

**UNIVERSITY-COMMUNITY ENGAGEMENT OPPORTUNITIES TO
ADDRESS CLIMATE CHANGE IN THE AFRICAN CONTEXT: A
COMPARATIVE CASE STUDY OF NDEJJE AND
MAKERERE UNIVERSITIES**

BY

MANDELA NELSON


**A RESEARCH THESIS SUBMITTED TO THE SCHOOL OF EDUCATION,
DEPARTMENT OF EDUCATION MANAGEMENT AND POLICY STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
AWARD OF DOCTOR OF PHILOSOPHY IN EDUCATIONAL
RESEARCH AND EVALUATION**

MOI UNIVERSITY

2025

DECLARATION

This research thesis is my original work and has not been presented for academic purposes in any institutions of higher learning. No part of this work may be reproduced manually, electronically, or otherwise without prior permission from the author and/or Moi University.

Sign:  Date: 5th March, 2025

Mandela Nelson

DPHLERE/5876/22

APPROVAL OF THE PROJECT SUPERVISORS

This research project has been submitted for examination with our approval as CERM-ESA supervisors.

Sign: _____ Date: _____

Prof. KYALO WAMBUA BENJAMIN

School of Education, Moi University

Sign: _____ Date: _____

DR. DAVID SSEKAMATTE

Department of Management,

Uganda Management Institute

DEDICATION

This thesis is dedicated to my loving wife Ampaire Lucky whose love, patience, understanding, and profound moral support during my period of study enabled me to complete this thesis. To my Lovey daughters Jewel, Janela, and Janelle and son Irandela Jayson with a prayer that they will diligently follow in my footsteps in pursuit of humility and knowledge that will transform the livelihoods of many generations after them.

ACKNOWLEDGEMENT

I am indebted to Moi University, particularly the School of Education for allowing me to undertake the Doctor of Philosophy in Educational Research and Evaluation programme. I am humbled by the rare opportunity by DAAD and CERM-ESA to enable me to pursue this program, I cannot thank you enough. I am indebted to register my sincere appreciation to my project supervisors Prof. Kyalo B Wambuwa and Dr David Ssekamatte who patiently and determinedly guided me during the period I undertook this work. I appreciate their invaluable guidance, patience, and encouragement.

Thank you, Prof. Dr. Karsten Speck, Prof. Dr. Bernd Siebenhüner, Dr. Malve Mollendorff, Ms. Birgit Schelenz at the Carl von Ossietzky University of Oldenburg, and their families, I appreciate your valuable suggestions and support to better my study, enhance my thinking and analysis. Thank you for the logistical and administrative support during my research stay at Carl von Ossietzky University of Oldenburg, I am greatly indebted. I sincerely appreciate Prof Mathabo Khau at Nelson Mandela University for always guiding me whenever contacted, without any hesitation.

Above all, my sincere gratitude and glory are to God who enabled me to go through this process in times of joy, being alone, sickness, discouragement, and challenges. He is with me and I am always strong when I am on his shoulders. To Him be glory and praise forever. Thanks to each one and God's blessings to all.

ABSTRACT

The detrimental impacts of Climate Change have necessitated a strong and growing impetus for University-Community Engagement (UCE) to facilitate and sustain carbon reduction strategies and practices by higher education institutions. Taking urgent action to combat climate change is based on the adoption of the United Nations to the Sustainable Development Goals (SDGs) by 2030. Many African universities have embedded climate change knowledge and programs in teaching and research, with a dearth of literature on the third mission (community engagement). Thus, this study explored the views and perspectives of university staff and students regarding the opportunities that universities can engage communities to address issues of climate change (knowledge, mitigation, and adaptation practices), particularly in an African context. The study answered four research questions; What are the community engagement activities implemented by the case universities on climate change? How are the case universities developing and coordinating community engagement programs on climate change action? What are the major constraints in the university-community collaborations in the efforts to address climate change in selected cases? What are the opportunities that might enhance the third mission programs towards climate change issues at the case universities? Using Ubuntu theoretical approach, a qualitative comparative case study design was adopted to generate data from 42 purposively selected university staff, students of climate change related programs at the case universities and community leaders. Data were generated through semi-structured in-depth interviews with the university staff and community leaders and focus group discussions with students. Data was analysed using Braun and Clarke's (2006) thematic analysis with the help of MAXQDA software. The findings revealed that both universities implement both university and students-initiated and led engagement programs on climate change action that include rendering institutional support, research and innovation programs, climate education and awareness creation activities, and capacity-building activities among others. These engagement programs are developed and coordinated through strategic capacity building, formulation of guiding engagement frameworks and partnerships with external stakeholders. However, the study findings revealed various challenges that the implementing units at these case universities face. These included institutional constraints, resource-related barriers, COVID-19 and its impacts, myths and misconceptions about climate change. The results of the study further revealed numerous UCE prospects for climate action like institutional commitment to community engagement towards climate change mitigation and adaptation; incorporation of indigenous knowledge about climate change mitigation and adaptation in mainstream academic and collaboration programs; leveraging traditional conversation spaces (Barazas) for UCE and pathways for sensitization; harnessing women's knowledge, experiences and contribution towards climate change mitigation and adaptation practices; and community empowerment and income diversification as a key to building climate resilient communities. The findings suggest that Universities in African contexts should ensure institutionalization of UCE with formal engagement structures and definite prioritization of inclusive, funded, transparent and equitable engagement programs. The conceptualization, implementation, and sustainability of CE programs in African contextualized Higher Education Institutions (especially universities) should reflect indigenous epistemologies induced by African philosophies as its core foundations.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES	xii
LIST OF FIGURES	xiii
ABBREVIATIONS AND ACRONYMS	xiv
CHAPTER ONE	1
INTRODUCTION TO THE STUDY.....	1
1.0 Introduction.....	1
1.1 Background of the Study	1
1.2 Statement of the Problem	8
1.3 Purpose of the Study.....	9
1.4 Research Objectives	10
1.5 Research Questions	10
1.6 Justification	10
1.7 Significance of the Study.....	12
1.8 Theocratical Framework.....	13
1.9 Conceptual Framework.....	27
1.10 Scope and Delimitations of the Study	28
1.11 Limitations of the Study	29
1.12 Assumptions of the Study.....	30
1.13 Operational Definition of Key Concepts and Terms	31
1.14 Summary	34
CHAPTER TWO.....	35
LITERATURE REVIEW.....	35
2.0 Introduction	35
2.1 Climate Change.....	35
2.2 The Effect of Climate Change on Communities	41
2.3 Climate change and education.....	42
2.4 Universities' Third Mission (University-community Engagement)	44

2.5 The Role of University-Community Engagements in Climate Change Action.....	50
2.6 Challenges Impending Climate Change Action	56
2.7 Conclusion and Gaps	57
CHAPTER THREE	62
RESEARCH DESIGN AND METHODOLOGY	62
3.0 Introduction	62
3.1 Philosophical Underpinnings of the Study	62
3.2 Research Approach.....	66
3.3 Research Design.....	67
3.4 Study Area.....	71
3.4.1 Case Description	73
3.5 Target Population.....	74
3.6 Sampling procedure and Sample size of the Study.....	75
3.6.1 Sampling Procedure at Ndejje University and Makerere University	76
3.6.2 Study sample at the two cases	77
3.7 Research Methods and Instruments	78
3.7.1 Semi-structured in-depth Interviews	79
3.7.2 Focus Group Discussions	81
3.7.3 Document Analysis	83
3.8 Quality of the Research Process (Trustworthiness)	85
3.8.1 Credibility: Truth-value	86
3.8.2 Transferability: Applicability or Generalizability.....	87
3.8.3 Dependability	88
3.8.4 Confirmability	89
3.9 Data Collection Procedures	89
3.10 Data Analysis	91
3.11 Ethical Considerations	97
3.11.1 Researcher's Honesty on the Study Purpose.....	98
3.11.2 Confidentiality.....	99
3.11.3 The Right to Withdrawal	99
3.12 Summary	99
CHAPTER FOUR.....	101
DATA PRESENTATION, INTERPRETATION, ANALYSIS AND	
DISCUSSION	101

4.1 Introduction.....	101
4.1.1 Contextual Case Analysis.....	101
4.2 Community Engagement Programs Implemented by the Case Universities on Climate Change.....	115
4.2.1 University initiated and led engagement programs on climate change action	116
4.2.1.1 Rendering institutional support for community engagement	117
4.2.1.2 Research and Innovation	119
4.2.1.3 Climate education and awareness creation activities	122
4.2.1.4 Capacity building programs.....	125
4.2.2 Students initiated and led engagement programs on climate change action (Makerere University)	128
4.2.2.1 Partnerships with NGOs and government	128
4.2.2.2 Climate education and awareness creation activities	131
4.2.3 University initiated and led engagement programs on climate change action at Ndejje University	133
4.2.3.1 Institutional Support for Community Engagement	134
4.2.3.2 Research and Innovations programs.....	137
4.2.3.3 Climate education and awareness creation activities	140
4.2.3.4 Climate Entrepreneurship	143
4.2.3.5 Capacity building programs.....	145
4.2.4 Students initiated and led engagement programs on climate change action .	147
4.2.4.1 Climate education and awareness creation activities	147
4.2.4.2 Research and Community Initiatives.....	149
4.2.5 Cross case analysis	152
4.2.6 Synthesis.....	154
4.3 Development and Coordination of Community Engagement Programs on Climate Change Action	156
4.3.1 Development of engagement programs.....	157
4.3.1.1 Strategic Capacity Building.....	158
4.3.1.2 Planning of engagement programs and activities	163
4.3.1.3 Formulation of Guiding Frameworks for Engagement	165
4.3.2 Coordination of engagement programs	169
4.3.2.1 Guidance of University Strategic and Action Plans	169

4.3.2.2 Climate Change Coordination Centre.....	171
4.3.2.3 Coordination through Partnerships.....	175
4.3.3 Development of Engagement Programs at Ndejje University	179
4.3.3.1 Strategic Capacity Building.....	180
4.3.3.2 Planning of engagement programs and activities	183
4.3.3.3 Formulation of Guiding Frameworks for Engagement	184
4.3.4 Coordination of Engagement Programs at Ndejje University.....	187
4.3.4.1 Guidance of university structures and plans.....	187
4.3.4.2 Coordination through Partnerships.....	189
4.3.5 Cross Case Analysis	192
4.3.6 Synthesis.....	194
4.4 Major Constraints in the University-Community Collaborations in the Efforts to Address Climate Change.....	195
4.4.1 Enemies of engagement programs on climate change action at Makerere University	195
4.4.1.1 Institutional constraints to engagement programs	197
4.4.1.2 Resource-related barriers	201
4.4.1.3 COVID-19 and its impacts	205
4.4.1.4 Myth and misconstructions about climate change.....	209
4.4.1.5 Policy Gaps in environment-related engagement programs.....	212
4.4.2 Constraints to engagement programs on climate change action at Ndejje University	215
4.4.2.1: Institutional constraints	216
4.4.2.2 Resource-related barriers.....	219
4.4.2.3 COVID-19 and its impacts on engagement programs.....	225
4.4.2.4 Unawareness challenges	229
4.4.2.5 Local priorities and livelihood concerns	232
4.4.3 Cross Case Analysis	235
4.4.4 Synthesis.....	238
4.5 University Community-Engagement Opportunities Towards Climate Change in African Context.....	240
4.5.1 Opportunities from Case One; Makerere University	241
4.5.1.1 Institutional commitment to CE towards climate change mitigation and adaptation	242

4.5.1.2 Leveraging traditional conversation spaces (Barazas) for UCE and pathways for sensitization	251
4.5.1.3 Incorporating CC Indigenous Knowledge in mainstream academic and engagement programs.....	258
4.5.1.4 Harnessing women's knowledge, experiences and contribution.....	264
4.5.1.5 Community Empowerment and Income Diversification as a Key to Building climate resilient Communities	268
4.5.1.6 Synergetic approach for policy formulation and implementation	272
4.5.1.7 Extensive capacity building.....	277
4.5.2 Opportunities from Case Two; Ndejje University	282
4.5.2.1 Institutionalization of CE towards climate change action	283
4.5.2.2 Adapting a community engagement Baraza as an alleyway for sensitisation	289
4.5.2.3 Community empowerment and income diversification strategies	292
4.5.2.4 Incorporation of CC Indigenous knowledge in mainstream academic and engagement programs.....	296
4.5.2.5 Collaborative approach to planning and implementation of engagement programs	300
4.5.2.6 Extensive capacity building.....	303
4.5.3 Cross Case Analysis	305
4.5.4 Synthesis.....	310
4.6 Chapter Summary	312
CHAPTER FIVE	313
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	313
5.1 Introduction.....	313
5.2 Summary of Findings.....	313
5.2.1 Community engagement programs implemented by the case universities on climate change	314
5.2.2 Development and coordination of community engagement programs on climate change action at the case universities	317
5.2.3 Major constraints in the university-community collaborations in the efforts to address climate change in the selected cases.....	319
5.2.4 Opportunities that might be able to enhance the third mission programs	

towards climate change issues at the case universities	321
5.3 Thesis Contribution.....	323
5.3.1 Empirical contribution of the study.....	324
5.3.2 Contribution to policy and practice	325
5.3.3 Theoretical Contribution	326
5.4 Conclusion	331
5.5 Recommendations.....	336
5.6 Recommendations for Further Research.....	338
5.7 Chapter Summary	339
REFERENCES	340
APPENDICES	364
Appendix I: Kampala and Luwero Districts	364
Appendix II: Consent Form	365
Appendix III: Interview Guide for University Management.....	368
Appendix IV: Interview Guide for Community Leaders Introduction	370
Appendix V: Document Review Guide	372
Appendix VI: Community Engagement Plan	373
Appendix VII: Focus Group Guide for Students	376
Appendix VIII: Research Permit, Ndejje University	378
Appendix IX: Institutional Research Permit: Makerere University.....	380
Appendix X: Institutional Research Permit: Ndejje University.....	381
Appendix XI: Research Permit; Uganda National Council for Science and Technology	382
Appendix XII: Recruitment information.....	384
Appendix XIII: Uganda Data Collection COVID-19 Risk Management Plan	385
Appendix XIV: Similarity Index/Plagiarism Report.....	389

LIST OF TABLES

Table 2.1 Summary of empirical review and gaps in knowledge identified	60
Table 4.1: Agricultural households that experienced climate-related shocks (%), 2009-2019	106
Table 4.2: Community engagement programs at Makerere University.....	116
Table 4.3: Community engagement programs at Ndejje university	134
Table 4.4: Development and coordination of engagement programs at Makerere University	158
Table 4.5: External partners of the College of Agricultural and Environmental Science, Makerere University	177
Table 4.6: Development and coordination of engagement programs at Ndejje University	180
Table 4.7: Enemies of engagement programs on climate change action at Makerere university	196
Table 4.8 Constraints to engagement programs on climate change action at Ndejje University	216
Table 4.9: University-community engagement opportunities to contribute to climate change action at Makerere University	241
Table 4.10: Faculty evaluation system at Makerere University. Source: Data from MUK, 2009, pp. 17–18.....	247
Table 4.11: Opportunities to enhance the university's third mission to contribute to climate change mitigation and adaptation at Ndejje University.....	283

LIST OF FIGURES

Figure 1.1: Conceptual Framework. Source: Researcher's Construct.....	28
Figure 3.1: Steps of the multiple case study, adapted from Yin, 2015	70
Figure 3.2 Data collection methods.....	79
Figure 3.3: Braun & Clarke's six-phase thematic framework (Braun & Clarke, 2006)	93
Figure 3.4 Summary of the research design.	100
Figure 4.1: Observed Rainfall Performance (in blue) for November 2023 compared with Long Term Mean (LTM) in Red Source: Uganda National Meteorological Authority (2023)	104
Figure 4.2 Makerere University 2020-2030 strategic plan goals; Source:	109
Figure 4.3 CAES strategic plan strategic areas.....	111
Figure 4.4: Ndejje University strategic objectives.....	114
Figure 5.1 Theoretical Model: Linking University community engagement to Climate Change action in the African Context	3293

ABBREVIATIONS AND ACRONYMS

AADP:	Africa Agricultural Development Program
ARUA:	African Research Universities Alliance
ASG-QA:	African Standards and Guidelines for Quality Assurance in Higher Education
AUC:	African Union Commission
CAES:	College of Agricultural and Environmental Sciences
CARTA:	Consortium for Advanced Research Training in Africa
CC:	Climate Change
CCAKB:	Climate Change Adaptation Knowledge Base
CCKMS:	Climate Change Knowledge Management System
CE:	Community Engagement
CEEDRR:	Climate, Environment, Energy, and Disaster Risk Reduction
CERM-ESA:	East and South African-German Centre for Educational Methodologies and Management
CL:	Community leader
COP:	Conference of Parties
COVID-19:	Coronavirus disease 2019
CREEC:	Centre for Research in Energy and Energy Conservation
CSAG:	Climate System Analysis Group
DAAD:	Deutscher Akademischer Austauschdienst (German Academic Exchange Service)
EAC:	East African Community
EARDC:	Environment and Agricultural Research and Development Centre
ERICCA:	Education and Research to Improve Climate Change Adaptation Activity

GDP:	Gross Domestic Product
GGGI:	Global Green Growth Institute
GHG:	Green House Gas
HEIs:	Higher Educational Institutions
IFAD:	International Fund for Agricultural Development
ITMUA:	Implementing the Third Mission of Universities in Africa
KCCA:	Kampala Capital City Authority
KP:	Kyoto Protocol
MAK:	Makerere University
MAXQDA:	Computer-Assisted Qualitative Data Analysis Software
MoU:	Memorandum of Understanding
MUCCA:	Makerere University Climate Change Association
MUCCRI:	Makerere University Centre for Climate Change Research and Innovations
NCCP:	National Climate Change Policy
NDP:	National Development Plan
NDU:	Ndejje University
NEMA:	National Environment Management Authority
NFA:	National Forestry Authority
NGO:	Non-Governmental Organisation
RICO:	Research, Innovations and Community Outreach
RUFORUM:	Regional Universities Forum for Capacity Building in Agriculture
SDGs:	Sustainable Development Goals
SRU:	Sustainability Research Unit
TM:	Third Mission

TTO:	Technology Transfer Offices
UBOS:	Uganda Bureau of Statistics
UCCCN:	Uganda Climate Change Champions Network
UCE:	University Community Engagement
UCUREC:	Uganda Christian University Research Ethics Committee
UN:	United Nations
UNCST:	Uganda National Council for Science and Technology
UNESCO:	United Nations Educational, Scientific and Cultural Organization
UNFCCC:	United Nations Framework Convention on Climate Change
UNICEF:	United Nations Children's Fund
UOTIA:	Universities and Other Tertiary Institutions Act
US:	University Staff
USAID:	United States Agency for International Development
WASH:	Water, Sanitation, and Hygiene
WMO:	World Meteorological Organization

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

This chapter presents an overview and background to the study on university-community engagement opportunities to address climate change, a statement of the problem, objectives of the study, research questions, significance of the study, justification of the study, scope, and delimitation of the study, limitations of the study, study assumptions, theoretical and conceptual frameworks, and operational definition of terms.

