngamita	Karmela	F	71
39	Opaurwoth	Sharon	F	28
40	Kumakech	Laurence	M	36
41	Owonko	Christopher	M	58
42	Omach	Jackson	M	
43	Opira	M	F	59
44	Ayello	Gloria	F	24
45	Ayiorwoth	Slivia	F	23
46	Akello	Conselate	F	25
47	Abisafi	Kayeny	F	65
48	Aciro	Christine	F	40
49	Ayomirwoth	Jolline	F	25
50	Anolith	Virgilia	F	44
51	Kwawan	Sunday	F	39
52	Monokuma	Claudia	F	47
53	Awacango	Juliet	F	52
54	Raciu	Lydia	F	50
55	Anirwoth	Jennifer	F	37
56	Anachango	Beatrice	F	34
57	Kworwiny	Grace	F	30
58	Kwadewiny	Maurine	F	35
59	Acen	Dorine	F	47
60	Faridah	Juliet	F	29
Community Dialogue Participants - Nyaravur				
61	Onyuthi	David	M	63
62	Urunyuthi	Joel	M	64
63	Monokuma	Claudia	F	47
64	Anirwoth	Jennifer	F	37
65	Ocopi	Samuel	M	53
66	Arua	Zeberio	M	70
67	Rumundu	Abei	M	
68	Okello	Jefune	M	52
69	Omia	Oshert	M	53
70	Omita	Michael	M	52
71	Anecho	Samuel	M	69
72	Rwothongeyo	Lazarus	M	35
73	Adegitho	Innocent	M	23
74	Afoyorwoth	Harriet	F	31
75	Atimango	Maurine	F	35
76	Ayiorwoth	Conslat	F	22
77	Atino	Sharon	F	22
78	Atimango	Margret	F	48
79	Ayiorwoth	Slivia	F	23

80	Ayomirwoth	Jolline	F	25
81	Owech	Harriet	F	25
82	Paska	Falling	F	58
83	Ayepanso	Juliet	F	42
84	Torach	Jerech	F	60
85	Omito	Andrew	M	70
86	Osaga	Kaito	M	30
87	Komakech	Vincent	M	30
88	Akumu	Agnes	F	45
89	Apio	Irene	F	18
90	Aciu	Lydia	F	50
91	Amony	Penninah	F	43
92	Acirucan	Doreen	F	42
93	Annolitho	Francis	M	52
94	Maditnun	Lazard	M	35
95	Wekahogu	Primp	M	
96	Ovoya	Samuel	M	76
97	Ogenwroth	Winfred	M	23
98	Obonyo	Pata	M	63
99	Dhanombe	Johna	M	34
100	Atimango	Daisy	F	26
101	Mungujakisa	Daniel	M	24
FDG Participants Nyaravur				
102	Kumakech	Walter	M	31
103	Kumakech	Godfrey	M	44
104	Bisekwa	James	M	36
105	Odokacen	Alfred	M	34
106	Kwotek	Emmanuel	M	34
107	Kumagum	Innocent	M	47
108	Odongo Mupe	Charles	M	46
109	Mandawun	Margaret	F	59
110	Muchara	Robert	M	50
111	Bilokeke	Albert	M	60
112	Amama	Gicel	M	54
113	Omwonya Mupe	Nestore	M	64
114	Rupiny	William	M	50
115	Opol-Wun	Agnes	F	35
116	Owechi	Santa	F	22
117	Acan	Dorine	F	33
118	Ayiorwoth	Sunday	F	18
119	Bernitho	Lucy	F	77
120	Akello	Jannet	F	23
121	Amia	Flavia	F	32

122	Wango	Chagress	F	30
123	Acirocan	Proscovia	F	45
124	Adok-Rwoth	Joyce	F	49
125	Akenda	Joyce	F	60
126	Muber	Joyce	F	33
127	Akumu		F	40
128	Aryemo	Agnes	F	38
129	Mican	Agnes	F	40
130	Dhanombe	Johna	M	34

c. Key informant Interview participants list

No.	Prefix	Surname	Other Names	Title	District
1	Mr.	Wamburu	David	CAO	Nebbi
2	Mr.	Jakisa	Eddy	DFO	Nebbi
3	Mr.	Dennis		ADFO	Nebbi
4	Ms.	Evalyn	Alicia - Juliana	Forest Ranger	Nebbi
5	Ms.	Titirach	Kerali-Scovia	DEO	Nebbi
6	Mr.	Akwayapanga	Dennis		Nebbi
7	Dr.	Okweru	Justine	DHO	Nebbi
8	Mr.	Opio	Tony	Agency for Community Empowerment	Nebbi
9	Mr.	Ajal	Paul	DHO	Pakwach
10	Mr.	Owinga	Richard	Phycal Planner	Pakwach
11	Mr.	Orwot	Brian	Youth	Pakwach
12	Mr.	Agwokto	Hellen	PWD	Pakwach
13	Ms.	Akenda	Joyce	Elderly	Pakwach
14	Mr.	Ugenmungu	Dan Evans	Project Manager, NURI	Nebbi
15	Mr.	Mungujakisa	Tobias	Environment and Climate Change Officer	Nebbi
16	Ms.	Atimango	Daisy	Community Health and Gender Officer	Nebbi
17	Mr.	Dhamombe	Johna	Agriculture Officer	Nebbi
18	Mr.	Orwot	Brian	Volunteer	Nebbi
19	Ms.	Chekwoti	Irene	Senior officer, Climate Change Department	Kampala
20	Mr.	Sunday George	Bob	Senior Agricultural officer and Food security Focal Point. MAAIF	Kampala
21	Mr/Br/PhD	Murongo	Marius Flarian	Senior Lecturer, Faculty of Agriculture, Uganda Martyrs University	Mpigi