

Assuring the Extent of Climate Change and Mitigation Strategies in Nakasongola District in Uganda: Practices and Experiences of Local Farmers

Samuel Mukasa

St. Lawrence University Uganda

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ABSTRACT.

Background: In Uganda, climate change is amongst the most substantive challenges inflicting on the wellbeing of humans in many parts of the country. In the central and south western parts of Uganda where the majority of the population rely on subsistence agriculture, climate change has adversative effects. In rural areas, low resilient capacity to shocks exacerbates the impacts of climate change such as food production catastrophe, hence resulting into food insecurity. It is upon the above experiences that this study assessed emphasis on mitigation strategies and practices of climate change among farmers Nakasongola district by using qualitative research. This research was guided by one research question, namely: what are the mitigation strategies practiced by local people to minimize the impact of climate change?

Material and method: The study employed a case study design where several instrumental bound cases are examined. We utilized multiple data collection methods to explore perceptions of climate change. Qualitative data for this study was generated from 15 selected households through focus group discussions, key informant interviews, and in-depth interviews. Data were collected using semi-structured interviews from fifteen purposefully selected local farmers from selected sub counties.

Results: The findings of this study revealed that, farmers were found to practice mitigation strategies such as afforestation, agroforestry and agricultural intensification as ways to overcome climate change.

Conclusion: Local farmers have intensively initiated agricultural policies that strive to protect the environment and such mitigation strategies are meant to enhance the capability of smallholder's farmers to deal with the persistent effects of climate change

Keywords: Climate change, Mitigation strategies, qualitative-focused enquiry, Nakasongola, Uganda.

INTRODUCTION

Climate change mitigation issues have become subject of intense global discussions in the past few decades representing a significant environmental social and economic threat which is now recognized by the majority of the world's governments and scientists as an issue of extreme concern (Egbe et al., 2014). Several studies have been done, for instance IPCC has provided regular, comprehensive and scientific assessments of the scientific, technical and socio-economic aspects of climate change (Dhar & Khirfan, 2017), but our general understanding of climate change remains uncertain on climate system dynamics (Bostrom et al., 1994) hence climate change is most likely to bring with it significant environmental consequences of sea level rise, increased frequency of extreme weather events, biodiversity loss, floods, droughts and species extinction (Axon, 2015).

In northern Thailand climate change and related hazards have claimed many lives, destroyed many houses and resulted in severe economic losses and they are unaware of the increasing landslide trends, flood hazards and the associated potential risks (Manandhar et al., 2015). A lot to note is that South Asia is one of the most climate change vulnerable areas in the world due to its large population, a large number of hungry people, land

management and infertile soil on marginal lands in semi-arid areas, growing rates of land humiliation, and anticipated effects of climatic change on fisheries, forestry, and agriculture sectors (Afzal & Nishtar, 2023).

In this regard, it is expected that Africa's agricultural production is greatly affected by climate change. Considering that the agricultural sector is a source of livelihood for many people especially the poor in rural communities (Elum et al., 2017). Like many African countries, South Africa has been identified as being highly vulnerable to the impacts of climate change (Republic of South Africa (RSA), 2011) and would therefore need supportive policies and framework to enhance climate change adaptation process among farmers especially considering that the agriculture sector is a major employer of labor in the country (Elum et al., 2017). In addition, Nigeria especially in the rural areas, tradition and culture often determines and influence their belief systems and it is evident that climate variability and change continues to disrupt the balance between people and the environment (Egbe et al., 2014; Nagasha et al., 2019). Thus, scenarios of climate change are often times perceived by these rural people as natural occurring events which may not have any adverse effects on the environment and the future. For instance, livestock death, occurrence of new livestock and crop diseases, reduction of biodiversity, increased deprivation of water and crop failure in the developing countries in sub-Saharan Africa (Muluneh, 2021) including Uganda.

In Uganda, climate change and weather-related events such as prolonged dry seasons, floods, storms, mudslides, extreme rainfall, and delayed/early rains have become more frequent and/or intense. This has left most of the rural poor farmers' food insecure and their livelihoods threatened together with ecosystem degradation, poor access to urban infrastructure, utilities and services (Okonya et al., 2013; Twinomuhangi et al., 2021). Similarly, Fisheries resources support livelihoods of fishing communities but are threatened by over-exploitation, habitat degradation, pollution, invasive species and climate change require appropriate adaptation strategies (Musinguzi et al., 2016). In addition, perceptions of the tourism industry on climatic changes that affect sustainable tourism in Uganda are majorly caused by deforestation and ignorance concerning the diverse effects of climate change (Barya, 2021).