1.1 Background of the Study

Climate change is exacerbating extreme weather across the globe. According to the United Nations Children's Fund [UNICEF] (2022) Strategy-at-a-Glance for Climate, Environment, Energy, and Disaster Risk Reduction-CEEDRR (2022-2030), many countries are currently experiencing heatwaves and changing seasons, which are contributing to catastrophic fires, draughts, floodings, and human suffering. Noticeably, climate change brings a double emergency of droughts and floods. The average number of disasters caused by natural hazards has increased in the last 20 years from 200 a year to more than 400 today, and this is predicted to increase by as much as 320 percent in the next 20 years (Khan et al, 2022, Benevolenza & DeRigne, 2019; Hallegatte, 2016; Anderson, 2010).

Taking urgent action to combat climate change is rooted in the adoption of the United Nations to the Sustainable Development Goals (SDGs). Both developed and developing countries are increasingly focusing on implementing policies and actions that achieve SDGs. In particular, this study focused on Sustainable Development Goal

13, “Taking urgent action to combat climate change and its impacts” United Nations Educational, Scientific and Cultural Organization (UNESCO, 2015). Among the targets are improving education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning. Regardless of the dedication of governments to improve the education sector, effective strengthening of resilience and adaptive capacity to climate-related hazards and natural disasters in almost all countries still remains hard to accomplish. This has been due to a lack of strong political will and the required resources.

In the Horn of Africa for example, there is little escape from the extreme weather. UNICEF (2021) has reported that Children in the Horn of Africa are at the sharp end of the climate crisis. Children and their families are experiencing the worst drought in 40 years, extreme hunger and severe water shortages, loss of homes and livelihoods and access to schools, and increased risk of violence and child marriage. Families are being driven to the edge and this is pushing communities from their homes. Such impacts of climate change mean disrupted education as schools close and immense pressure on extremely scarce water resources. These are signs that climate change is something that humans should worry about now and thus should be treated with utmost urgency.

Uganda has in past decades experienced more erratic rainfalls leading to frequent busting of rivers, mudslides and landslides in areas like Bududa, changing weather patterns, and drops in water levels. Furthermore, Uganda has also experienced an increased frequency of extreme draughts that continue to lead to the loss of lives and property of communities especially those living in the mountainous areas of Kasese, particularly Rwenzori Mountains, by causing glacier melting, increasing water levels in the Nyamwamba, Mubuku, and Ruimi Rivers (Mertens et al, 2016; Taylor et al

2009).

It has been noted that climate change threatens to undo and even reverse the progress made toward meeting the SDGs and poses one of the most serious challenges to reducing global poverty for the international Community (Kompas, Pham, & Che, 2018; Anderson, 2010). In 2021, world leaders headed by the United Nations (UN) secretary general and United Kingdom prime minister warned that the earth risks losing the climate change fight if leaders do not act and initiate strategies to thwart global heating from surpassing a critical threshold (Wulff, 2021). The Conference of the Parties (COP26) climate summit (which involves nearly 200 countries as per the Paris Agreement signed in France in 2016) targets capping global heating to 1.5 degrees Celsius, all countries need to commit and act by halving greenhouse gas emissions in the next 8 years and reach net-zero emissions by 2050.

Global challenges like climate change require societal transformation toward a more sustainable future that is characterized by knowledge transfer, participatory decision-making, and lifelong learning. The Uganda environmental education policy (2010) asserts that environmental education should adequately be mainstreamed in all relevant education programs and curricula for both primary and secondary levels. This should address issues of environmental management and biodiversity conservation. This policy cements the significance of climate change education in Uganda. Relatedly, Uganda signed and ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (KP) and signed and ratified the Paris Agreement thus committing themselves to the adoption and implementation of policies and measures designed to mitigate climate change and adapt to its impacts (Apollo, & Mbah, 2021; Uganda Climate Action Report, 2016).

Uganda is also a party to the implementation of the East African Community (EAC) Climate Change Policy, which requires member states to initiate and develop consistent and harmonized, policies and plans to address climate change. Like many countries, Uganda's economy is largely dependent on climate-sensitive sectors like agriculture. Thus, Uganda also intends to implement strategies, plans, and actions for low greenhouse gas emissions in the context of its development goals based on the country's National Climate Change Policy (NCCP) 2015. This policy is derived from the Constitution of the Republic of Uganda (1995, as amended in 2005 and 2015) and reflects Uganda Vision 2040 (2012).

The priorities in the National Climate Change Policy have been integrated into the Second National Development Plan (NDP II) 2015/16 - 2019/2020; the third NDPIII (2020/21 – 2024/25) and the fourth NDP IV (2025/26-2029/30). In the long term, Uganda intends to follow climate-resilient and low-carbon development paths that explore possible opportunities like stakeholder engagements linked to green growth and broader sustainable development goals. Relatedly, the Kampala Climate Change Action strategy is a plan aimed at mainstreaming climate change response in all the city services in order to put the city on a low-carbon development path. The strategy addresses three issues: (i) the short and long-term adaptation of the city to climate change impacts, (ii) charting a low emissions development path for the city and (iii) transforming the threat of climate change into an opportunity for Kampala residents.

As the risks posed by climate change have become increasingly well documented Rising et al, (2022); Zenios (2022); Rocque et al, (2021); Celik (2020); Kompas et al, (2018;), the urgency of engaging the public around these risks has grown. In modern knowledge-based societies, universities play an increasingly important role in achieving economic growth and social progress. In the past few decades, universities

have disregarded themselves as isolated and separated islands from their surrounding communities and have therefore developed internal mechanisms to bridge their activities with the needs and expectations of external actors (Pinheiro et al, 2015). Thus, traditional roles and missions are being broadened to accommodate activities that facilitate engagement with various stakeholder groups in the communities. This supports the view that universities are not merely located in a community but are supposed to be active members of the community. Therefore, universities have an integral role to play in the welfare and development of the community contributing to and from, the communities around them (Bhagwan, 2017).

Community engagement has emerged as a top priority at universities to collaborate and facilitate the mutually beneficial exchange of knowledge and resources for both universities and communities (Jadhav & Suhalka, 2016). However, in some African setups, community engagement practices are not commonly followed and not prioritized but, rather, done as an add-on or afterthought (McNair & Ramaley, 2018). This results in limited and very superficial interactions between academics and communities. Furthermore, it leads to limited incorporation of community engagement activities into the teaching and research projects of the university.

Since their evolution, Universities have assumed a tripartite function; teaching, research, and community engagement, all of equal importance. Like cogwheels, the three rely on each other to turn and keep society in motion. Although teaching and research feed into each other, there has always been a danger of falling short of engaging the community, and hence that translates to a lack of relevance of higher education to society. It is only recently that community engagement is now regarded as the core goal of higher education, also referred to as the Third Mission (TM) (Montonen et al, 2021). The same authors argue that community engagement is more than just the

application of expert knowledge of university researchers, but that researchers and community members need to engage in a reciprocal relationship in which both will benefit. Thus university-community engagement is a mutually beneficial and integrated interaction between students, staff, and their communities.

The partnerships between universities and communities in African contexts ought to be underpinned by the Ubuntu philosophy of interdependence and reciprocity within an African society. Thus, *Ubuntu* as a philosophy of higher education ought to be cultivated by humans serious about addressing societal, environmental and political malaise, and this implies that they (universities) have to see themselves as co-belonging to a community of humans on the basis that there is no precondition for belonging and community engagement (Waghid, 2020).

Raditloaneng (2013) and Alcántara-Rubio et al (2022) have provided testimony and point of contact that African universities can work together on collaborative projects that depict university service to communities in their regions regarding climate change action. O’Keeffe (2016) concluded that ‘various universities have established climate change research centers to assist Ethiopia in addressing the potential problems of climate change (p. 809). The author cites Addis Ababa University and the University of Gondar. The centre established by Gondar aims to ‘empower local communities to improve their living prospects and works’ amidst climate change through various interventions including climate change adaptation and mitigation, education, and awareness.

Besides a wide range of integral roles and benefits of university-community engagements, universities, and communities, as actors within regional and social contexts, have positive social, cultural, and environmental impacts that allow

integration with the SDGs particularly addressing climate change (Bedoya-Dorado et al, 2021). Indeed, Axion (2016) has noted that the transition to higher levels of community engagement provides an opportunity for social solutions to demonstrate their potential as effective approaches for addressing climate change and the multitude of benefits that can result. For example, University-community engagement opportunities can practically enable carbon-neutral communities, and energy efficiency and reduce their (universities and communities) own ecological footprint (Karami, Shobeiri, & Jafari, 2017).

Despite fore fronting community engagement and legislation encouraging the establishment of collaborative and mutually beneficial university-community partnerships, this has remained a contested space. University–community engagement in most African universities continues to be characterised by universities engaging with communities to extract data to further their research agenda and, in the process, not acknowledging community needs and also not contributing to sustainable benefits for the community (Sathorar & Geduld, 2021). Thus, universities have to ask why and how they engage with their communities, as well as whether their engagement would contribute to social transformation through the achievement of SDGs. It is therefore timely that in a period of increasing public engagement in addressing climate change and the rapidly growing number of networks of activists globally, this study aims to explore the opportunities for university-community engagements towards the transition to a low-carbon society and future. This is particularly important given that the activities and actions of individuals, households and communities are responsible for causing and addressing climate change (Whitmarsh & O'Neill, 2011).

1.2 Statement of the Problem

The changing climate is making it harder to deliver quality education and ensure food security, sustainable agriculture, and development. Disasters induced by climate change damage or destroy educational facilities and systems, threatening the physical safety and psychological well-being of communities and interrupting agricultural sustainability which 70% of Africans depend on for livelihoods. African countries are said to be more at risk from climate change effects because of several factors including limited skills and equipment for disaster management, limited financial resources, weak institutional capacity, and heavy dependence on rain-fed agriculture. The effect of climate change on human activities (and vice versa) raises significant questions for societies and their education systems.

While the motivation and need to address climate change are real and present, its translation into action lacks immediacy and severity (Wulff, 2021). USAID (2022) has noted that while climate action is included as one of the 17 SDGs, climate impacts will affect and undermine global efforts to achieve virtually all of these goals. Whereas there are several existing solutions, there has been an over-reliance on technological responses with minimal attention paid to the role of social solutions. Following the UNCCC (2015) and 2023 Nairobi declaration (resolution 45), there has been a need for community engagement regarding (addressing) climate change. This provides an opportunity for the ‘third mission of universities to demonstrate their potential through CE as an effective approach for addressing climate change and the multitude of benefits that can result.

Whereas universities are some of the institutions well-positioned to solve problems related to climate change by virtue of them being generators of knowledge,

they have mistakenly been viewed as ‘ivory towers’ that is, isolated entities that are elitist in nature and disconnected from the places in which they are situated which account for the gap between the two as research and teaching have been treated as separate entities from communities. While several studies have been done on the third mission activities of universities (Nabaho et al, 2022; Papadimitriou, 2020; Edvardsson, 2020; Nicotra et al, 2021; Axon 2015), there is a dearth of literature on university-community engagement activities and programs on climate change action, particularly in an African context. Most extant studies focus on technological solutions for addressing climate change and are largely skewed toward the European and American higher education contexts.

Thus, this study explored the opportunities for university-community engagement towards climate change action and sustainable development in an African context. The findings of this study can guide the integration of climate change measures into national policies, strategies, and planning.

1.3 Purpose of the Study

The purpose of this study was to explore the opportunities for university-community engagement towards climate change action in an African context at two universities in Uganda. This is to enhance the TM of higher institutions of learning in addressing the challenges of climate change and achieving a sustainable world. Reflecting on indigenous epistemologies induced by the African theoretical framing of Ubuntu, I was particularly interested in finding out not only whether the universities engage with, and reach out to the external communities to address issues of climate change, but also importantly about the main TM-related activities and the development

and coordination of TM activities. The study focused, although not entirely, on the 1990–2022 period.

1.4 Research Objectives

- i. To establish community engagement activities implemented by the case universities on climate change.
- ii. To investigate how the case universities develop and coordinate community engagement programs on climate change action.
- iii. To identify major constraints in the university-community collaborations in the efforts to address climate change at the case universities.
- iv. To explore opportunities that can enhance the third mission programs towards climate change issues at the case universities.

1.5 Research Questions

- i. What are the community engagement activities implemented by the case universities on climate change?
- ii. How are the case universities developing and coordinating community engagement programs on climate change action?
- iii. What are the major constraints in the university-community collaborations in the efforts to address climate change in selected cases?
- iv. What are the opportunities that might be able to enhance the third mission programs towards climate change issues at the case universities?

1.6 Justification

Educational institutions are mandated to form partnerships with other societal actors and communities, to foster interdisciplinary collaboration and impact positively on the society (Fear & Sandmann, 2016). Indeed, higher education institutions ought to

ground academic knowledge in real-world conditions, connecting knowledge to practice, bringing academics and practitioners into closer relationships, and improving conditions in local communities for sustainable development. As the third core function/mission of universities, besides research and teaching, engagement can therefore be described as the universities' commitment to producing knowledge that benefits society through critical and constructive contributions to regional, national, and global sustainability. It has been emphasised at the African Climate Summit (2023), resolution 45, that an inclusive approach should include engagement and coordination with the indigenous people and communities in climate-vulnerable situations and should be accorded high priority by all institutions.

The whole world is currently catastrophically far from the crucial goal of 0.5 °C as governments everywhere (including Uganda) continue to accelerate the climate change crisis, spending billions of money on fossil fuels. The future of millions of Africans is at stake as there are likelihoods of worse food security, and educational and agricultural disruptions, as a result of climate change impacts. Since education offers untapped opportunities to address climate change, it is paramount to investigate how universities can collaborate with communities in what is now referred to as the 'third mission on how to adopt and mitigate climate change before a terrifying future befalls. If not addressed, climate change threatens to undo and even reverse the progress made toward meeting the SDGs, particularly goals one, four, eleven, and thirteen, and poses one of the most serious challenges to reducing global poverty for the international community. The importance of a stable climate is clear as we need food, fresh water, fibre, timber, and protection from hazards to survive and thrive (Lehtonen et al, 2019).

1.7 Significance of the Study

It is hoped that the findings of this study may improve education, awareness-raising, and human and institutional capacity for climate change mitigation, adaptation, impact reduction, and early warning. Findings may further strengthen community resilience and adaptive capacity to climate-related hazards and natural disasters in African contexts. The study findings may guide the promotion of mechanisms for raising the capacity for effective climate change-related planning and management in Uganda and Africa at large including focusing on women, youth, NGOs, and local and marginalized communities among others. This is as per SDG goal number thirteen targets.

This study may further guide the formulation and passing of climate policies that protect humanity, especially the students (the most vulnerable) and greatly reduce on risks of climate change and its impact on education. Particularly, findings might inform climate change integration into national policy and strategy development and in particular, to what extent are climate change considerations being taken into account by the drafters of the National Development Plans (NDPs).

This study may also make a significant contribution to the discourse on university-community engagement in higher education particularly regarding climate change action. Mainly, it may add to the limited literature on the third mission of universities from a supranational perspective in an African context and therefore complement the scanty literature that uses higher education institutions as a unit of analysis. Hence, although the study concerns only two cases, its conclusions, recommendations, and observations are expected to be rather useful for HE researchers and leaders from other HEIs (especially African universities).