This study was done at Nakasongola district. According Roothaert and Magado, (2011) as cited in (Mfitumukiza et al., 2017), Nakasongola district is one of the driest districts in Uganda, characterized with prolonged drought episodes, scattered woody biomass plant communities and savannah. The district is located in the north-western part of the central region of Uganda having 8 sub-counties namely; Kalungi, Kakooge, Lwampanga, Nabisweera, Wabinyonyi, Nakitoma, Lwabyata, Kalongo and Nakasongola Town Council. In addition, Nakasongola district lies in the cattle corridor of Uganda where livestock production is the main agricultural activity that sustains livelihoods. Most common livestock species kept include cattle, goats, and sheep. These livestock species depend chiefly on grazing natural pastures in the rangelands (Owoyesigire & Mpairwe, 2020).

The district experiences a bimodal type of rainfall with the first rain season occurring from March/April to June/July and second season occurring from August to October/November of each calendar year. The amount of rainfall received ranges between 500 to 1000 mm per annum, maximum daytime temperature ranges between 25 to 35°C, while the minimum diurnal range is 18 to 25°C (Namugwanya et al., 2018). According to Mugerwa et al., (2011) as cited in (Mfitumukiza et al., 2017) reveals that the soil catena is composed of Buruli and Lwampanga both with undulating areas and valleys and in terms of vegetation cover, the most predominant vegetation types occurring in the district include the open deciduous savannah woodlands with short grasses, tropical trees and plantations.

For the survival of smallholder farmers, subsistence farming (crop and livestock rearing) is the main source of livelihood engaged by the smallholder farmers in the district. The major types of crops grown include cassava, sweet potatoes and bananas; while the livestock reared include cattle, goats, sheep and poultry (Kuule et al., 2022; Mfitumukiza et al., 2017). Therefore, this study was intended to explore the mitigation strategies practiced by local people to minimize the impact of climate change.

Climate change mitigation is now a paradigm that must be promoted in the entire world (Ortmann & Veit, 2023). Today, the world has greatly responded to climate change phenomenon through mitigation strategies with the aim of regulating the antagonistic effects of climate change that have massively affected the global communities

(Elum et al., 2017). Attempts have been done to curb the causes through several mitigation strategies. Mitigation entails all anthropogenic interventions or policies aimed towards reducing greenhouse gas (GHG) emissions or enhancing the sinks for GHGs (Acharyya, 2021; Elum et al., 2017) which includes the three main climate change mitigation approaches such as conventional mitigation efforts which employs decarbonization technologies and techniques that reduce CO₂ emissions, such as renewable energy, fuel switching, efficiency gains, nuclear power, and carbon capture storage and utilization (Fawzy et al., 2020). Therefore, Tripathi and Maurya (2025) argue that mitigation entails developing strategies to minimize both production and concentrations of greenhouse gases (GHGs).

The mitigation strategies are aimed at fighting the devastating environmental hazards through climate change that result from anthropogenic and natural disorders such as the depletion of the ozone layer, and greenhouse effects (Muluneh, 2021). Therefore, it is important to have mitigation strategies for which this study is intended to hold and that is exploring perceptions on climate change and mitigation strategies in Nakasongola district.

Theoretical Perspective

This study was guided by two theories, for instance, the protection motivation theory (PMT) and the theory of planned behavior (TPB). I draw this study primarily on the PMT and TPB. The protection motivation theory (PMT) was first introduced by Rogers in 1975 with the main purpose of assessing individual's response to perceived threats of health problems and motivation to respond to the threats. Later, it is extended to other social science issues such as environmental degradation and response measures (Bagagnan et al., 2019). PMT sheds light on factors influencing individual's motivation to react to a perceived risk and it is linked to climate change as it can be used to encourage behavioral changes that will mitigate climate change. Underlying assertion is that fear appeals to encourage people to react or decide to adopt risk preventive activities against perceived threats such as climate change. People who perceive that the threat is happening are able to examine the risks and potential benefits after pursuing preventive measures. Therefore, decision regarding risk preventive behavior depends on an evaluation of two major elements which make the PMT model: In this regard, this theory helped to explore the peoples' perceptions on climate change and mitigation strategies.

In other words, this theory was important for this study, as it helped in exploring and understanding how people perceive climate change and the mitigation strategies they adopt. This study was guided by the theoretical framework of perceptions for the reason that this theory is about perceptions yet this study is also exploring the perceptions of people on climate change and their mitigation strategies. Therefore, this theory was used to administer three concepts (i.e., People's perception, climate change and mitigation strategy). This theory was further seen as appropriate by underpinning this investigation because it digs deeper to understand the individual's response to perceived threats to climate change.

This study followed a consistently applied theory which precedes and guides a qualitative investigation (Bradbury-Jones et al., 2014) by ensuring that this theory is visible throughout the study. In this regard research questions were closely mapped to the key concepts of PMT as the underpinning theory. Thus, the theory acted as a driver for the rest of the study and a determinant for the research design, influencing the research questions, help in organizing the interview schedule and in finalizing the analysis process (Bradbury-Jones et al., 2014).

It is important to have PMT under pin this study because it has the potential to strengthen the rigour of qualitative research and it is likely to add considerable strength and transparency in this qualitative study (Henry, 2015). In this case, I adopted a critical, flexible and a creative attitude when applying PMT to guide my study (Canterbury, 2021; Rajaram, 2023; Wu & Volker, 2009). There is an argument that a theory is always present in some guise but it can vary from being non-existent, through to being more pervasive and influential (Kasirye, 2021; Makri & Neely, 2021; Wu & Volker, 2009). In this study, the later was preferable because research cannot be undertaken in a theoretical vacuum (Bradbury-Jones et al., 2014) and that a theory is at the heart of practice, planning and research and most notably theories powerfully influence how evidence is collected, analyzed, understood and used (Collins & Stockton, 2018; Sandelowski, 1993).

Theoretical gap: weaknesses of the Protection Motivation Theory (PMT).

The limitations of the theory were partly addressed in the revision of the framework in 1983 by Rogers, Cacioppo and Petty, whereby cognitive and individual variables, namely response cost and self-efficacy, were added to the model (Koinig & Koinig, 2016; Marikyan & Papagiannidis, 2023). This theory was limited by a rigorous framework to understand individuals' intention to comply with adaptive behaviour, it has been noted by the author of the theory and other researchers that it does not provide an exhaustive list of all environmental factors, cognitive processes and moderators that might shape motivation (Marikyan & Papagiannidis, 2023; Tanrikulu, 2021).

PMT assumes that the cognitive processes are invariant across people with different personality traits and characteristics. In addition, dispositional factors (Tomaka & Magoc, 2021) (i.e. to what degree the person is situationally or psychologically predisposed to mitigating the threat), such as anxiety and defensive style, were found to impact the appraisal of fear appeals, although they were not incorporated into the model (Rogers, 1975). And it has been argued that PMT fails to explain individuals' intention to comply with suggested behaviour in specific cases.

Secondly, this study was also guided by the theory of planned behavior (TPB) which was advanced by Fishbein and Ajzen, in 1975. TPB is derived from the theory of reasoned action and it postulates that individuals' behavioral intention is influenced by their attitudes, subjective norms, and perceived behavioral control (Sniehotta et al., 2014). The theory of planned behaviour (Ajzen, 1991) is an extension of the earlier theory of reasoned action (Ajzen 1975), which continues to attract attention in psychology (Sheppard et al. 1988; Ajzen 2001). Both models are considered deliberative processing models that imply that people's attitudes are formed after careful consideration of available information (Conner, 2020). For over two decades, the theory of planned behavior has been a centerpiece for approaching human dimensions research, and is the most widely used attitude theory in the field (Miller, 2017).

This theory was used in this study as it is comprehensive where incorporates multiple factors such as attitudes, subjective norms, and perceived behavioral control that influence behavior, making it a more comprehensive framework compared to simpler models like the Attitude-Behavior Relationship. In addition, the theory has shown strong predictive power in a wide range of contexts, including health behaviors, environmental actions, and consumer choices. As well it focuses on attitudes, norms, and perceived control and adaptability as it can be applied to various populations, cultures, and behaviors, demonstrating its versatility and generalizability.