1.8 Theocratical Framework

The theoretical framework for this study was informed and underpinned by *Ubuntu* theory, a deeply held African philosophy with ideals of a community rooted in the interconnectedness of others. *Ubuntu* can be defined as a phenomenon that is a philosophy, an ethic, African humanness, or a worldview (Nyawuwe & Mkabela, 2007). These authors have noted that *Ubuntu* is a social tenet, a collective worldview contained in the Zulu proverb ‘*umuntu ngumuntu ngabantu*’ (‘one is a person through others’). In the context of theoretical structuring, *Ubuntu* stresses the collective spirit; and the importance of community, engagement, solidarity, caring, reciprocity, and sharing. This worldview of *ubuntu* advocates a profound sense of interdependence and emphasizes that our true human potential can only be realized in partnership with others. Thus, ubuntu is an African worldview of societal relations.

Relatedly, the moral philosophy of *Ubuntu* is also premised on the reciprocal belief that an individual’s humanity is expressed through personal relationships with others in a community, and in turn other people in that community recognize the individual’s humanism that conceptualizes and treats the world as an interdependent ecosystem of humans, nature, and the planet (Nyaumwe & Mkabela, 2007). Notably, the *Ubuntu* theory is deeply connected to the other African philosophy of *ujamaa* by Mwalimu Julius Nyerere of Tanzania— which forefronts community, mutual respect, responsibility, reciprocation, and the responsibility of cooperating for the common good of all (Nyerere, 1968). Thus, *Ubuntu* can be considered as both a descriptive account of value systems that operate across much of Sub-Saharan Africa (and hence helpful in understanding and contextualizing research and practice in this part of the world) as well as a normative philosophy of how people should relate to one another (of relevance well beyond Africa) (Bolden, 2014).

Ubuntu derives from the Nguni and Bantu languages of Africa (Samkange and Samkange, 1980). In the Zulu language of South Africa, the word symbolises being human. This meaning is also expressed in other languages. In Zimbabwe, the word *unhu* is used in Shona, while the Ndebele use the word *ubuthosi* and Ubuntu in the Kiswahili language, a lingua franca of the East African Community (EAC), and a national and official language of most of the countries in the EAC. It is *mundu* in Kikuyu (Kenya), *ubuntu* in kiSukuma (Tanzania), *gimuntu* in kiKongo (DRC). In Botswana, the word *botho* expresses the same meaning whilst in Tanzania it is *bumuntu* generally. Congo, Angola, Malawi, Mozambique and Uganda use the words *bomoto*, *gimuntu*, *umunthu*, *vumuntu* and *omuntu* respectively (Mugumbate & Nyanguru, 2013).

In Uganda particularly, with the context of a multilingual society, Ubuntu takes different forms of morphology and dialects. Wichtner-Zoia (2012) observes that in Runyakitara, which is the collection of dialects spoken by the Banyankore, Banyoro, Batooro, and Bakiga of Western Uganda and also the Bahaya, Banyambo, and others of Northern Tanzania, *obuntu* refers to the human characteristics of generosity, consideration, and humaneness towards others in the community. In Luganda, the dialect of Central Uganda *obuntu-bulamu* refers to the same characteristics. Ubuntu is thus portrayed as either a true African philosophy or a value system that governs societies across the continent (Kamwangamalu, 1999). As a corpus of philosophical thought, Ubuntu is described as arising from a deliberate reworking of authentic theoretical ideas by Africans or in the African context (Battle, 2009; Oruka, 2003; Regine, 2009).

While much has been written about *ubuntu*, a most poignant explanation of the concept is to be found in anti-apartheid activist, Archbishop Desmond Tutu's 1999

publication:

Ubuntu speaks to the very essence of being human. When you want to give high praise to someone we say, ‘Yu, u Nobuntu’; he or she has Ubuntu. This means that they are generous, hospitable, cooperative, and caring. They share what they have. It also means that my humanity is caught up, is inextricably bound up, in theirs. We belong in a bundle of life. We say, ‘a person is a person through other people’ (in Xhosa Ubuntu umgamntu ngabanye abantu and in Zulu Umuntu ngumuntu ngabaye). I am human because I belong, I participate, and I share. A person with Ubuntu is open and available to others, affirming of others, and does not feel threatened that others are able and good; for he or she has a proper self-assurance that comes with knowing that he or she belongs in a greater whole and is diminished when others are humiliated or diminished or treated as if they were less than who they are (Tutu 1999: 34–35).

Following Tutu (1999), people in a community practicing *ubuntu* show openness, acknowledge others, and engage with them without being impeded by others’ competencies. Such a view of human engagement occasions is more than just for humans to participate. In other words, for humans to participate as a corollary of *ubuntu* is to assume that they merely need to collectively work towards a common cause. Tutu opines that one has to be engaged deliberately with others to contribute substantively to community matters. This is what *ubuntu* signifies, engaging in deliberation with others so that humans in a community can come up with substantive solutions for particular societal problems. In congruence, prominent *ubuntu* scholars, such as Mbiti (1970) and Gyekye (1997), aver that *ubuntu* involves a community taking risks and being engaged in communitarian deliberations respectively.

Contemporary research shows that *ubuntu* continues to play an important role in African society. It is regarded as a key cultural strength of communities (Nkosi & Daniels, 2007), a theory of higher education in Africa (Waghad, 2020), an important foundation for resilience among the community (Theron & Phasha, 2015), can shape community responses to disaster (Sapirstein, 2006), a theory of social work

(Mugumbate & Chereni, 2020) and as a community engagement transformative undertaking for Higher Education Institutions (Nicolaidis & Austin, 2022). Educators and researchers especially in African contexts have a twin responsibility of embracing ubuntu and using the values of ubuntu to arrive at solutions to societal problems and achieve sustainable development. With the overwhelming consensus that the global climate is changing—largely due to human activities—with heightened risk levels for social and ecological systems, ubuntu provides an epistemic framework to arrive at solutions to such community problems (Okoliko & David, 2021).

Ubuntu is a strong theoretical foundation for African Indigenous researchers researching African Indigenous practices that are embedded within the values and beliefs of research participants and their indigenous communities (Mkabela, 2015). The moral philosophy of ubuntu shapes the relationship between an individual and his/her community because it is rooted in the spirit of mutual support and the principle of caring for each other's well-being. Such a framework guides and scores the relationship between universities and communities as these two are not just concepts but people. Both the university management and community members need to idealize values of commonly practiced engagement activities towards a societal cause. This has to be through the already indicated main moral philosophy of ubuntu which is imperative to people in a community for its power of creating cooperation and unity of purpose among the people.

In his postulation, 'Towards a theoretical model linking university education to climate change interventions in the African context,' Ssekamatte (2020) has emphasized that Ubuntu values of communalism, interconnectedness, and reciprocity are inherent in most of the African social and cultural structures and therefore are key

drivers for what individuals, institutions, communities and nations do for humanity. Ssekamatte further notes that African universities can engage actors and communities in climate change action initiatives based on this African theoretical framework. Indeed, higher education is characterized by learning and research output that promotes the real prospect for the person as inevitably connected to a group and essentially a social member of the local and global world community.

In line with the Ubuntu values, dimensions of the conception of higher knowledge provide guidance in refraining from the search for the satisfaction of individual or small groups' needs at the expense of collectivism. Moumouni 1968 recognises that indigenous African epistemology of *Ubuntu* within the University's third mission of engagement in the context of community and the rich, social, and reciprocated interactions. The "ivory tower" image inherited within most African Higher Education systems highlights a disjoint between the current traditional Euro-American Education archetype and that of African indigenous Education. Community engagement, as envisioned within the transformation agenda for Higher Education is, however, reminiscent of indigenous pedagogical methods, and hence community engagement should be explored as a means to re-connect the fragmented epistemological and axiological foundations of the university's third mission. As per Tutu (1999), three major interrelated *Ubuntu* values are postulated.

Firstly, is the interdependence/human interconnectedness. In the sense articulated by Tutu (1999), this tenet is inextricably connected to the practice of human togetherness. Put differently, the notion of *Ubuntu* as belonging implies that humans do things together because they are attached to one another. Their human attachment is enhanced through generosity, hospitality, caring, and compassionate action. *Ubuntu* as

a philosophy of higher education ought to be cultivated by humans serious about addressing societal, environmental, and political malaise, and this implies that they (humans) have to see themselves as co-belonging to a community of humans on the basis that there is no precondition for belonging. They co-belong in an act of human togetherness without any representable condition. In this way, *Ubuntu* cannot be considered some human practice that actually exists. Instead, it is an action in becoming that could result in some form of co-belonging of a community of humans on the African continent.

In light of the above, institutions and communities that underscore *Ubuntu's* tenet of an *interdependent* perspective view themselves as members of a community and recognize that institutions and communities are mutually dependent on each other (Mabovula, 2011). This tenet views institutions as those that consider themselves responsible for the well-being of a community, view their success as intimately tied to the greater well-being of the community, and actively seek a variety of opportunities to invest and contribute to the multiple aspects of a community.

The second tenet of *Ubuntu* is communalism/collectivism/solidarity. Khoza (2005) describes communalism as a concept that views humanity in terms of collective existence and intersubjectivity, serving as the basis for supportiveness, cooperation, collaboration, and solidarity. In a similar conceptual context, Gyekye (1987) defines African communalism as a kinship-oriented social order, which is informed by an ethic of working together. In a communal social order, one is brought up with a sense of solidarity with large groups of people in the course of this “cohabitation” (Khoza, 2005:266). Thus, one comes to see one’s interests as being bound up with the interests of the group over a great number of issues of life and well-being. This sense of

community, according to Gyekye, is a characteristic of African life and indeed, to many Africans, this communal efficacy defines Africanism. In a hostile environment, it is only through such community solidarity that hunger, isolation, deprivation, poverty, and any emerging challenges can be survived, because of the community's brotherly and sisterly concern, cooperation, care, and sharing.

In the context of Gyekye's definition, this form of communalism signifies the humane person as an inherently communal being embedded in a context of social relationships and interdependence, and never as an isolated, atomistic individual. In the African community, people view themselves and what they do as equally good to others as to themselves. A good example one can think of is how things were (and still are) done in indigenous African settings in which people come together whenever problems arise, where ideas are shared, and solutions are sought and found by all community members in a given real-life situation (Mabovula, 2011). This relates to a relationship of *solidarity*, achieving the good of all, being sympathetic, acting for the common good, serving others, and being concerned for others' welfare (Metz, 2016). This too provides a framework for universities in African contexts to view themselves as collaborators who always come together whenever communities face common problems. Here, too, there is a behavioural component, of doing what is likely to enable others to live better lives.

The other related value is Reciprocity (Mutually beneficial relationship). This is another useful attribute of Afro-centric systems, the reciprocity and mutuality of human relations which emphasizes the belief that collaborations should always be reciprocated. Reciprocity underlies the *Ubuntu* phenomenon, where one only becomes a person through one's relations with others, thereby creating harmonious world

relations with others. Following Tutu (1999), a person practicing *Ubuntu* shows openness, acknowledges others, and engages with them without being impeded by others' competencies. This view of human engagement instances is more than just for humans to participate (Waghad, 2020).

Notably, the moral philosophy of ubuntu is premised on the reciprocal belief that an individual's humanity is expressed through personal relationships with others in a community, and in turn other people in that community recognize the individual's humanity and contribution (Nyaumwe & Mkabela, 2007). People who truly practice *Ubuntu* are always open and make themselves available to others, they are affirming of others and do not feel threatened that others are able and good. With Ubuntu, one has a proper assurance that comes with the fundamental recognition that each individual belongs to a greater community. As a philosophy, reciprocating relationships can help African organizations to develop a better understanding of African society and of their roles as an integral part (corporate citizens) of that society. The positive attributes of Ubuntu also demonstrate what an organization can gain in terms of understanding the seriousness of embracing a corporate conscience that is in line with African society. It requires a life that depends on a normative engagement with the community, a substantive appreciation of the common good, and a constitutive engagement with one another in a rational and ethical community.

Underpinned by the core value of reciprocity, Nicolaides and Austin (2022) have noted that Community Engagement may differ from institution to institution but broadly speaking it relates to how an institution interacts with a community in which it operates in ways that result in a win-win situation for all parties involved and positively influence the quality of life within society in general. Thus, a communal existence must

of necessity take precedence over individuals, so that CE for example, has a natural role to play. This means that people are intrinsically communal entities within a social relationship context in which there is a need for interdependence. HEIs as entities need to then not live in isolation from persons in their communities but should naturally be inclined towards them. The pursuit of the common good is the key objective of shared relationships such as CE between HEIs and the community, and this should take precedence over individualistic preferences. HEIs that do not involve themselves in their communities could be viewed as detracting from the desired reciprocity and common good postulated by *Ubuntu*.

If CE is to drive sustainable development in any way at all, it needs to augment and stimulate scholarship via solid win-win partnerships with HEIs (Daniels et al. 2013). There is a need for solid knowledge creation with communities by HEIs (Scully and Cuthill 2010). Nonetheless, all university-community collaborations and projects should involve the community as learners and teachers so that solutions can be found (Bhagwan 2017). It is also evident that communities are generally distinctive and each has diverse needs and challenges. This implies that HEIs need to tailor their CE initiatives to meet a variety of needs in a spirit of solidarity and partnership. HEIs should strive to work with communities to discover reciprocally beneficial solutions.

The *Ubuntu* tenets (discussed above) link social responsibility and community engagement to the functions of higher education institutions, particularly the university's third mission. The *Ubuntu* philosophy therefore underpins any grouping within an African society. Such groupings include formal organizations that operate within local communities. Thus, *Ubuntu* as a philosophy of higher education ought to be cultivated by humans serious about addressing societal, environmental, and political

malaise, and this implies that they (universities) have to see themselves as co-belonging to a community of humans on the basis that there is no precondition for belonging and community engagement (Waghid, 2020). Unlike Teferra (2014: 16) who suggests that more attention be given to ‘strategies that build on the social responsibility and civic engagement role of higher education’, Waghid contends that the *Ubuntu* should be considered a pertinent theory of higher education that can guide its practices (including strategies) vis-à-vis national and global sustainable development. Underscored and guided by *Ubuntu*, the possibility of higher education in Africa to address social responsibility and to play a critical role in cultivating citizenship and an attentiveness to otherness, might become enhanced.

What follows from the above explication of *Ubuntu*, is that any understanding of higher education on the African continent can be informed by what it means to cultivate ethical beings, i.e. humans who exercise their corporate social responsibility with collective voices, who co-belong without any precondition of belonging, and who remain attentive to others and otherness through deliberative encounters. In that way, an *Ubuntu*-informed philosophy of higher education engagement in Africa has the potential to cultivate numerous programs of reciprocated UCE activities that can potentially enhance climate change awareness, contextualised climate change adaptation, and mitigation practices within African universities and communities. For example, the connection to, and protection of the environment is highly valued in the *Ubuntu* philosophy. In African culture, people connect with their land by building a permanent home on it, protecting the land, and passing it on to future generations. Birth-in-place and death-in-place (meaning on one’s soil or land) are valued. The land is a heritage that provides income and livelihoods. The land is the home of deceased family members, their graves are located there, and so will be those of the future. Such values

that African communities hold could be a soft landing for university knowledge and provide a fertile ground for UCE to address issues of climate change. Therefore, given the importance of the Ubuntu philosophy in the African contexts, I intended to find out in what ways it might influence universities and their engagement with communities.

In a nutshell, *Ubuntu* can significantly enhance social work's understanding of, and promote the achievement of, sustainable development through the recognition that our embeddedness in the human community is not merely in the present community, but also in both past and future communities. While Western notions will regard these latter communities as remote, African *Ubuntu* philosophy regards them as immanent. An *Ubuntu*-informed sustainable development would, therefore, have significantly greater leverage on interventions focused on promoting social, economic and environmental development.

It is important to note that, like any theoretical framework, Ubuntu bears its share of criticism. Hailey (2008) has questioned whether Ubuntu can be universally applied across cultures. Hailey has argued that because it is not homogenous, it may not be universally applicable. This challenge is made worse by the indictment that Ubuntu has no solid authorship and framework, what it means and what makes it up cannot be theorised. But sympathisers have pointed out the fact that globally accepted practices, like democracy, are by no means universally applied but they have found their way into most communities. Even when the claims were factual, it is in the same vein that ubuntu must find its way into every society. Up against similar claims, some have also argued that African knowledge, values and practices are known to be communally owned and such criticisms could be intended for deliberate African epistemic erasure. Since it appears that who we are has been defined for us much more than we have, scholars and

researchers in African contexts need to be with the ultimate aim to produce diverse and rich epistemic academic canons that recognise experiences from the global south, especially from Africa.

Higher education research in Africa continues to draw from Western Eurocentric views, which undermine and dismiss indigenous philosophies such as *Ubuntu* as false assumptions and simple illegitimate African thinking (Letseka 2014:334). Such negative assumptions about African indigenous knowledge systems result in young researchers from African cultures feeling unwelcomed and alienated in higher education research (Ndlovu-Gatsheni 2018:8). Therefore, while acknowledging the ongoing debate on the status of *Ubuntu* as a necessary conversation for gnostic practice, the earlier discussed tenets and conditions are sufficient in *Ubuntu* framework to turn attention on community engagements and synergies to address real-life challenges that affect the common world.

Relevance of the theory to the study.