It assumes that the main behavioral driving force is the intention to perform a given behavior. Here, intention refers to an individual's willingness and commitment when performing planned behaviors. It is thus a function of attitude, subjective norm, and perceived behavioral control. Furthermore, attitude refers to an individual's favorable or unfavorable evaluation of planned behavior. However, because many behaviors pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioral control also works as a proxy for actual behavior (Wang et al., 2019). The theory of planned behavior is linked to climate change as it emphasizes the individual initiatives that can be adopted to meet the challenges of climate change (Masud et al., 2016).

Theoretical gap: weaknesses of the Theory of Planned behavior

1. Limited explanatory power: Despite its predictive strength, TPB sometimes underestimates the variance in actual behavior, suggesting that other factors beyond those included in the model may influence behavior.
2. Overemphasis on cognition: TPB largely focuses on cognitive factors (i.e., thoughts and beliefs) and may not adequately account for emotions, habits, or unconscious processes that may impact behavior.
3. Perceived behavioral control: While this construct is useful, it's not always a perfect proxy for actual control, and it may not capture all the external factors that can influence behavior.
4. Stability of components: Attitudes, subjective norms, and perceived control can change rapidly, and TPB doesn't always capture these fluctuations or consider the dynamic nature of these constructs.

5. Simplification of social influence: TPB conceptualizes subjective norms as a single construct, which may overlook the complexity of social influences and variations in social pressure from different reference groups.

Indeed, PMT and TPB have also helped the researcher to understand the concept of climate change and mitigation strategies in developing and developed countries. TPB also emphasizes the importance of inspiring attitudes, subjective norms, and perceived behavioral control. In this case local people are inspired by their community leaders in protecting their environment. Finally, the protection motivation theory (PMT) and the theory of planned behavior (TPB) complement each other to provide a better understanding of the concept of climate change and pave way to mitigation strategies.

MATERIAL AND METHODS

Research paradigm and study population: This study utilized an interpretivist research paradigm in which the research questions are grounded in an epistemological position with assumptions that data tells us something about farmers' perception of climate change following a case study research design. The study population, consisted of fifteen participants from Kalungi, Kakooge Lwampanga , Nakasongola town council, Nabisweera, Wabinyonyi and Nakitooma all of which were local farmers and local leaders.

The population of the local farmers and local leaders was drawn from the primary information provided in Table 1.1:

<i>Distribution of local farmers/leaders</i>	<i>Proposed interview sample</i>	<i>Actual interviewed Sample size</i>	<i>Sampling strategy</i>
Kalungi	06	03	Purposive
Kakooge	2	01	Purposive
Lwampanga	05	03	Snow ball
Nakasongola town council	07	03	Purposive
Nabisweera	10	02	Purposive
Wabinyonyi	06	02	Purposive
Nakitooma	03	01	Purposive
TOTAL	51	15	

Source: Primary data source

Study Design: This study has followed a case study research design to explore the perceptions on climate change and mitigation strategies among people in the district. According to Mouton (2001) a research design refers to a plan of how you intend to conduct the research addressing specific questions. This plan informs a specific research methodology. This study adopted a multiple interpretivist case study design/approach with two units of analysis at the selected sub counties in the district.

Study sample: The study employed 15 participants. The criteria for selecting the participants were based on; age, academic qualification, experience and residency in the case of Nakasongola district (Schreier, 2018). These are the factors that guided us to determine the sample size in a qualitative study. In addition, participants were accessed on appointment which enabled them to conveniently be interviewed. The snow ball sampling techniques was also used to complement purposeful sampling as an attempt to get rich information about

farmers' perceptions of climate change. I purposively chose from local farmers and local leaders, those with authority, those with experience and they are desirable in this specialized situation of climate change in Nakasongola district. I chose ten renown local farmers and five local leaders. As a qualitative researcher, I may get responses from fewer participants and reach the saturation level of my data collection

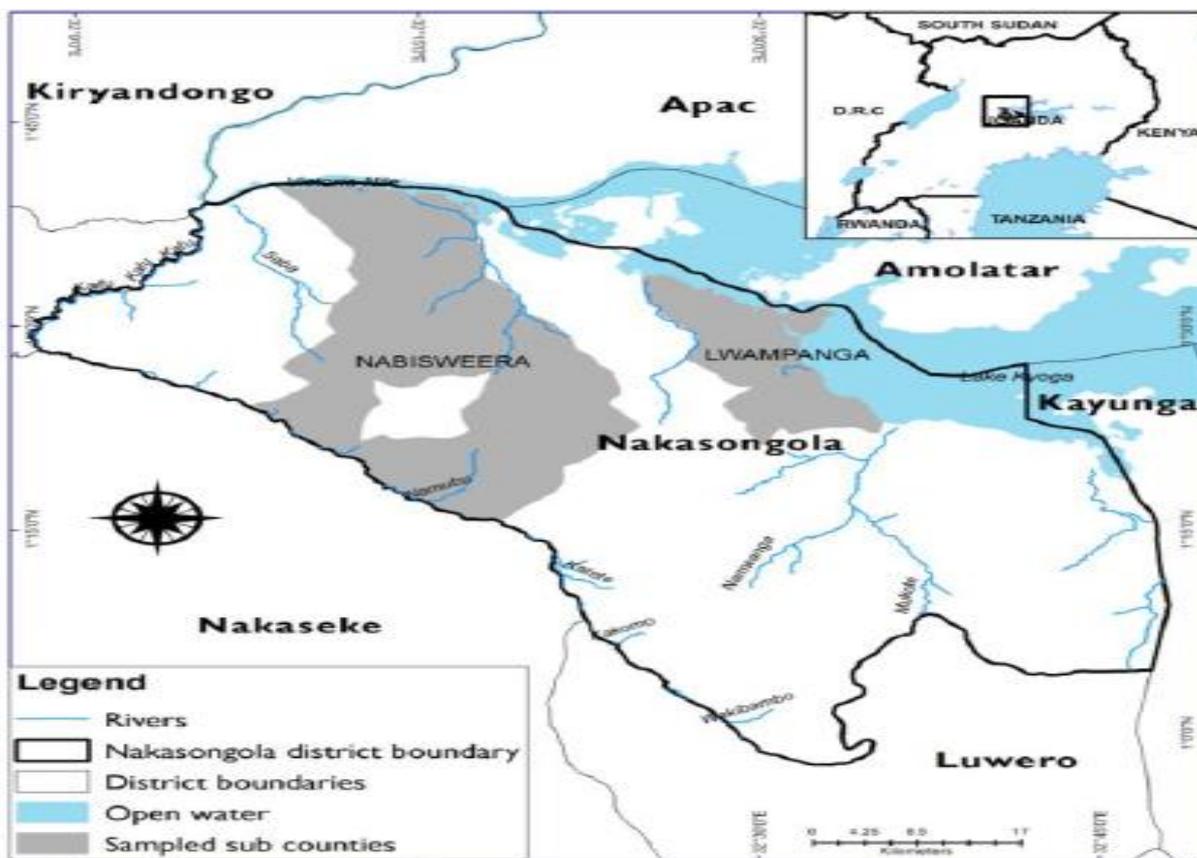
Research methods: Data were collected using semi-structured interviews from fifteen purposefully selected local farmers hence we used both primary and secondary data collection methods. The secondary data collection method consisted of analyzing various types of documents including national environment management authority. We chose this method as it is an important research tool and allows for triangulation of information. We also utilized interpretive methods for data collection, due to the fact that qualitative research methods are of greater value especially on enabling the understanding of phenomena.

This study being qualitative and interpretive in nature, the focus was on how the participants make meaning of a specific phenomenon such as curriculum leadership styles by analyzing their understanding and experiences upon this theme. Therefore, to have a clear analysis of the data, all recorded interviews were listened to several times immediately after every interview.

Area of study

The study was carried out in Nakasongola district located in the central region of Uganda which is known for experiencing various consequences of extreme climatic conditions such as drought and insufficient rainfall throughout the year hence it is unique with substantive climatic changes in Uganda (Owoyesigire & Mpairwe, 2020).

Fig. 3.1: Map showing Nakasongola district



Location of study area

RESULTS

This section reports findings about farmers' mitigation strategies in Uganda. The number of participants in this study, were as follows in Table 1.2 that provides a summary of participants' profiles.