Ubuntu was recently adopted as the first theme for the 2020–2030 global agenda for social work and social development (Willmore et al, 2023). Recent studies outlined by Chigangaidze (2023) have indicated that *Ubuntu* is relevant in the components of human relations with nature, food security, climate change, natural disasters, sustainable development and eco-spiritual social work. To better understand practical UCE opportunities to address issues of climate change, *Ubuntu* principles assert that social responsibility, interdependence with, and social concern about others, society, and the environment, and civic engagement ought to become a central part of the mission of African universities. More specifically, as earlier discussed, a philosophy of higher education in Africa is intertwined with a notion of *Ubuntu*—an African dictum

for human interdependence—and its associated link with actions such as social responsibility, citizenship, and an attentiveness to otherness. Of course, it is important to note that I am not denying that Western forms of inquiry can contribute significantly to enhancing relations among individuals, institutions, and communities, most notably the practice of deliberation that emanates from Western forms of human engagement.

However, the contention is that African moral theory potentially ruptures those Western practices that seem to be remiss in advancing communal humility, interdependence, social justice, and reciprocity of actions towards sustainable development. The ubuntu framework thus gives an opportunity to recover, present, and enable the valorisation of African epistemologies from early African thinkers to explore African-context-based UCE opportunities to address issues of climate change. Climate change impacts affect continents differently and thus UCE in Africa ought to be addressed in relation to a defensible rationale or plausible philosophy. This means that the concept of Ubuntu is essentially linked to the notion of collaboration and working together (Mupedziswa et al, 2019). Congruently, Ayayia (2022); and Kyei-Nuamah and Peng (2024) have argued that the issue of climate change is a problem rooted in anthropocentric activities, individualistic values and capitalism can be minimized by integrating the ideologies of 'Ubuntu' as a cultural value in African environmental ethics into the dialogue on climate change adaptation and mitigation approaches.

Notable, national development and achieving SDGs in the twenty-first century is dependent on a particular understanding of higher education, which cannot simply be aggregated to a dearth of appropriate ontology, epistemology, expertise, African value-laded social responsibility and catching up numerically with the rest of the world. According to Nyerere, higher education needs to address the realities of African

societies and foster the social goals of living together and working together for the common good (Nyerere, 1968). Thus, the study appropriated concepts from the theory such as interconnectedness, indigenous knowledge, corporations, interdependence, and collaborative practices. The concepts helped in investigating the UCE activities and programs that the case universities and universities engage in to address climate change issues and the ways in which these different activities and programs are developed and coordinated between the university and the community. The theoretical framework provided a better way of collecting relevant contextual information and understanding the challenges, drivers, and opportunities available for UCE towards climate change action at the case universities.

The contribution of *Ubuntu* further added to a methodology package in its philosophical stance and values. These values were crucial for conducting this qualitative study where I sought to explore local and contextualised perspectives on UCE opportunities to address issues of climate change. As earlier insinuated, this is particularly important in a context where colonialism reigned for decades (or centuries), ignoring and silencing local voices, indigenous epistemic lenses, and customs, and where there has been deliberate epistemic erasure, marginalisation and invisibility of historiography of African scholars on African values and experiences. This has at times bred conceptual and empirical narratives that are incongruent with the local context.

In this study, I used concepts such as humility, solidarity, reciprocity, harmony, and social justice for guidance on how to engage with research participants and navigate through the context. Thus, Ubuntu principles served as the ontological foundation for exploring UCE phenomena as well as addressing issues of climate change. As noted by Mkabela (2015), to honour indigenous methodologies, researchers need to approach

social protocols, values, and practices as an integral part of methodology within a specific discipline as well as from within the particular indigenous community. Conclusively, as Waghad (2020) opines, *Ubuntu* as a philosophy of higher education is an appropriate understanding for enacting substantive change based on the possibility that social responsibility, deliberative engagement, and attentiveness to others and otherness are in becoming.

1.9 Conceptual Framework

A concept is an abstraction or general notion inferred or derived from specific instances. It is also a word or phrase that symbolizes numerous interrelated ideas. Unlike a theory, a concept does not need to be debated in order to be comprehended (Smyth, 2004). The conceptual framework describes and explains the concepts to be used in the study and their relationships with each other. In this study, the conceptual framework shows the connection between university community engagements and climate change mitigation, adaptability, and sustainability.

In this study, it was postulated that community engagement (third mission) by the universities is a top priority to collaborate and facilitate the mutually beneficial exchange of knowledge and resources for both universities and communities. This provides the ability to address climate change through research, training, educational practices, and awareness about knowledge sharing, adaptation, and involvement in activities that give knowledge about climate change and conservation of the environment among others. Therefore, it is conceptualized that the universities' third mission of community engagement towards climate change issues has the power and faculty to contribute to capacities to the communities, civil societies, activists, other educational institutions, university alumni, donor organisations, independent research

councils, local enterprises, and non-formal businesses among others to deliver accurate climate change information, addressed numerous misconceptions about climate change in the communities and raise awareness about the significance of climate change education for sustainability.

Notably, effective university-community engagements towards climate change can further promote knowledge and develop problem-solving skills, and mastery of climate change knowledge and finally create an opportunity to enhance the integration of indigenous climate change adaptation practices in the fight against climate change impacts. Resultantly, the universities' third mission of community engagement can enhance the fight against climate change in terms of creating awareness and practically becoming carbon-neutral, and energy efficient in the universities and communities.

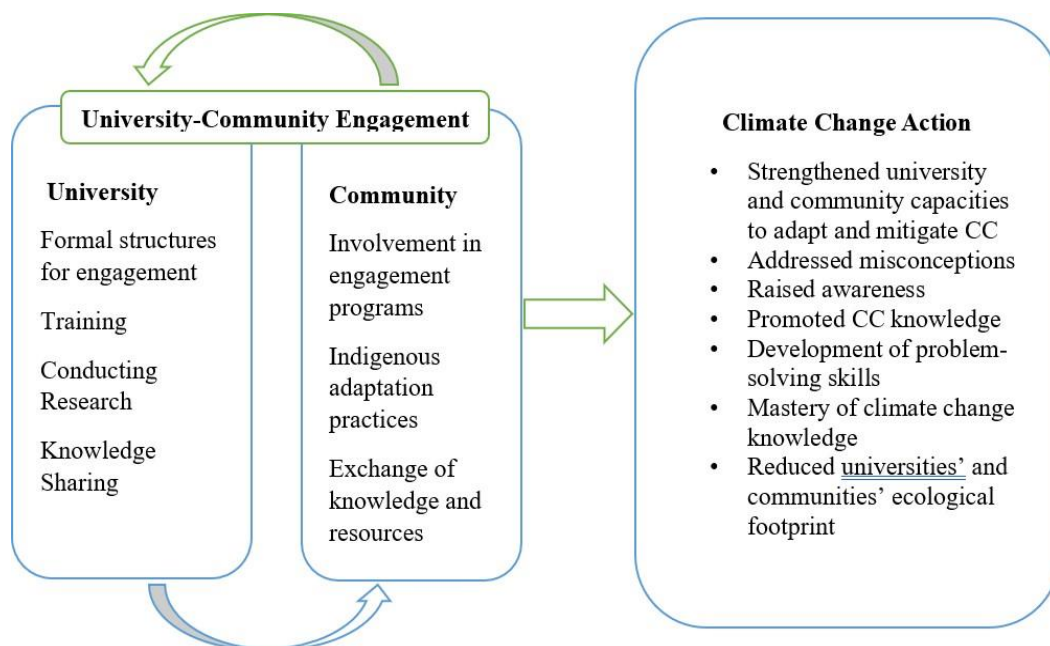


Figure 1.1: Conceptual Framework. Source: Researcher's Construct

1.10 Scope and Delimitations of the Study

This study explored university-community engagement opportunities for climate change action using two comparative cases of Makerere and Ndejje Universities in Uganda. Communities are not only geographical but also virtual and university-

community engagement could take various forms thereby widening the university's influence. Communities in this study were more than a group of people with a common characteristic or interest living together within a larger society. Thus, the community encompassed local governments, central government, civil society, and climate change-related NGOs and activists.

I was particularly interested in understanding the (in)coherence of the engagement structures and the existing challenges to the university-community engagement. Accordingly, this is to facilitate university-community engagement opportunities that enhance and promote climate change adaptation and mitigation practices through equitable partnerships and citizenry promotion of sustainable communities. Hence, the study focused on both external and internal actors, essentially the university staff, students, and community leaders. The study also focuses, although not entirely, on the 1990–2022 period.

In addition, I did not select any participant with whom I had a personal or professional relationship within this research, which included friends, family members, co-workers, or professional and personal acquaintances. This enabled avoidance of any perceptions about influence to participate in the study due to an existing relationship between the participants and I.

1.11 Limitations of the Study

These are possible limiting and restricting conditions that may go beyond the control of the researcher in regard to the reliability and validity of the findings. The following are possible limitations noted in this study.

The use of interviews is commonly associated with the participants giving subjective data to the researcher. This limitation to interviews was minimized by

searching for disconfirmation and paying attention to new themes that emerged during the data generation and collection process. This was through debriefing of the participants of this study.

The study was limited to two cases; therefore, the sample size was small and purposively selected, which limited the ability to generalize findings. However, the findings could be transferred to other universities with similar context and characteristics. As a result, future studies could also expand the sample population across other cases with dissimilar characteristics to achieve a broader understanding of university-community engagement towards climate change action. Furthermore, future studies can also explore other educational stakeholders' different forms of engagement towards climate change action.

1.12 Assumptions of the Study

This study assumed that the target population of university management, students, and community leaders operated within the same environmental conditions, hence giving related responses that were true and reliable concerning university-community engagements towards addressing climate change issues.

The target population that participated in this study was aware of the activities, processes, and procedures for university-community engagements at the selected cases. The participants in the study cooperated during the study and were able to give the required information without hesitation.

The participants in this study also provided necessary documents for document analysis and answered questions in the interview honestly and openly. The findings of the study can result in a positive sustainable change as findings are directed at Ministry of Education policymakers, university administrators, students, and community

members, which they can use to develop and improve policies and practices geared towards enhancing climate change issues and contributing to the adaptation and mitigation of climate change impacts.

1.13 Operational Definition of Key Concepts and Terms

Climate: This means the average weather in a given area over a longer period of time (Werndl, 2020). The climate is usually the average weather, or more rigorously as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years (Mathews et al, 2021). The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization (WMO). The relevant quantities are most often surface variables such as temperature, precipitation, and wind.

Climate change: Climate change in this study refers to the long-term change in the average weather patterns that have come to define Earth's local, regional, and global climates. This is with regard to the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable periods. Thus, the UNFCCC in its Article 1, defines climate change as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes

University: A university is an institution of higher education, usually

comprising a college of liberal arts and sciences and graduate and professional schools and having the authority to confer degrees in various fields of study.

Community: A group of people living in one particular area and are considered a unit because of their common interests, social groups, or nationality. These people are linked by geographical location, identity e.g., ethnicity, religion, social responsibility, or any other identity that forms a basis for the common interest. In this study, community meant members of the locale around the universities including stakeholders like civil society, NGOs, and government (traditional, local, and national government).

Community engagement: This is a process of working collaboratively with and through individuals and or groups of people linked by geographical location, special interest, similar situations, or other identities, to address issues affecting their interests. Community engagement in this study meant a strategic process with the specific purpose of working with identified groups of people, whether they are connected by geographic location, special interest, or affiliation to identify and address issues affecting their well-being. The use of the word “engage” is important here. It is only by engaging with the community regarding the processes, procedures, and activities to address climate change. This breeds support for community projects that can be implemented as interventions to facilitate and sustain a transition towards a low-carbon sustainable future.

Community engagement, relatedly, speaks to the university’s larger policies and practices toward meaningful interaction with the “non-university” world (Bowers, 2017). Theoretical underpinnings of engaged scholarship interact with and challenge what is meant by traditional engagement, and for the purposes of this study, the terms are viewed as symbiotic, conveying a larger directive for intentional and

interdisciplinary collaboration through a variety of methodologies to achieve consequential and sustainable change. Therefore, from the African context, third mission activities should be viewed from the perspective of contributing to the public good rather than generating profit (Nabaho et al, 2022). For example, innovations by universities and faculty should target addressing societal problems rather than generating revenue.

Third Mission: This study conceptualized TM as pertaining to a different set of university responsibilities, namely wider participation, social engagement, and direct contributions to society/economy. This pertains to a demand for interacting externally or establishing relationships with non-academic domains. This process is not about the gradual absorption of new functions into the core of the university but about reproducing it.

This third mission- the engagement of university with societal needs” (Molas-Gallart, 2004, p. 74) or the contribution of the university to sustainable development, has multiple names, such as third stream activities, the third leg, the third role, community engagement, public service, and civic engagement, that underscore the idea that universities should combine the classical missions of teaching and research (Knudesen et al., 2019; Sin et al., 2019) with a contribution to society (Compagnucci & Spirarelli, 2020). This study subscribed to the notion that universities are the engines of sustainable development, and that teaching and research undertaken within academic environments are necessary but not sufficient to contribute to socially sustainable objectives hence, the imperative for universities to engage in third mission activities in addition to teaching and research. Thus, in this study, the third mission largely meant community engagement. This is identical to Mugabi, (2014, p. 15) who defined the

third mission as:

A meaningful and mutually beneficial collaboration [of HEIs] with partners in education, business, public and social service. It represents that aspect of teaching that enables learning beyond the campus walls; that aspect of research that makes what we discover useful beyond the academic community; and that aspect of service that directly benefits the public.

The third mission activities take place outside academic environments, and they aim to address the social and economic needs of society to promote sustainable socio-economic transformation.

1.14 Summary

This chapter has outlined the background to the study, the research problem and objectives as well as questions that this study sought to answer. It defines key concepts as well as the scope and limitations of the study. The next chapter also reviewed the conceptual and empirical literature on the third mission activities of universities towards climate change mitigation and adaption in different contexts.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter covers a literature review of university-community engagement practices for climate change action. The emphasis was on areas of university-community engagements, the third mission, climate change and its impacts on education, and indigenous knowledge practices towards climate change action. These areas are considered significant to an accurate exploration of the problem of study. The literature search procedures for this research included a wide-ranging search in Moi, Ndejje, and Makerere University library databases which include SAGE Journals Online, PsycINFO, EBSCO host research databases, and Academic Search Complete. More so, I also conducted searches through Google Scholar. The phrases, search terms, and their variants mentioned below were used in different combinations: climate change, university-community engagements, third mission, and indigenous knowledge among others. This particular way of literature search implies that the reference lists from the reviewed literature were too searched for more relevant studies. This process was repeated until no new relevant studies were found. The literature review is organized into various subheadings as follows.

2.1 Climate Change

There is scientific consensus that climate change is real, manifested through increasing temperatures, changing rainfall patterns, and increasing frequency and severity of extreme weather events, including drought, flooding, and cyclones. Climate change is defined as the shift in climate patterns mainly caused by greenhouse gas emissions from natural systems and human activities (Fawzy et al, 2020). There is strong evidence that the average temperature of the Earth's surface is increasing as a

result of anthropogenic interactions with the physical environment, having significantly increased atmospheric concentrations of carbon (CO₂) emissions in the atmosphere (Gaston et al, 2023; Kennish 2023; van Nes et al., 2015).

The concentration of CO₂ has increased from 277 parts per million (ppm) in 1750 (Joos and Spahni, 2008) at the beginning of the Industrial Era to 395.31 ppm in 2013 (Dlugokencky and Tans, 2014), as a result of economic development and population growth (Reimann et al, 2023; Le Quéré et al., 2014). So far, anthropogenic activities have caused about 1.0 °C of global warming above the pre-industrial level and this is likely to reach 1.5 °C between 2030 and 2052 if the current emission rates persist. Various anthropogenic activities (e.g. burning fossil fuels and transportation) result in CO₂ emissions into the atmosphere. Global CO₂ emissions have increased from roughly 16 GT in 1970 to 37.5 GT in 2018 (Kamkeng et al, 2021). This has led to major concerns about global warming and climate change. The importance of reducing CO₂ emissions to prevent global warming consequences such as rising sea levels and melting glaciers has been widely recognised. As earlier noted, it is recommended that CO₂ emissions should be lowered to net zero around 2050 to limit the global temperature increase below 1.5 °C by 2100.

At the 21st session of the United Nations Framework Convention on Climate Change Conference of the Parties (COP21) in Paris, an agreement to strengthen the effort to limit the global temperature increase well below 2°C was decided. However, even if global warming is limited, some regions might still be substantially affected by climate change, especially continents like Africa where the socioeconomic conditions are strongly linked to climatic conditions (Dasgupta et al, 2023; Weber et al, 2018).

In Africa, Climate change affects almost all aspects of life including; health, livelihoods, air quality, economic and social infrastructure, water resources, and many other sectors. Climate change is commonly recognized as a major issue likely to have negative consequences on food security and livelihoods in the region (Connolly-Boutin & Smit, 2016). It is estimated that the livelihoods of 70 % of Africans are dependent on rain-fed agriculture, an activity that is characterized by small-scale, subsistence farms that are vulnerable to a variety of stresses, including those associated with climate change (World Bank 2022). Due to its largely adverse effects on African agriculture and livelihoods, climate change is expected to have a negative impact on food security (Niang et al. 2017; Thornton et al. 2011). The climate crisis is undermining hard-won development gains and deepening cycles of poverty, fragility, and vulnerability across the continent.