Table 1.2: Provides a summary of participants' profiles

subcounty	Participant's Code	Highest Academic Qualification	Agricultural activity
Kalungi	KLCNS	PLE	Seasonal crop growing
Kakooge	KO-LCEAT-1	UCE	-Animal keeping -Seasonal crop growing
	KO-LCEAT-2	UACE	Animal keeping
	KO-LCEAT-3	Primary five	Seasonal crop growing
	KO-LCEAT-4	Primary six	-Seasonal crop growing -Animal keeping
	KO-LCEAT-5	PLE	Seasonal crop growing
Lwampanga	LWA-CAES1	PLE	Animal keeping
	LWA-CAES-2	PLE	-Seasonal crop growing -Animal keeping
	LWA-CAES-3	PLE	Seasonal crop growing
Nakasongola town council	NAKA-LCCIS-1	UCE	Animal keeping
	NAKA-LCCIS-2.	UCE	Seasonal crop growing
Nabisweera	NAB-CHS- 1	UCE	Animal keeping
	NAB-CHS- 2	PLE	-Seasonal crop growing -Animal keeping
Wabinyonyi	WA-COVAB,	UACE	Seasonal crop growing
Nakitooma	NAK-COCIS	PLE	Seasonal crop growing

Source: Primary data source

Sub-Theme #1: Farmers’ mitigation strategies

The section of the study explored the mitigation strategies practiced by local people to minimize the impact of climate change in Uganda. This objective emphasized explanations on mitigation strategies practiced by local people.

Table 1.3: Participants’ views on mitigation strategies practiced by local people

Participants’ views on mitigation strategies	Participants who held this view
Sensitization programmes and awareness programmes and training programmes	KLCNS
Disseminating current information on mitigation methods	KO-LCEAT-1 NAB-CHS-2 LWA-LCCIS-2
Enhanced use of small-scale irrigation schemes	KO-LCEAT-2
Changing the planting calendar of agronomic activities	LWA-CAES-1 LWA-CAES-2
Embracing of drought resistant and early maturing crop varieties	LWA-CAES-1 LWA-CAES-2
Increased use of soil and water conservation (terracing, water harvesting etc) technologies	KO-LCEAT-2
Challenges of erratic rainfall variability and environmental degradation	KO-LCEAT-3
Afforestation/reforestation (planting trees for climatic conservation)	KO-LCEAT-3
Expansion of agro-forestry (mango, avocado farms)	KO-LCEAT-2 NAB-CHS-1 WVAB-1 NAK-COCIS
Increased use of fuel wood conservation (stove, solar panels, and bio-gas) mechanisms.	KO-LCEAT-4
Planting diverse varieties of crops, cultivating different crops, shortening growing season	LWA-CAES-3

Findings from this objective reflect that education levels of the local farmers significantly influence the mitigation strategies being used. For instance: Participants KLCNS and KO-LCEAT-1 revealed that, famers have been trained and sensitized on the better methods to climate adaption as a mitigation strategy/ measure through their trusted model farmers in cooperation with the government extension workers who are able to train the farmers regularly.

In a similar way, participant KO-LCEAT-2 confessed that: most people in Nakasongola are effectively adapting measures for soil and water conservation and afforestation/reforestation through the use of fertilizers followed by the use of manures as well as an effective measure of water harvesting and enhanced use of small-scale irrigation schemes. This has sustained their little agricultural activities as a way of survival.

Participant KO-LCEAT-3 further pointed out that:

Agriculture is the most significant sector in Uganda’s economy, but it remains experiencing challenges of erratic rainfall variability and environmental degradation. I have resorted to planting trees have a long gestation period (Afforestation/reforestation) as a way to modify our Nakasongola climate and it is now that we have known what to do with our climate, I must look for means as an individual to make my climate sustainable and friendly.

In addition, participants LWA-CAES-1, and LWA-CAES-2 revealed that:

Timely planting, crop rotation, intercropping, and proper spacing were the most predominant agricultural practices in addition to changing the planting calendar of agronomic activities and embracing of drought resistant and early maturing crop varieties while rotational grazing, mulching, fertilizer use, and use of pesticides and herbicides were the least prevalent practices in the entire Nakasongola district. People in our communities are trying to use these methods as ways to mitigate the continued climate change in the area.

Similarly, Participants, NAB-CHS-1, WVAB-1, NAK-COCIS stressed that: afforestation and reforestation, wetland construction and restoration are the key aspects we must follow in our village to sustain good climate. In this regard, it is showed that the most effective mitigation measures are by planting drought resistant crops to overcome harsh climatic conditions.

For instance, KO-LCEAT-4 and LWA-CAES-3 confirmed that; Indigenous mitigation to climate change strategies in the entire Nakasongola district includes, planting diverse varieties of crops, cultivating different crops, shortening growing season, increased use of fuel wood conservation (stove, solar panels, and bio-gas) mechanisms, minimizing use of chemical fertilizers, improving in water maximization and mulching processes as well as taking the issues of climate change ultimately serious.