Additionally, in Sub-Sahara Africa, the repercussions of climate change are expected to be felt in various ways throughout both natural and human systems in Sub-Saharan Africa. Climate change projections for this region point to a warming trend, particularly in the inland subtropics; frequent occurrence of extreme heat events; increasing aridity; and changes in rainfall—with a particularly pronounced decline in southern Africa and an increase in East Africa (Serdeczny et al, 2017). The region could also experience as much as one meter of sea-level rise by the end of this century under a 4°C warming scenario. Sub-Saharan Africa's already high rates of undernutrition and infectious disease can be expected to increase compared to a scenario without climate change. Particularly vulnerable to these climatic changes are the rainfed agricultural systems on which the livelihoods of a large proportion of the region's population currently depend.

As agricultural livelihoods become more precarious, the rate of rural-urban migration and school dropout may be expected to grow, adding to the already significant urbanization trend in the region (Pauleit et al, 2015; Adhikari et al, 2015). Sub-Saharan African countries have been characterised by low levels of science and technology to support the mitigation of climate change (Ssekamatte, 2020). These countries cannot mitigate climate change due to low levels of science and technology, financial resources, and climate expertise. This makes these countries more vulnerable to the effects which call for adaptation measures. Therefore, universities among many other factors, can be handy in supporting governments and communities on climate change mitigation through training and research.

The Southern parts of Africa are equally facing the diverse effects of climate change. Simultaneously with the changing political landscape, the climate crisis is deepening with devastating impacts on the working class in the form of rising food and energy prices, crop failures, water shortages, and dislocation. Many South Africans are exposed to what Nixon (2013) has called ‘the slow violence’ of toxic pollution in a process that is damaging, insidious, and largely invisible. Mostly, Black South Africans continue to live on the most damaged land in the most polluted neighbourhoods often adjoining working or abandoned mines, coal-fired power stations, steel mills, incinerators, and waste sites or polluting industries, without access to clean air and water, electricity, sanitation, and refuse removal.

In the province of Gauteng (in which Johannesburg is situated), 1.6 million African people are living in mine dumps that are contaminated with uranium and toxic heavy metals, including arsenic, aluminum, manganese, and mercury. Rätzzel et al (2018) have observed that South Africa’s commitments to reducing polluting carbon

emissions are vague and insubstantial. These authors argue that at present, over 500 tonnes of carbon a year are emitted, two new coal-fired power stations (among the largest in the world) are being built and 40 new coal mines are planned, most of them in Mpumalanga on the most fertile land in the country. The country is moving towards ecological catastrophe because the government remains wedded to the dominant interests of capital organized in the mineral–energy complex (Baker, Burton, Godinho, & Trollip, 2015).

In East Africa, Climate change is projected to increase temperature and precipitation variability. The temperature in Africa is projected to rise faster than the rest of the world, which could exceed 2°C by mid- 21st century and 4°C by the end of the 21st century (Niang et al. 2014). Climate change is projected to overall decrease the yields of cereal crops in Africa by shortening the growing season length, amplifying water stress, and increasing the incidence of diseases, pests, and weeds outbreaks (Atube et al, 2021; Adhikari et al, 2015). Among the various environmental changes brought about by climate change include affecting the livelihoods of communities and education systems.

Twecan et al (2022) have indicated that Uganda is ranked 15th on vulnerability and 147th on readiness, meaning the country is very vulnerable, sadly, unprepared to respond to climate change impacts. Uganda's economy and livelihoods of the people are already experiencing the effects of climate change. Particularly, there have been climate variability, floods, droughts, and changes in seasonal rainfall which have had significant socioeconomic impacts on the country in the past. For example, floods in 1961/62, 97/98, and 2007 saw widespread infrastructure damage, displacement, and destruction of livelihood assets (Twinomuhangi et al, 2021, Hepworth, & Goulden,

2008). Droughts have also taken a significant toll with, for example, 1.8 million people affected through increased malnutrition, poverty, illness, asset loss, and migration in the 93/94 event. Changes in rainfall reliability, onset, and cessation can cause crop failure and hunger, and this can be exacerbated by other stresses such as land degradation or insecurity.

More so, rainfall variability and changing lake levels also have implications for natural resource use: low lake levels since 2005 have led to power shortages, disruption to water supplies for urban settlements around the lake, transportation, and infrastructure and are thought to have negatively affected the people of Uganda (Antonelli et al, 2021). Climate is likely to contribute to the majority of terrestrial and freshwater range boundaries. This generalization excludes species that are endemic to specific islands, lakes, rivers, and geological outcrops, although these local endemics are not immune from the effects of climate change.

According to Kampala Capital City Authority (KCCA) and the Kampala Climate Change Action Strategy, the Green House Gas (GHG) emissions per capita reach 2.4tCO₂e/resident in Kampala and 1.75tCO₂e/resident at the greater Kampala level, compared to 1.4tCO₂e/resident at national level (KCCA 2015; 2017). This is characterized by a very high proportion of GHG emissions from fuel consumption by the car fleet which represents about 92% of the total energy consumed (50% of fuel consumption is related to the waste collection & 24% to road construction activities). Relatedly, although the precipitation levels have not changed significantly, the patterns have become more erratic. This makes the city, her metropolitan and the nation at large more vulnerable. The major drivers of vulnerability include Heavy reliance on charcoal & firewood for cooking which has significantly reduced tree cover countrywide, heavy

reliance on imported petroleum products for transportation which is susceptible to price & supply shocks, reliance on grid electricity which is susceptible to damages on transmission lines resulting from severe storm and high levels of unemployment which limits the ability of individuals and communities to cope with the impacts of climate change.

2.2 The Effect of Climate Change on Communities

In 2018, the world encountered 315 cases of natural disasters which are mainly related to the climate. (Fawzy et al, 2020) revealed that approximately 68.5 million people were affected, and economic losses amounted to \$131.7 billion, of which storms, floods, wildfires, and droughts accounted for approximately 93%. Economic losses attributed to wildfires in 2018 alone are almost equal to the collective losses from wildfires incurred over the past decade, which is quite alarming. Additionally, food, water, health, ecosystem, human habitat, and infrastructure have been identified as the most vulnerable sectors under climate attack.

Furthermore, there are primary consequences of climate change which include increases in the variability and intensity of natural disasters, e.g., hurricanes; increases in the rate of species extinction; decreases in snow and ice distribution in the Northern Hemisphere; permafrost thawing and destabilization of the Greenland glacier and West Antarctic ice sheet; and low-lying coastal cities that become more susceptible to sea level rise and flooding (Boudreault et al., 2014; Hansen and Phillips, 2015).

Relatedly, there are also several secondary impacts that would be exacerbated by climate change. Among others, these include increases in the number of environmental refugees and the displacement and migration of those in developing and low-lying states, whilst increases in famine, heat waves, and air pollution increase

respiratory diseases (Houghton, 2009; Stocker et al., 2013). If there is no action taken, there is an indication from the global climate models of an increase of 0.3°C to 4.8°C increase in global temperature by the end of the 21st century (Stocker et al., 2013). One of the targets of the 2015 Paris Agreement is to minimize these temperature increases.

2.3 Climate change and education

Investing in quality education to combat climate change is an essential tool in achieving the SDGs. The education sector offers a currently untapped opportunity to combat climate change. There is a clear education agenda in climate change adaptation and mitigation strategies, which require learning new knowledge and skills and changing behaviors in order to reduce the vulnerabilities and manage the risks of climate change (Rousell, & Cutter-Mackenzie-Knowles, 2020). This allows universities and existing communities of practice to mobilize around in order to promote education for sustainable development and also integrate disaster risk reduction, quality learning, environmental sensitisation, and climate change education.

Climate change has had immense impacts on education sectors in most parts of the world. Globally, it is projected that environmental threats like weather-related disasters disrupt the education of approximately 37.5 million learners annually (Theirworld, 2018). Climate change disrupts education in numerous ways. For example, damaging the infrastructure and transport links or displacement can interrupt the physical access of learners to education facilities like schools (Education Cannot Wait, 2020; IDMC, 2020b). Relatedly, disasters like weather-related ones affect children's physical and mental health and well-being, which can impact children's physical and neurological development and ability to concentrate on class and other school-related activities (Kousky, 2016; Peek et al., 2018). This, in the long run, can affect children's

performances and academic achievements.

There is high confidence that people living in areas affected by environmental degradation are experiencing an increase in the negative effects of climate change (IPCC, 2019). For example, an estimated of at least 200 million adolescent girls living in the poorest communities face a heightened risk from the effects of climate change (Atkinson & Bruce, 2015). It is important to note that weather events that are extreme such as floods and tropical cyclones interrupt educational activities in various ways and impacts can last much longer (Kousky, 2016; Anderson, 2019). For instance, damaging road and transport links obstruct access to school and other learning places; children's reluctance to go to school if water, sanitation, and hygiene (WASH) facilities are not in place or not rehabilitated quickly; displacement of families; and reduced capacity for learning because of malnutrition or trauma (Siriward; Kousky, 2016; Chuang et al., 2018; Anderson, 2019; Nordstrom & Cotton, 2020).

Climate change further has dire consequences on communities' livelihoods on which parents depend to pay school fees and meet expenses for other school-related monies. The consequences for livelihoods, food security, and household income can be particularly destabilising in low-income contexts and influence decisions on schooling (Nordstrom & Cotton, 2020). These decisions include withdrawing children from education to support household chores, if children are not withdrawn from school, their learning and progress may still be negatively impacted by increases in household responsibilities and less time available to study (Chuang et al., 2018; Kousky, 2016). Actually, in most developing countries like in sub-Saharan Africa, some families find alternative income by arranging early marriages for their children, especially girls. This particularly puts an end to their education. Climate change, therefore, threatens to

reverse developmental gains made in access to education over the past couple of decades, which is a growing risk as its effects become increasingly unpredictable and severe. The impact on children could potentially be long-lasting.

However, despite the vulnerability of the education sector and children to the effects of climate change and environmental degradation, it is paramount to note that there is growing evidence of the significant role of education in supporting climate resilience, adaptation, and mitigation. For example, research has identified the direct and indirect effects of education on reducing vulnerability to climate change, thereby decreasing the negative impact of weather-related disasters (Muttarak & Lutz, 2014). Therefore, much as climate change has dire consequences on education, on the other hand, education can positively be used as an untapped opportunity to address the same climate change. One of the ways could be through establishing university community engagement opportunities geared towards addressing climate change actions.

2.4 Universities' Third Mission (University-community Engagement)

The articulation of a 'third mission' gained diverse attention since the 1980s as a consequence of global pressure on universities to play a more central role in the knowledge economy (Venditti et al., 2011). The third mission of universities, as the name suggests, is a latecomer among the roles of universities and can be traced to the United States in the 1860s following the rise of the land grant universities (Altbach, 2008). The late 1980s thus ushered in the second academic revolution, which institutionalized the third mission as a role of the university.

Numerous unprecedented challenges, such as the knowledge economy, globalisation, and the financial, and environmental crises, are contributing significantly to redesigning and extending the missions of universities (Trencher et al., 2014; Hadidi

& Kirby, 2016; Rubens et al., 2017). Implicit to mention is the fact that, historically, there has been the first (conservation and transmission of knowledge, through teaching) and second mission (research) performed by universities. Therefore, a plethora of stakeholders in higher education subscribe to the notion that the contemporary university can be compared to a three-legged stool (Rubens et al., 2017), with each leg representing one of three missions—teaching, research, and a third mission.

Building upon the first two core missions, the second phase of the third mission is grounded on two key elements, namely, the translation of research findings into intellectual property or the ‘commodification of knowledge’ (Papadimitriou, (2020); Naidoo and Jamieson (2005) and the direct contribution of university activities to economic development or ‘societal impact’ (Nicotra et al, 2021; O’Carroll et al, 2006). Therefore, recently, and in the context of a much fiercer competitive higher education landscape and a much-needed sustainable development, both nationally and globally, TM has come to represent a ‘strategic opportunity for securing public support (external legitimacy) towards universities’ core tasks and functions in reciprocated engagements.

However, the concept of a third mission has been somewhat ambiguous to define. Frondizi et al, (2019) have noted that the Third mission of universities entails diverse activities not covered by the first mission (education) and second mission (research) such as technology transfer, community sustainable development, continuing education, and social engagement. In modern, knowledge-based societies, universities play an increasingly important role in achieving economic growth and social progress.

Their traditional roles and missions are being broadened to accommodate activities that facilitate engagement with various stakeholder groups (Pinheiro, Langa, & Pausits, 2015). Society relies on academic research to address environmental issues,

yet academic institutions have had limited success in communicating scientific findings outside academia and even less success in involving society in developing a scientific agenda (Whitmer et al, 2010). These authors emphasise that engaged research and societal interactions offer one approach to address this problem but are discouraged by institutional constraints within academic organizations.

Universities do not want to be regarded as isolated and separated islands from their surrounding communities and have therefore developed internal mechanisms to bridge their activities with the needs and expectations of external actors. Universities have to acknowledge that their structure and culture can simultaneously serve as opportunities and also create barriers to community engagement that would contribute to social transformation (Sathorar, & Geduld, 2021). Partnerships between institutions of higher education appear on the surface to involve multiple members with a common goal or goals (Salmi, & D'Addio, 2021; Cox, 2000). Community engagement work has grown over the last 30 years (Harkavy, 2016), and literature on the nature and impact of university and community partnerships has grown in turn (Rubin, 2000).

Boundaries between 'town and gown' are dissolving as university actors collaborate with local government, industry, and civic organisations to drive the physical and sustainable transformation of a specific locality, region, or societal sub-sector, with ambitions to influence broader society (Trencher et al, 2014). Admittedly, many of the methods and approaches adopted in such partnerships appear little more than an accentuation of more established paradigms such as agricultural extension, action and participatory research, transdisciplinarity, urban reform and regional development, etc. Yet what appears novel in the emerging co-creative function is the combining of these various roles into a systematic response to localised sustainability

challenges, and most importantly, the integration of values of sustainable development.

The third mission is considered since it is beneficial to the academic community and society (Nabaho et al, 2022). The mutual benefits from engaging in the third mission support the notion that universities should not regard university-community engagement as a burden but rather as a responsibility from which they stand to reap unquantifiable benefits. One of the other benefits of such collaborations is that they strengthen student engagement with the community as well as democratic values and civic responsibilities in students. The benefits of the third mission to universities are (a) “enriching scholarship, research, and creative activities; and (b) enhancing teaching and learning” (AUC, 2018a, p. 24).

Finally, in university community engagements, the university addresses “critical societal issues and contribute[s] to the public good” (AUC, 2018a, p. 24). The benefits attest to the complementary nature of the triple missions of the university. The complementarity of the missions can breed contestations regarding nesting activities in the specific missions because of the porous nature of the boundary between the triple missions of universities. The idea of reciprocal benefits from the third mission, as far as universities and the community are concerned, is explicit in the standard. Thus, the third mission is intended to facilitate a “mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity” (AUC, 2018a, p. 24).

In Europe, policy formation has recently been dominated by an ambitious modernization of domestic higher education systems (Maassen 2009, Dabic et al 2018; Capano, & Pritoni 2019). Even though teaching and research are still considered pivotal functions/missions of universities, other activities such as community sustainable development, technology transfer, lifelong learning, or social engagement

have broadened the scope of their actions. Germany has framed this concept of the third mission in the last few years and public universities are responding to this in their formal structure (Berghaeuser, & Hoelscher 2020).

This has not only significantly influenced the core missions of institutions (research and teaching), but has also shed attention on their direct contribution to economic development and innovation by bringing ‘social impact’ to the fore. In the United Kingdom, universities have adopted an entrepreneurial university model to stimulate knowledge transfer through external collaborations with industry and commerce and to bring in further resources for the accomplishment of academic goals (Kitagawa et al., 2016; Degl’Innocenti et al, 2019). For instance, in Norway, societal engagement or outreach is now an official mission that is mandated by law for all higher education institutions.

In Nordic countries like Sweden, universities have been engaging in non-profit activities with the communities that encompass policy development, entrepreneurship education for students or researchers, or contributions to the community in multiple ways such as lifelong learning pursuits or creating links between universities and vocational schools (Schnurbus, & Edvardsson, 2022). These collaborations have been instrumental in ensuring better execution of common goals when it comes to regional sustainable development and growth, and the formation of regional innovation systems. To effectively implement and follow the third mission at institutions, the management should do more than set up physical structures such as Technology Transfer Offices (TTO) or science parks, but needs to do more to embed the third mission opportunities into their general strategy and link it with primary missions of research and teaching.

In African countries, there is a growing body of studies that emphasises the

engagement of universities with local communities to address economic, social, and environmental issues. In Africa, the seeds of the third mission in higher education were sown in the 1960s (Mugabi, 2014). It has been evident that there has been renewed interest in the third mission of universities in Africa since 2000 (Nabaho et al, 2022). The third mission has an associated standard in the African Standards and Guidelines for Quality Assurance in Higher Education (ASG-QA) underscored by the African Union Commission [AUC]. It is emphasised that: “A higher education institution is not only responsible for teaching, learning and research, but also for serving society” (African Union Commission [AUC], 2018a, p. 24).