To add on this, participants NAB-CHS-2, LWA-LCCIS-2 confessed implementation of modern technique as mitigation strategies of climate change by improving on the seed varieties, embracing water for irrigation farming practices, disseminating current knowledge on mitigation methods, awareness programmes and training programmes calls for instant action in order to consign the impact of climate change in Nakasongola. In addition, participant NAKA-LCCIS-2 talked of implementing specific climate conservation and mitigation programmes serving as facilitators, promoters, encouragers, guardians in developing and applying more sustainable ways to conserve the existing climate.

Themes that emerged from the findings on the objectives

Several themes emerged from the priori issues as per the study objective which was; To explore the mitigation strategies practiced by local people to minimize the impact of climate change. Thus, themes emerged from the findings as shown in the table below:

Table 1.4: Themes that emerged from the findings

Themes that emerged from the findings
Climate awareness
Changing season

Climate awareness: Climate change awareness is defined as the concern about and belief in the issue of climate change (Yilmaz & Can, 2020). In this regard, Calculli et al. (2021) posits that people have begun to develop increasing environmental awareness and positive attitudes toward ecological matters particularly young people have begun to actively participate in environmental challenges by organizing green movements and engaging with policymakers exploring the aspects of awareness of the potential impacts of climate change and of environmental issues in each individual's daily life.

More still, In developed countries, climate change awareness is much advanced therefore, their climate change adaptations are also far better than those employed by farmers in the developing countries like Pakistan and climate change awareness obviously determines the nature, quality and strength of climate change adaptations as well as empowering the farming communities to take appropriate measures to mitigate the negative consequences of this phenomenon but the responses are not necessarily identical in scale and forms (Halady & Rao, 2010). However, the limitation of this definition is that, Yilmaz and Can (2020) never explained well how people observe climate change. They leave the reader in uncertainty in trying to conjecture how climate change awareness is and this prompted the researcher to undertake this study to find out awareness of people on climate change. From the findings of this study, it was revealed that majority of the participants confirmed their awareness on climate change and what is happening in their locality.

Changing season: The seasons change because of two things – how much direct sunlight a place gets during the year and how long the sun shines on that place during the day (El-kenawy et al., 2021). In a similar way, Kutta and Hubbart (2016) posits that seasonality are insufficient to reflect changes associated with a swiftly changing climate and regional changes in season onset and length using surface-based metrics are well documented, but hemispheric assessments using tropospheric metrics has received little attention to date.

Unreliability of climate, where there is no longer a recognizable pattern, is perhaps the most problematic factor for farmers and these changes in the seasonality of precipitation over Africa have high potential for detrimental socioeconomic impacts due to high societal dependence upon seasonal rainfall (Dunning et al., 2018). The above-mentioned journals provide an insight on changing seasons. They provide an overview on how seasons change in relation to rain fall and temperatures over places. However, they don't properly explain how these seasonal changes occur over time. This persuaded the researcher to conduct a study on peoples' perception and attitude on changing seasons.

Similarly, the variations are controlled instead by the seasonal changes in atmospheric temperatures hence colder atmosphere in winter enhances the temperature differential between the atmosphere and the sea surface, leading to a larger greenhouse effect despite the lower moisture contents. The magnitude of the clear-sky greenhouse effect is thus controlled by atmospheric humidity at low latitudes, but by atmospheric temperature at middle and high latitudes (Webb et al., 1993).

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the main findings from the research study revealed a number of key ideas and it is concluded that the study found out several mitigation strategies that are seen relevant to the climate such as planting drought resistant tree species, avoiding swamp reclamation, scaring away bush burning, charcoal burning and overgrazing. Protection motivation theory (PMT) and the theory of planned behavior (TPB) are upon problem solving in order to create awareness on climate change and mitigation strategies. From this perspective, this dissertation builds on Roger's appeal to encourage people to react or decide to adopt risk preventive activities against perceived threats such as climate change (Regasa & Akirso, 2019).

For instance, it is recommended that there should be a team of environment and climate experts to sensitize on the mitigation strategies in all the communities of Nakasongola district. Team leaders on environment protection must be done, issues of creativity on how to conserve nature must be encouraged and spread to all people in the Uganda.