In South Africa, there has been a revival of interest in community service as a policy-oriented exercise for universities and regional development, partly stimulated by international demands for relevance in higher education (Preece 2011). University-community engagement was a relatively unknown concept in South African higher education until the late 1990s (Lazarus et al, 2008). These authors note that the White Paper on the Transformation of Higher Education (Department of Education, 1997) laid the foundations for making community engagement an integral part of South African higher education. It called on higher education institutions to ‘demonstrate social responsibility and their commitment to the common good by making available expertise and infrastructure for community service programs. It is noted that a total of approximately 1500 community engagement projects were identified covering a full spectrum of activities from volunteerism to service learning. In Uganda, Nabaho et al (2022) noted that Ndejje University is one of the few universities in that country that have actively embraced the third mission in a bid to demonstrate their relevance, shed off the ivory tower syndrome, and generate additional income.

2.5 The Role of University-Community Engagements in Climate Change Action

There is a strong and growing impetus for universities and colleges to ensure that their presence within various communities is productive and transformative (Bowers, 2017). Alongside this positioning, there has been an increasing emphasis on the role of communities to facilitate and sustain carbon reduction practices. University community engagements towards community-based carbon reduction strategies are one example of action towards achieving sustainability and addressing climate change. Thus, university-community partnerships have the potential to respond to society's most pressing needs through engaged scholarship (Pundt, & Heilmann, 2020). This particularly could be through universities moderating between the different actors like NGOs, and community members, due to their independent and science-driven perspective. This collaborative approach in which a university is not only the coordinator, but in particular the moderator, indicates clearly a 3rd mission activity whereby the university outreaches to local communities, organisations, enterprises, and the public to address climate change.

There is currently the presence of complex and wicked sustainability challenges like climate change, environmental degradation, peak oil, and food security. These sustainability challenges are rooted in multiple areas of the complex social, economic, technological, political, cultural, and environmental fabric of human settlements in Africa and other parts of the world. Thus, Myers and Kent (2008) have opined that it is little wonder that the generation of concrete and effective solutions is beyond the capability of many central and local government institutions. Partnerships and collaboration between academia, industry, government, and civil society are consequently increasingly seen as prerequisites for tackling various sustainability challenges (Talwar et al., 2011; Whitmer et al., 2010).

UNESCO (2015, p. 67) argued that to promote climate change actions, players need to form or strengthen “partnerships and collaborations”. These could be formed between “education communities, public organizations, NGOs, local communities, entrepreneurs etc” (Virtanen, 2010). Therefore, effective climate change interventions require local and international support which could be in the form of technical, financial, collective learning, and other kinds of support for the programs. Universities could explore partnerships with other universities, international NGOs, the private sector, donor agencies within and outside the respective countries, as well as public agencies to boost their climate change education interventions.

Universities clearly harbour a huge potential regarding such alliances. They are powerful generators of social and technological innovation (M’Gonigle and Starke, 2006), with an innate ability to link vast areas of expertise and activities across society (Arbo and Benneworth, 2007). For such reasons, some scholars hold an argument that university collaborations across sectors significantly contribute to the local or regional transition to sustainability (Stephens et al., 2009; Molnar et al., 2011; Trencher et al., 2013; Yarime et al., 2012). Coupled with this growing consensus, there are mounting calls for universities to tie their research agendas to real-world sustainability issues (Crow, 2010) and direct their various functions to the development needs of different regions.

In the United Kingdom, Axon (2015) conducted a study exploring public engagement in addressing climate change and community-based carbon reduction strategies. The findings from this study suggested that community members accept the concepts of community collaborations that aim to facilitate low-carbon living and are prepared to collaborate on a number of cognitive, affective and behavioural levels,

demonstrating intentions to (proactively) participate in carbon reduction-related projects.

The full potential of the third mission regime to function as a useful guiding concept or propelling force in the quest for low-carbon development and the sustainable transformation of individual towns, cities, and regions is still contested. This is despite attempts to tack on the concept of sustainable development or green innovation. Providentially, Whitmer et al, (2010) propose several ways through which academic institutions avoid discouragement or neutrality and pursue proactive support. Institutions can achieve this through (1) recognizing research and activities that advance scientific knowledge and improve outcomes for human and natural systems and (2) appreciating the challenges involved with such engagement. By doing so, the academic community would have to articulate standards of excellence for engaged, collaborative research approaches.

The institutions can therefore demonstrate effective support for the engaged scholarship by designating financial grants to support solutions-oriented research that can impact the surrounding communities. Public meetings and seminars that highlight this work and bring together researchers and stakeholders from across the campus and surrounding communities should be considered. Finally, Whitmer and his fellow researchers propose that training and mentorship should be adopted through innovative programs from the undergraduate to the faculty levels Whitmer et al, (2010). By providing strong institutional support for engaged research, academic institutions can play a more important role in leveraging scientific and societal knowledge to solve environmental problems. In the context of this study, the relevancy of this investigation is in achieving desirable university-community engagement opportunities geared

towards climate change actions.

In the United States of America, universities started implementing the third mission of universities to have a positive impact on communities for sustainable development. The objective of driving a sustainable transformation in particular regions and cities has even been elevated to an institutional priority. For example, the Berkley and San Diego campuses of the University of California have made tremendous efforts to accelerate a regional transition to a high-tech green economy and hasten the uptake of smart grid technologies and renewable energy (Trencher et al, 2014). Across the Atlantic, administration from universities in Manchester has teamed up with the city to exploit the established functions of urban reform (Perry and Wiewel, 2005) and regional development to dramatically transform a 243-hectare strip in the city centre into a low-carbon hub of knowledge-driven business activity.

Furthermore, Oberlin College in the USA has had university-community engagements with objectives like goals: 1) Create climate positive town by shifting the City and College to renewables, improving efficiency and drastically reducing carbon emissions; 2) Stimulate local economy through existing and new ventures in energy efficiency, solar deployment, food and sustainable resources; 3) Establish 20,000-acre green belt for supplying local foods, forestry and bio-fuel products and carbon sequestration; and 4) Create sustainability educational alliance with local schools and college. Oberlin College has since then become a ‘transformative institution’, one dedicated to co-creating societal transformations in view of materialising sustainable development (Trencher et al, 2014).

As established by Raditloaneng (2013) African universities can work together on collaborative projects that depict university service to communities in their regions

regarding climate change action. This is based on a project; Impact of “Implementing the Third Mission of Universities in Africa (ITMUA) collaborative research project, 2010-2011”. At the University of Botswana, it was felt that the SDGs serve as a benchmark and tool for a number of cross-cutting issues that are addressed in the university curricula such as community development, environmental awareness, global warming and climate change as part of university-community collaborations. This is done through environmental campaigns by students and environmental education programs to remote communities. The university felt that although progress had been made in making the university more relevant to local needs, there was a need for more community service and elevation to the same level as teaching and research; to work more closely with communities for mutual benefit.

The University of Malawi in Malawi cited a climate change program in the Geography Department that was experimenting directly with farmers on the variety of crops that should be grown in drought-vulnerable areas of the country (Raditloaneng, 2013). This was a result of the university working more closely with its immediate surrounding community and conducting a needs analysis to be more proactive in interacting with the wider community. However, it is paramount to note that a key challenge for African universities is how to match global demands for higher education as a commodity for knowledge production whilst preserving indigenous qualities of pedagogy, identity, and relevance to regional and local development needs. To this, David (2020) has noted that the universities in Africa need to actively be engaged in community initiatives by taking part in coming up with ideas and implementing them as a way of supporting communities, especially those with low capacity to deal with the effects of climate change, especially where specialized expertise is needed.

In South Africa, universities, among other sectors of society, are fostering climate change communication where they are expected to promote initiatives and strategies towards a better understanding of the multidimensional nature and effects of climate change (Villavicencio et al, 2018). These authors noted that universities offer a meaningful platform for broader and multidisciplinary academic communities to discuss its effects, to emphasise the solutions, and ultimately, motivate people towards taking action. For example, in 2016, at the North-West University (NWU), South Africa, several activities were undertaken with the communities as part of the international initiative, “Global Climate Change Week” and under the heading “Ready to Act?”. These activities connected with surrounding communities and with the realities, challenges and opportunities of climate change. Relatedly, the University of Cape Town hosts global and regional atmospheric, ocean, and coupled modeling undertaken by the Climate System Analysis Group (CSAG) and the Department of Oceanography (Ziervogel et al, 2014). This is with a focus on ocean-atmosphere process studies, seasonal forecasting, and climate change projection that help the community to mitigate climate change and adapt to its impacts.

In Tanzania, at the University of Dar es Salaam, (Ssekamate 2022) noted that the university is a leader in action on climate change in communities. To them, the university conducts outreaches and engages local communities in adaptation initiatives that are simple and friendly or easy to implement, supported by the research conducted on climate change. However, Ssekamate observed that there is a need to have these local-based adaptation initiatives being supported or routed from communities themselves, rather than injecting sophisticated information, and science-based information into our local communities.

In Uganda, Ssekamatte (2020) has noted that some universities like Makerere have been implementing several pieces of training, research, and community engagement programs with regard to climate change education. David indicated that the training programmes were; short courses, seminars, undergraduate and postgraduate programmes on climate change. The universities conduct various research programs mainly on climate change adaptation. Findings from David's study showed that implementing units at these universities conducted sensitization events, local adaptation community initiatives, policy engagement events, climate change festivals, and identification as well as empowerment of climate change champions in various communities across. Makerere University being the oldest public university in Uganda (and East Africa) boasts of the prestige and plays an exemplary role to other public and private universities in Uganda. This is an ideal gap to explore a comparative study on opportunities that Makerere University and Ndejje University (the oldest public university in Uganda) can utilize to address issues of climate change.

2.6 Challenges Impending Climate Change Action

Universities face challenges as they implement their programs on climate change in societies. In their study, Koryakina et al (2015) identified two major types of barriers: external, relating mainly to government regulations and funding allocation, and internal, involving organizational characteristics. The study also highlighted some tensions between a growing emphasis on third-mission activities and their institutionalization process within universities in efforts to social efforts towards sustainable development.

In East Africa, Ssekamate (2021) cited inadequate funding for research, the high cost of training amidst high levels of poverty, and poor delivery of training due to

inadequate resources and facilities as major challenges impeding the implementation of climate change action by the universities, especially in the communities. Ssekamate noted that these are very serious challenges because research, training, and community engagement programs require adequate funds. Moreover, he notes that most of the community engagement programs on climate change so far implemented by the university are part of research projects and therefore not well structured and on a large scale as expected. Additionally, Thomas et al (2019) have cited limited expertise in climate change science and negative attitudes of communities towards new technologies and products introduced by the university through research as other major impediments towards climate change action.

Besides these challenges, David (2020) suggests that universities can actively participate in climate change outreach and policy engagements in their respective countries. This could be through the development of sensitization and outreach initiatives to disseminate climate change information and engage communities on mitigation and adaptation measures at their local level. Through outreaches, the university could explore piloting some of their innovations and technologies on climate change arising from their research projects. Universities especially in sub-Saharan Africa can support policy formulation and review on climate change in their respective countries.

2.7 Conclusion and Gaps

The literature review has shown that there is over-reliance on technological solutions and how social and the third mission approaches can address climate change. Indeed, there has been contention about whether technology can achieve a sustainable future and address climate change (Axon, 2010; Pacala and Socolow, 2004).

Nevertheless, many have argued that technological development has helped create an unsustainable future (Omer, 2008b). Yet there is a tendency within political decisions and academic literature to focus more on the contributions of technological solutions for addressing climate change rather than consider a reorientation of people's everyday collaboration practices and lifestyles that are more environmentally conscious and sustainable. This warrants an exploration of university-community collaboration opportunities that are geared towards addressing climate change issues.

While many of the primary effects of climate change may be global, the reviewed literature indicates that the causes are located within the activities and climate-relevant behaviors of individuals, households, and communities (Whitmarsh & O'Neill, 2011). These unsustainable habits, activities, and behaviors can be addressed through the application of a number of social collaboration solutions, tailored to the needs of individuals, communities, and organizations that technological innovation alone is unable to alter. Axon (2015) argues that collective action towards climate change creates wider benefits, thus an opportunity for university-community engagement.

Generally, there is a dearth of studies in the African context on the third mission compared to the plethora of studies on the teaching and research missions of universities. The extant studies on the third mission are skewed towards the European and American higher education contexts (see Koryakina et al., 2015; Lebeau & Cochrane, 2015; Schnurbus & Edvardsson, 2020).

Studies on the third mission, particularly in the African context, are scarce (Mugabi, 2014). Therefore, little is known about how the third mission is decoded within the African higher education landscape and the activities that universities in Africa engage in to fulfil their role in this regard. From the reviewed literature, a

consensus has not emerged regarding the activities of universities that may be encapsulated in the third mission, particularly regarding climate change issues. This knowledge gap is compounded by the strategic silence on how the university engagement opportunities can enhance the fight against climate change, an SDG that affects most of the other SDG goals. Moreover, Ssekamatte (2022) has recommended an exploration of deliberate and comprehensive community engagement approaches for climate change mitigation and adaptation and the creation of more networks and partnerships with local actors.

A review of the “Government White Paper on Education Policy Review Commission Report,” for example, shows that the Ugandan government expects all higher education institutions to engage with, and provide outreach services to, external communities. Likewise, a review of the mission statements of Ugandan and South African universities shows that besides teaching and research, the universities aspire to engage with external communities and contribute to the socio-economic transformation of society. However, such declarations and aspirations reveal less about the state of such university-community opportunities. Accordingly, it is also against this backdrop that this study explores university-community engagement opportunities towards climate change action in an African context. The AUC expects universities at a general level to institute mechanisms for “partnering with other stakeholders in the community for sustainable development” (AUC, 2018a, p. 24).

Table 2. 1 Summary of empirical review and gaps in knowledge identified

Objective	Authors	Literature	Gap
Community engagement programs implemented by universities on climate change	Koryakina et al., (2015); Lebeau & Cochrane, (2015); Schnurbus & Edvardsson, (2020); Nabaho et al, (2022), Papadimitriou et al (2020); Frondizi et al (2019).	-Role of University-Community Engagements in climate change action Idea of reciprocal activities from the universities and communities; initiatives and strategies towards understanding of the multidimensional nature and effects of climate change; University community engagements strategies towards community-based carbon reduction;	-Over-reliance on technological activities and how social and the third mission approaches can address climate change.; consensus has not emerged regarding the activities of universities that may be encapsulated in the third mission, particularly regarding climate change issues; Universities are regarded as isolated and separated islands from their surrounding communities
Development and coordination of community engagement programs on climate change action	UNESCO (2015); Pundt and Heilmann (2020); Axon (2015); Ssekamate (2022); Trenscher et al, (2014); Villavicencio et al (2018)	-University community engagement structures and programs -Possible external stakeholders of engagement	-Context gap: little is known about how the third mission is decoded within the African higher education landscape and the activities that universities in Africa engage in to fulfil their role
Constraints in the university-community collaborations in the efforts to address climate change	Koryakina et al (2015); Ssekamate (2021); Thomas et al (2019); Ssekamate (2020);	-Challenges impending climate change action; Perceptions of universities regarded as isolated and separated islands from their surrounding communities; academic institutions' success in communicating scientific findings outside academia; success in involving society in developing a scientific agenda	-Exploration of Constraints in the university-community collaborations in the efforts to address climate change in an African context; -Limited success in involving society in developing a scientific agenda

Opportunities that might be able to support policy making and enhance the third mission programs towards climate change issues and sustainability	Uganda Government White Paper on Education Policy Review Commission Report (1992), AUC, 2018a, p. 24; Nicotra et al, 2021; Sathorar, & Geduld, 2021)	Partnering with other stakeholders in the community for sustainable development; expectations of all higher education institutions to engage with, and provide outreach services to, external communities; universities' aspiration to engage with external communities and contribute to the socio-economic transformation of society	Exploration of university-community engagement opportunities towards climate change action in an African context; declarations and aspirations reveal less about the state of such university-community opportunities; a dearth of literature on how the university engagement opportunities can enhance the fight against climate change in an African context.
---	--	--	--

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter sets out the various stages and phases that I followed to examine university-community engagement opportunities to address climate change in an African context. The chapter explains how the study was carried out hence, it gives details of the methodology procedures, and modalities in the collection of data. Particularly, the chapter covers the design process as well as the population and sample, strategies for data collection, measures of trustworthiness, data analysis, and ethical measures. To achieve the research objectives and have the research questions answered, a qualitative approach was employed, located within an interpretivist paradigm and positioned as a comparative multiple case study design as discussed below.

3.1 Philosophical Underpinnings of the Study

Research in any field of inquiry is based on some beliefs and assumptions (Creswell, 2013). According to Creswell (2009), these consist of overarching philosophical or ideological stances, systems of beliefs about the nature of the world, and ultimately, when applied in the research setting, the assumptive base from which we go about producing knowledge. Whether researchers are aware of it or not, they always bring in certain beliefs and philosophical assumptions to research. This is related to the views that researchers have about the type of problems that they need for study, the research questions to ask, and the process and methods they take to generate data (Creswell, 2013). Notably, philosophical assumptions are paramount because they help in shaping how to formulate the research problem and questions, and how information is sought to answer the research questions (ibid, 2013). The philosophical underpinnings of this study are according to the four key philosophical

assumptions: ontological, epistemological, methodological, and axiological as discussed below.

The ontological belief relates to the nature of reality and its characteristics (Creswell & Clarck, 2018; Creswell, 2003). This study is set in a qualitative, interpretivist paradigm, which is based on the idea of multiple realities. Thus, there was a prevailing, dominant reality that was socially constructed and maintained (Mertens, 2010). The ontological position of this study is that there are many tangible realities as people are constructing the realities. Therefore, the reality is limited to the context, space, time, and individuals or groups (Chilisa & Kawulich, 2012). This study therefore adopted interpretivists' beliefs that there is a multitude of interests, and different ways of understanding the world throughout the inquiry (Barnes 2020; Creswell, 2012).