REFERENCES

1. Acharyya, A. (2021). Integrating Climate Change Adaptation and Vulnerability Reduction for Sustainable Development in South Asia and Africa. In *Economic Effects of Natural Disasters* (pp. 547-557). Elsevier.
2. Axon, S. J. (2015). Addressing climate change at the community level: Opportunities for, and challenges to, mainstreaming sustainable development. The University of Liverpool (United Kingdom).
3. Bagagnan, A. R., Ouedraogo, I., M. Fonta, W., Sowe, M., & Wallis, A. (2019). Can protection motivation theory explain farmers' adaptation to climate change decision making in the Gambia? *Climate*, 7(1), 13.
4. Bostrom, A., Morgan, M. G., Fischhoff, B., & Read, D. (1994). What do people know about global climate change? 1. Mental models. *Risk Analysis*, 14(6), 959-970.
5. Bradbury-Jones, C., Taylor, J., & Herber, O. (2014). How theory is used and articulated in qualitative research: Development of a new typology. *Social Science & Medicine*, 120, 135-141.
6. Canterbury, J. L. (2021). Phenomenological Study of Lived Experiences of Leaders in a Women's Fitness Program American College of Education].
7. Egbe, C. A., Yaro, M. A., Okon, A. E., & Bisong, F. E. (2014). Rural peoples' perception to climate variability/change in Cross River State-Nigeria. *Journal of Sustainable Development*, 7(2), 25-36.
8. Elum, Z. A., Modise, D. M., & Marr, A. (2017). Farmer's perception of climate change and responsive strategies in three selected provinces of South Africa. *Climate Risk Management*, 16, 246-257.
9. Henry, P. (2015). Rigor in qualitative research: Promoting quality in social science research. *Res J Recent Sci ISSN*, 2277, 2502.
10. Kuule, D. A., Ssentongo, B., Magaya, P. J., Mwesigwa, G. Y., Okurut, I. T., Nyombi, K., Egeru, A., & Tabuti, J. R. S. (2022). Land use and land cover change dynamics and perceived drivers in rangeland areas in Central Uganda. *Land*, 11(9), 1402.
11. Makri, C., & Neely, A. (2021). Grounded theory: A guide for exploratory studies in management research. *International journal of qualitative methods*, 20, 16094069211013654.
12. Marikyan, D., & Papagiannidis, S. (2023). Protection motivation theory: A review. *TheoryHub Book: This handbook is based on the online theory resource: TheoryHub*, 78-93.
13. Mfitumukiza, D., Barasa, B., & Ingrid, A. (2017). Determinants of agroforestry adoption as an adaptation means to drought among smallholder farmers in Nakasongola District, Central Uganda. *African Journal of Agricultural Research*, 12(23), 2024-2035.
14. Muluneh, M. G. (2021). Impact of climate change on biodiversity and food security: a global perspective—a review article. *Agriculture & Food Security*, 10(1), 1-25.
15. Musinguzi, L., Efitre, J., Odongkara, K., Ogutu-Ohwayo, R., Muyodi, F., Natugonza, V., Olokotum, M., Namboowa, S., & Naigaga, S. (2016). Fishers' perceptions of climate change, impacts on their livelihoods and adaptation strategies in environmental change hotspots: A case of Lake Wamala, Uganda. *Environment, Development and Sustainability*, 18, 1255-1273.
16. Okonya, J. S., Syndikus, K., & Kroschel, J. (2013). Farmers' perception of and coping strategies to climate change: Evidence from six agro-ecological zones of Uganda. *Journal of agricultural science*, 5(8), 252.
17. Owoyesigire, B., & Mpairwe, D. (2020). Farmers' Agro-climatological Knowledge of Changes in Precipitation and Temperature Extremes in Semi-arid Nakasongola.
18. Sandelowski, M. (1993). Theory unmasked: The uses and guises of theory in qualitative research. *Research in nursing & health*, 16(3), 213-218.
19. Tripathi, A., & Maurya, N. S. (2025). Emerging Strategies in Greenhouse Gas Emission Analysis and Reduction: A Nanobiotechnology and Bioscience Perspective.
20. Twinomuhangi, R., Sseviiri, H., Mulinde, C., Mukwaya, P. I., Nimusiima, A., & Kato, A. M. (2021). Perceptions and vulnerability to climate change among the urban poor in Kampala City, Uganda. *Regional environmental change*, 21, 1-13.
21. Wu, H. L., & Volker, D. L. (2009). The use of theory in qualitative approaches to research: application in end-of-life studies. *Journal of advanced nursing*, 65(12), 2719-2732.