Interpretive researchers conduct a study with the intent of reporting these multiple realities and the evidence of these multiple realities includes the use of multiple forms of evidence in themes using the actual words of different individuals and presenting different perspectives (Creswell, 2013). Thus, I based on such beliefs to make the interpretations of what the participants from the two cases made of the university-community engagement opportunities to address climate change in an African context. This is also due to the fact that this study was interested to establish how the opportunities/activities undertaken by members of case universities are seen as being potential in addressing climate change initiatives as interpreted by the participants.

Epistemology deals with what counts as knowledge and how knowledge claims are justified (Creswell, 2013). Therefore, it refers to the nature of knowledge, the type of knowledge generated, and the relationship between the researcher and participants.

Notably, the truth lies within the human experience and authoritative knowledge. This was paramount for this study which was characterised by close collaboration and interactions between myself and the participants with authority and relevant knowledge about the university-community engagements. The interpretivism paradigm espouses that when conducting a qualitative study, researchers try to get as close as possible to the participants being studied and subjective evidence is assembled based on individual views (Chilisa & Kawulich, 2012). Therefore, Truth lies within the human experience. Thus, Data was collected from people with experience and authority about the subject studied, and relevant documents were analysed about how university community engagement opportunities can be utilised to address climate change in an African context.

The methodological assumptions provide a disciplined approach to generating and constructing knowledge. Conducting this interpretivist study took place in a natural setting where the participants and I made a living adhering to the research process (Chilisa & Kawulich, 2012). This is far from a linear process and requires a cyclical methodology that can accommodate and highlight the complexities of the multiple realities, and adapt over the lengthy engagement. In adopting this stance, the interpretivist researcher was able to select the research design and the methodology that are most appropriate to address the research question. The research questions have been used to guide the methodology and methods used. Data-generating methods are selected depending on the choice of the design, the nature of the participants, and the research problem.

Lastly, axiology refers to assumptions about the nature and role of values in research. Axiology denotes principles and ethics in conducting research and the ethics

that govern these (Cohen, Manion & Morrison, 2018). Therefore, values inevitably influence researchers and inform their choice of paradigm for inquiry, the choice of a topic they study, the methods chosen to collect and analyse data, and how findings are interpreted and reported. The inquirers admit the value-laden nature of the study and actively report their values and biases as well as the value-laden nature of information gathered from the field (Creswell, 2013). Located in interpretivism, I therefore engaged with my personal values brought into the study. Further, I became cognisant of the values and biases pervasive in the participants' social context, and different policy documents and ensured that my engagement did not inadvertently perpetuate these.

Drawing on the above philosophical stances, and as recommended by Creswell and Clark (2018), qualitative research investigates the understanding and interpretation of individuals regarding their social world which leads to the epistemological position of interpretivism (Graue, 2015). In line with this multiple case study, the interpretivist paradigm located this study by recognising negotiation between myself and the researched to produce the account of the insider's perspective, so both the researcher and the researched were "present". The data are accounts, which researchers then coded for emergent themes, looked for connections, and constructed higher-order themes (Hancock, Ockleford, & Windridge, 2001).

As an interpretivist, I was concerned with "understanding the subjective world of the human experience" and rather, as part of our consciousness and due to our interaction with the world in which we live. Notably, behaviours and experiences can be understood by researchers only via those who perform them and the context in which they occur (Assalahi, 2015). Informed by the research aim and objectives, it was appropriate for this study to be positioned in the interpretive paradigm. The

interpretivism paradigm allowed me to view the phenomenon through the perceptions and experiences of the participants. This paradigm enabled me to get subjective reality of the various participants i.e. the way they view the opportunities created by universities in addressing climate change issues, as advanced by several participants. In seeking the answers to the research questions, I used those experiences to construct and interpret my understanding of the generated data from the participants in this study.

3.2 Research Approach

This study was positioned as a qualitative study. A core feature of qualitative research methods is that satisfactory explanations of social activities require a substantial appreciation of the perspectives, culture, and 'world views' of the actors involved (Allan, 2020). As Creswell (2013) notes, in qualitative research, a population is usually explored without using predetermined measurable variables but is empowered to share their experiences in order for the researcher to acquire a complex and detailed understanding of the setting. This means that the research procedures are continuously devised as the research progresses. This makes it possible for a researcher to find solutions to challenges that present themselves during the research.

The qualitative approach was selected because it invites participants to “speak in their own voice” and acknowledge the changing nature of human experience (Reavey & Johnson, 2012; Denzin & Lincoln, 2005). Rather than establishing universal truths about the world, a qualitative study is about gaining an understanding of how some differently positioned actors talk about their experiences and the meanings they associate with particular events, actions, and claims. This was a valuable approach because so often the cost of attempting to generalise is that researchers do not see and

investigate those aspects of a process that do not fit their presuppositions about a particular phenomenon (Nassaji, 2020; Broom & Willis, 2007).

Qualitative research, concerned with exploring the human experience, draws on research strategies or methodologies such as phenomenology, ethnography, case studies, and grounded theory, to mention a few. Qualitative research also employs research methods such as participant observation, archival source analysis, interviews, focus groups, and content analysis (Mohajan, 2018; Hancock et al., 2001). These authors further note that the qualitative approach enables the researcher to gain a deeper understanding of the research problem since the approach postulates that there are multiple realities that different individuals constructed. Qualitative research uses small samples, and the relationship between the researcher and participants can take place over an extended period (Guest et al, 2020).

Therefore, this study adopted a qualitative approach to examine the perspective of the university staff, students and community members about the experiences and prospects for the third mission of the university in addressing climate change issues within the context of universities in Africa. The research questions of this study required a research approach that engaged individuals within the institutions and communities to share their views, opinions, experiences, and ideas on how climate change issues are being addressed in their university programs as well as the challenges and opportunities they face in their university-community engagement programs. This approach was valuable in finding answers to the research questions as well as the objective of the study.

3.3 Research Design

Research design is defined as the logic or master plan of research that shows

how the study is to be conducted. It constitutes the blueprint for the collection, measurement, and analysis of data (Sileyew, 2019; Kothari, 2004). It is a plan or strategy which is used to carry out research that involves selecting what kind of data is needed for answering the research questions, and how it is generated (Harris, 2019; Leuwenhuis, 2007). Research designs are useful because they help guide the methods and decisions that researchers must make during their studies and set the logic by which researchers make interpretations at the end of their projects.

To achieve the research objectives and have the research questions answered, a comparative multiple case study design was employed. This approach involves researchers and participants working together to understand a problematic situation and change it for the better (Keahey, 2021). I adopted a case study design to link the interpretive theoretical paradigm, the methods of data collection, and the research questions posed in order to understand the phenomenon under study at Ndejje University and Makerere University.

Creswell (2009) defines a case study as “A researcher who explores in-depth a program, an event, an activity, a process, institution or one or more individuals”. The structure of a case study should be the problem, the context, the issues, and the lessons learned (Creswell, 2014). The case method has its roots in sociology and has been found to be especially valuable in practice-oriented fields, such as management, public administration, psychology, history, education, and medicine. It is used to study one or more cases within a bounded setting or context and it is conducted by using multiple sources like questionnaires, interviews, observations, written accounts, and audio-visual materials (Creswell, 2009). They are classified as a single case study or multiple case study. This study adopted the latter (comparative in nature) which involves more

than a single case and has the advantage of providing, through the evidence of the cases, a more robust study (Silva & Mercês, 2018).

The main advantages of this multiple case study are its applicability in different epistemological orientations and the possibility of using multiple sources of evidence. Thus, the use of this design is a strategy of social science research, since it enables the investigation of phenomena in the real context, with various sources of evidence that allow the reflection and the search for alternatives to solve problems (Faillie, 2019). Consequently, this contributes to the advancement of knowledge and sustainable development. Notably, Comparative case studies are undertaken over time and emphasize comparison within and across contexts (Goodrick, 2020). Comparative case studies involve the analysis and synthesis of the similarities, differences, and patterns across two or more cases that share a common focus or goal. To be able to do this well, the specific features of each case should be described in depth at the beginning of the study.

Yin (2015) has identified several steps of the multiple case study are preparation of the research project with the definition of its components (research question, theoretical propositions, unit of analysis, data linkage to the propositions, criteria for interpreting the findings); development of the protocol for the case study; data collection; individual report of cases, data analysis and a final report with data cross-referencing. Based on Yin's typology of case study research designs, I adopted this holistic, descriptive multiple case study design as shown below.

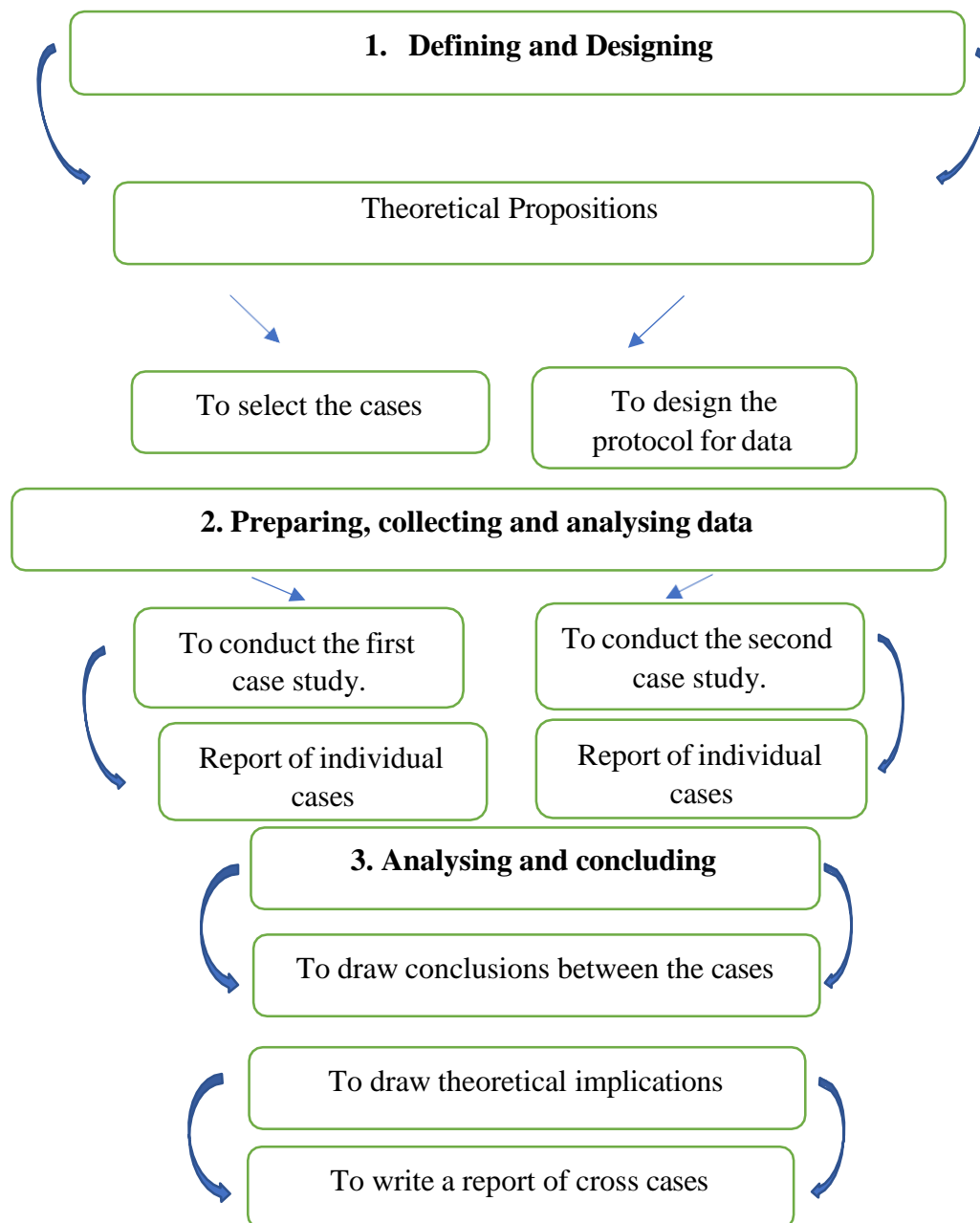


Figure 3.1: Steps of the multiple case study, adapted from Yin, 2015

The above figure illustrates the stages that I went through while designing and conducting the multiple case study. As earlier mentioned in chapter one (See 1.8), this study adopted the Ubuntu theoretical orientation. I then used purposive sampling to select the cases, that is, Ndejje University and Makerere University. I then developed a data collection protocol which was approved by the research

ethics committee at Uganda Christian University and Uganda National Council for Science and Technology (UNCST). Developing a study protocol was helpful to me to be clear about the delimitation, the theoretical and empirical debates around the phenomena under study, as well as the methodology to be followed.

I generated data for each case in Uganda. One of the principles relevant to the collection of data on case studies is the use of multiple sources of evidence, which allows the researcher to develop converging lines of research and the triangulation of data during analysis (Yin, 2015). Thus, there was data collection using document analysis, interviews, and focus group discussions with participants at the case universities and these provided the evidence on which I relied on to reach conclusions (Silva & Mercês, 2018). Cross-case analysis and conclusions entailed bringing together the common and divergent findings from the cases and identifying patterns across them. I then wrote a cross-case report and developed policy, empirical, and theoretical implications.

3.4 Study Area

Within every study, there probably exist numerous study areas that could be visited or observed, people who could be interviewed, and documents that could be reviewed. Thus, researchers always contemplate where to observe, and in this case, which institution to focus on. For this study, being a multiple case study focusing on two cases, the selection of the case was based on a double criterion, explicit institutional acknowledgment of the TM as a core function of the university and offering courses and activities related to climate change and environmental management in an African context.

All the countries all over the world have been shown to be vulnerable to climate change, but they face different risks and levels of vulnerability depending on their geography and underlying socio-economic conditions (World Bank, 2023). Within countries especially in Africa, poor and marginalized communities are most at risk because they have less ability to adapt or to respond to climate change shocks. Uganda, being one of those poor low-income countries, is highly likely to struggle to mitigate and adapt to climate change impacts. World Bank and other international agencies have indicated that different continents and different countries need to address climate change differently as mitigation, adaptation, and diagnostic measures/approaches vary according to contexts. With Uganda's structure of the economy being agriculture, which tends to be one of the most vulnerable sectors to climate change, University-community engagement opportunities in the country's context could prove significant towards effective climate change awareness, mitigation, and adaptation.

To carry out this study, I purposively selected two cases (universities)—Ndejje and Makerere University in Uganda. These two universities explicitly acknowledge the third Mission (University-community engagement) as one of their core missions and functions. Furthermore, the two universities have climate change programs, influential in the higher education systems in the country, and they are capable of influencing other emerging universities in the region and the continent. Also, the two cases had two distinctive characteristics that cemented my intentions to compare them. Ndejje University is the oldest private university in Uganda, which largely depends on students' tuition to run university activities. On the other hand, Makerere University is the oldest public/government university in Uganda. Most of the activities at the university are funded by the government. Secondly, the two universities have two completely different contexts. Ndejje University is set up in the rural area of Bombo,

Luwero district. On the other side, Makerere University is at the heart of Kampala, the capital city of Uganda.

3.4.1 Case Description

In social science research where a case study is used, researchers must describe the aspects of cases under study and view the process within their total environment (Mfinanga et al, 2019; Zainal, 2007). In their context therefore, a variety of data sources are used to ensure that there is no exploration of an issue through one lens, but rather multiple lenses which allows multiple facets of the phenomenon to be revealed and understood (Tomaszewski et al, 2020; Baxter, 2008).

Ndejje University

Ndejje University is a private, multi-campus, Christian university in Uganda. The main campus of the university lies approximately 42 kilometres (26 mi), by road, north of Kampala, the capital city of Uganda. Ndejje Hill is located about 8 kilometres (5.0 mi), northwest of Bombo, the nearest large town. The coordinates of Ndejje University Main Campus are: 0°36'44.0"N, 32°28'34.0"E (Latitude: 0.612222; Longitude: 32.476111).

In 1995, "The Christian University of East Africa" with some government involvement was annexed by the Anglican Diocese of Luweero, in the province of the Church of Uganda. The name of the university was changed to Ndejje University. In 1998, the institution received recognition as a tertiary-level institution of higher learning by the government of Uganda through the Ugandan Ministry of Education and Sports. Ndejje University was issued a University Charter by the government of Uganda in 2009. The university offers undergraduate and postgraduate programs that are recognized nationally and internationally among which are Environment and

Agricultural Sciences courses that underpin the climate issues that this study is interested in. This Faculty connects the university to the community through Research, Innovations, and Community Outreach. Established in 1992, Ndejje University (NDU) is the oldest private university and among the fastest-growing in Uganda.

Makerere University

Makerere University, Kampala is Uganda's largest and oldest institution of higher learning, first established as a technical school in 1922. It became an independent national university in 1970. Today, Makerere University is composed of nine colleges and one school offering programs for about 36,000 undergraduates and 4,000 postgraduates. The university has several campuses in the country: the main campus located on Makerere Hill in Kampala City, the Mulago Hill campus for the College of Health Sciences; the Business School campus in Nakawa; Kabanyolo campus for the College of Agriculture and Environmental Sciences; and the Jinja campus located in Jinja town in eastern Uganda.

The choice of this University was also hinged on its mission to engage communities and a world-class engaged and transdisciplinary African university that responds to socio-economic and environmental challenges in society. Sustainable development is embedded in the university's core ideology. Its Sustainability Research Unit (SRU) is the dedicated interdisciplinary research group focusing on the sustainability of complex social-ecological systems in the communities through improved collaboration toward the SDGs.

3.5 Target Population

Rather than meaning everyone who lives in the study area, the target population refers to all the items in the category of things that are being researched (Denscombe,

2014). The target population of this study pertained to two universities. Particularly, this study targeted university managers/administrators, lecturers from the Environment and Agricultural Sciences, and students offering courses related to climate change. From the community, the study targeted community leaders and climate change activists who have participated in engagement programs with climate change.

3.6 Sampling procedure and Sample size of the Study

After being cleared ethically by the relevant authorities, I embarked on sampling. Not only does the appropriateness of methodology and instrumentation lead to a quality piece of research, but also the suitability of the sampling strategy that is adopted (Vergara-Hernández et al, 2024; Acharya et al, 2013). This study used non-probability sampling, particularly, participants who were subjected to interviews were selected using the purposive sampling technique. Purposive sampling is the technique that is mainly used in naturalistic inquiry studies and is defined as selecting units (for example individuals, groups of individuals, or institutions) based on specific purposes associated with answering a research study's questions (Obilor, 2023; Anney, 2014).

This is the deliberate choice of a participant due to the qualities the participant possesses and the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Etikan et al, 2016). As highlighted by Nyimbili and Nyimbili (2024), this sampling technique helped to increase the utility of the findings since the sample included participants who portrayed certain characteristics and were able to contribute the 'rich thick' data that served to deepen the understanding of university-community engagement opportunities towards climate change. As an ethical requirement, the participants were allowed to withdraw from the study without any penalty.

Purposive sampling was also used in selecting the institutions to be covered in the study. In selecting the institutions, I was able to draw a frame in which I was interested in meaningful data within a reasonable time. The other and perhaps most important consideration in the frame was the actual participant from the institution to be included in the study. This was to ensure that people with “knowledge” and not just people of influence from those institutions participated in the study. In designing my frame for the study, I first consulted literature, and expert guidance (like my supervisors), and did an internet search to get more information about the components that I have listed above. In instances where I did not get sufficient information on the internet, I visited those places to establish the relevant participants from the ground.

3.6.1 Sampling Procedure at Ndejje University and Makerere University

At Ndejje University, I selected the university staff, Faculty of Environment and Agricultural Sciences, and centre for Community Outreach and Partnerships. These house the outreach programs that consolidate organic linkages between NDU and society in such a way that the needs of society form the core of the NDU teaching, research, and innovation agenda. The Faculty of Environment and Agricultural Sciences connects the university to the community through research, innovations and community outreach on a wide range of programs including climate change related. These initiatives presumably reverse the deficit model of university-community interactions geared towards sustainable development. I used purposive sampling to select 5 university staff who were subjected to semi-structured in-depth interviews. 11 students involved in community outreach programs and offering courses related to climate change were also selected for an FGD. I also selected 4 community leaders from the locale in the neighbourhood of the university.

I likewise purposively sampled participants at Makerere University in the College of Agriculture and Environmental Science, specifically in the School of Forestry, environmental, and geographical science. Participants from this college provided information regarding engagement and partnerships, interactions with stakeholders, and reaching out and contributing towards the sustainable development of communities. I focused on engagement programs related to climate change mitigation and adaptation. 5 university staff were selected and subjected to a semi-structured in-depth interview. I similarly selected 11 students from the same college. The students were subjected to a focus group discussion. I also selected four community leaders from the neighbouring locale.

The complete sample size at this case university is presented in the table below.

Participant group	Number	Method of data collection
Administrators	10	Semi-structured in-depth interviews
Community members	8	Semi-structured in-depth interviews
Students	22	Focus Group Discussion
Total	42	

3.6.2 Study sample at the two cases

The selection of the participants was due to the belief that these participants had rich experience and knowledge about the phenomena. Identified potential participants who met the selection criteria for inclusion in the study were contacted verbally and requested to kindly participate in the study. A few of the participants were reached through phone calls and email. Participants with whom I had a personal or professional relationship within the study were not included. These include family members, friends, co-workers, or professional and personal associates. This was so to prevent perceived

coercion to participate due to any existing or expected relationship between the participants and I.

3.7 Research Methods and Instruments

Qualitative research methods allow researchers to better understand the experiences of participants and allow the exploration of how decisions are made in different situations and contexts (Barrett & Twycross, 2018). To develop such insights, qualitative research requires data that are holistic, rich, and nuanced, allowing themes and findings to emerge through careful analysis. Researchers using the qualitative lens prefer involving participants in their generation of data and strive to build rapport and credibility with the individuals in the study as a whole (Johnson et al, 2020).

In order to answer the research questions of this study, data for this research is both primary and secondary. I collected data using multiple data collection methods including semi-structured in-depth interviews, focus group discussions, and document review. I did an Audio recording which helped me to ensure that the sentiments, views, and opinions of the participants were well captured. Note-taking was also done to help capture additional notes including non-verbal expressions such as facial expressions and gestures which were useful in interpreting the verbal data. The data collection methods are indicated in the figure below.

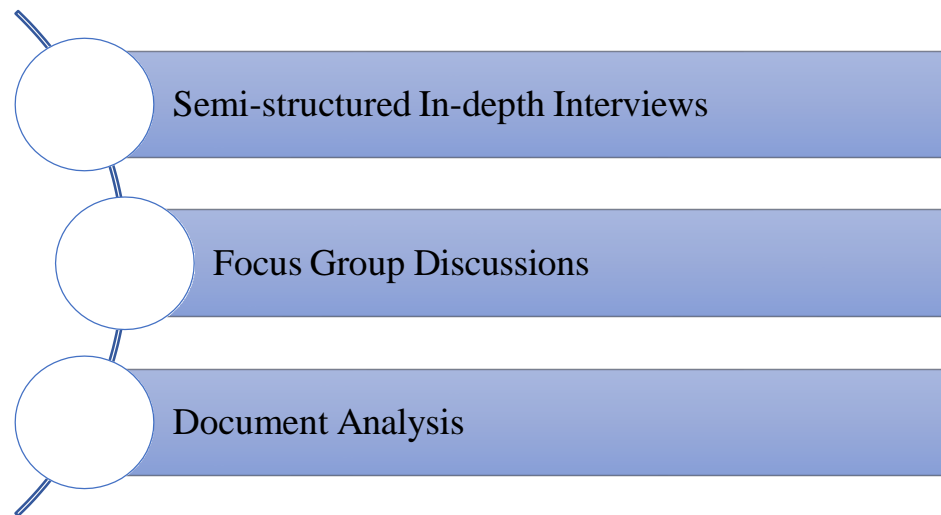


Figure 3. 1 Data collection methods

3.7.1 Semi-structured in-depth Interviews

Collecting data through interviews with participants is a characteristic of many qualitative studies. Interviews give the most direct and straightforward approach to gathering detailed and rich data regarding a particular phenomenon (Barrett & Twycross, 2018). The type of interview used to collect data can be tailored to the research question, the characteristics of participants, and the preferred approach of the researcher. Conspicuously, the value of interviewing is not only about building a holistic snapshot, analysing words, and reporting detailed views of informants; but it also enables interviewees to “speak in their own voice and express their own thoughts and feelings (Siedlecki, 2022; Alshenqeeti, 2014).

This study used interviews which encompassed participants directing their attention towards each other with the purpose of opening up the possibility of gaining an insight into the beliefs, concerns, interests, knowledge, experiences, values, and ways of seeing and thinking. This allowed me to get inside the context and understand the perspectives of those involved (Galanis, 2018; Schostak, 2005). Following this postulation, conducting interviews allowed me to do comprehensive probing which

led to the generation of more information and a clear expression of opinions, feelings, and attitudes by the participants that may not have been captured by the questionnaire.

In this study, data was generated using an interview guide that I developed to conduct individual face-to-face, in-depth semi-structured interviews with participants. As earlier intimated, the semi-structured interview provided me with the flexibility to probe more deeply into the rich descriptions of experiences and knowledge about the issues that concern university-community engagement opportunities in the two selected cases (Busetto et al, 2020). At the same time, interviews allowed me to ensure that I elicited the same core information from each participant. This flexibility enabled me as the researcher, rather than leading, to follow the participants, as they guided me to the relevant factors associated with the third mission of universities to address climate change.

The individual interviews were moderated and recorded by myself. My role as a researcher was therefore to give direction to the interviewees, probing them and encouraging them to give as much information as possible. The participants' responses were captured on audio and cloud zoom recording if they consented to. Additionally, I also took handwritten notes alongside the recording, capturing any other relevant information as necessary. The audio recording helped me to ensure that the sentiments, views, and opinions of the participants were well captured (Thunberg & Arnell, 2021). On its part, note-taking also helped me to capture additional notes including non-verbal expressions such as facial expressions and gestures which later became useful in analysing and interpreting the verbal data.

Interview Guide

I developed interview guides that were used to generate data at the case universities. Kostere and Kostere (2021) have noted that the interview guide contains various questions or topics that the interviewer explores during the interview. According to them, the researcher has to prepare the interview guide to ensure consistency across participants interviewed but also to guide the interviewer in probing further to gain enough detail. The interview guide does structure the “course of the interview” and contains a “sequence of carefully worded questions” (Siedlecki, 2022). An interview guide helps the researcher to conduct what Yin (2016) called “guided conversation” (p. 147).

In this particular study, I prepared two interview guides while putting together the research protocol. The interview guides solicited perspectives, information, and standpoints from the two groups of participants: university staff and community leaders. These guides together with other instruments were reviewed by this study’s supervisors to check the consistency, relevance, adequacy, and wording of the questions. The interview guides were also checked and approved for ethical considerations by an ethics body at Uganda Christian University and the National Council for Science and Technology in Uganda for a national research permit. After approval of the protocol, I proceeded to the individual cases for institutional permits to conduct research in the universities. After the institutional permits, I proceeded to make bookings and appointments for interviews with the participants.

3.7.2 Focus Group Discussions

Focus Group Discussion (FGD) is a technique involving the use of in-depth group interviews in which participants are selected because they are purposive,

although not necessarily representative of a specific population, this group being ‘focused’, concentrates on a given topic (Nyuma et al, 2018; Rabiee, 2004). Participants in this type of research are, therefore, selected on the criteria that they would have something to say on the topic, are within the age range, have similar socio-characteristics, and would be comfortable talking to the interviewer and each other (Gill et al, 2008). In a way, focus groups resemble interviews, but focus group transcripts can be analysed so as to explore the ways in which the participants interact with each other and influence each other’s expressed ideas, which obviously cannot happen with one-on-one interview material (Akyıldız, & Ahmed, 2021; Hancock et al., 2001).

Gundumogula, M. (2020) and Halcomb et al. (2007) note that focus groups are an increasingly common research tool used to obtain the opinions, values, and beliefs of an identifiable group using a facilitated interview technique. These authors add that this technique generates data through the opinions expressed by participants individually and collectively and that the technique is useful when a researcher is seeking a range of ideas about a given issue at a go.

Focus Group Discussion Guide

The focus group discussions in the study were conducted using a standard focus group discussion guide prepared by myself specifically for this study. Braun and Clarke (2013) recommend that one of the first things a researcher intending to conduct focus group discussions has to do is to design the focus group discussion questions carefully. The focus group discussion guide contains a wide range of topics that the researcher wants participants to discuss. The guide was meant to stimulate and engage the participants to share their views and perspectives on phenomena under study. This guide consisted of questions and leads that relate to each of the research questions and

that are well thought out to provide enough information to help me answer the actual research questions for the study.

However, the researcher may not strictly follow the questions as they appear in the guide, but rather, as Creswell (2014) advises, the guide only ensured that those specific core areas of the research were well covered. Therefore, the focus group discussions were less interrupted by the researcher and the participants were free to take turns and freely make their contributions to the discussions. My role as the researcher was that of a moderator, pausing the questions, moderating the contributions, and encouraging all discussants to contribute.

Two focus group discussions were conducted with the students at the two cases, one at each case. I guided the selection of the participants using the following two criteria:

- (1) they must have had the experience or information that the research purpose required, and
- (2) they must have been able to communicate it to the group. The proceedings of all the focus group discussions were captured on a voice recorder. I also made use of my notebook and wrote down some of the issues that I observed among the participants as the discussion progressed. Most of these issues that I observed and noted in the notebook were also used to probe the participants in later stages of the discussion.

3.7.3 Document Analysis

Document analysis is a systematic procedure for reviewing or evaluating documents, both printed and electronic (computer-based and Internet-transmitted)

material (Morgan, 2022). Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge (Wood et al, 2020, Bowen 2009). Qualitative document analysis is similar to other qualitative methodologies in that the main emphasis is on discovery and description, including a search for underlying meaning, patterns, and processes rather than mere quantity and numerical relationships between two or more variables (Asdal, & Reinertsen, 2021; Altheide, 2000). Using document analysis in combination with other qualitative data collection methods, allows the researcher to appropriately gain a rich understanding of Policy and other documents related to the study (Owen, 2014).

In this study, documents such as personal and official documents, mass media articles, virtual outputs, and photographs provided a wide range of data. Others included; “annual reports, mission statements, press releases, newsletters, memos, minutes of meetings, internal and external correspondences, policy documents, strategic plan documents, and program evaluation reports”. These documents were reviewed for each case.

The documents that were used in this study were grouped into three types:

- I. Internal documents of the case institution, such as the current and past strategic plans, memorandum of understanding, guidelines for field attachment, statutes, intellectual property management policy and annual reports;
- II. Government documents—for instance, the Government White Paper on the Education Policy Review Commission Report, the Universities and Other Tertiary Institutions Act (UOTIA), the Government White Paper on the

Report of the Visitation Committee to Public Universities in Uganda, and the National Development Plan.

- III. External documents, such as the mission statements of other HEIs (both within and outside Uganda) and reports from community partners, pertinent to the study.

The documents were obtained through website searches, the source institutions and purchases. The reviewed documents offered a context for interpreting the interview data, that is, they served as a valuable resource for confirming the insights that emerged from the interviews.

Document Review Guide.

In reviewing the various documents listed in the foregoing paragraph, I made use of specialized document review guide that was prepared for this purpose. The guide was structured in a way that allowed me to extract only data that I deemed relevant to each objective of the study. The advantage of using document analysis is that it provides both primary and secondary data and this has the effect of enriching the data collected. The supervisors reviewed the guide to ensure that its contents were consistent with the research questions and ethical considerations. It was further useful in collecting the necessary contextual information that was needed for the study at the case universities.

3.8 Quality of the Research Process (Trustworthiness)

Qualitative research is equally as concerned about the quality of data as quantitative research. As epistemological and ontological assumptions of research differ from quantitative research, qualitative researchers have substituted these terms with ‘credibility’, ‘dependability’ ‘conformability’ and ‘transferability’. These are

more appropriate for qualitative research studies Lincoln and Guba (1986), although there is still no consensus on these terms. These are encompassed in Trustworthiness (Burke, 2016; Lincoln & Guba 1986).

Trustworthiness in qualitative research has become a vital concept since it allows researchers to describe the virtues of qualitative terms which are outside the parameters that are usually applied in quantitative research (Kyngäs et al, 2020). As already mentioned, it is generally often questioned by positivists, perhaps because their concepts of validity and reliability cannot be addressed in the same way in naturalistic work. Trustworthiness or rigor of a study thus refers to the degree of confidence in data, interpretation, and methods used to ensure the quality of a study (Connelly, 2016). In each study, researchers ought to establish the protocols and procedures necessary for a study to be considered worthy of consideration by readers.

Conversely, trustworthiness demonstrates that the evidence for the results reported is sound and that the argument made based on the results is strong and truthful (Anney, 2014). Here, researchers seek to satisfy four criteria; credibility, transferability, dependability and confirmability (Stahl and King 2020; Hadi, & José, 2016; Guba & Lincoln, 1986).

3.8.1 Credibility: Truth-value

Stahl and King (2020) note that in addressing credibility, investigators attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented. A study is also credible when external readers can recognise the experience when confronted with it after having only read about it in a study. To ensure credible results, I used probing questions during the interview to seek clarification and correct interpretation of what the interviewees were saying. Additionally, a member check was

done with members of the groups from whom the data was originally obtained to help to test interpretations and conclusions. This ensured that participants validated their data, checking for accuracy and validity. Member checking happened informally during and after data collection where I in both instances summarized and confirmed his interpretation of what a participant said during data collection

I have also had adequate training acquired through a CERMESA-DAAD-funded research methodology training and several research methodology and scientific writing workshops in Port Elizabeth, South Africa, and Eldoret, Kenya. This meets Patton's (2015) argument that a researcher is "the instrument in qualitative inquiry" and his or her credibility is critical in ensuring the quality of the inquiry (p. 700). The credibility of the inquirer, in this case, is determined by his or her "relevant experience, training, perspective, competencies and purpose" (p. 708).

3.8.2 Transferability: Applicability or Generalizability

Transferability (sometimes called applicability and analogous generalizability) is another criterion to identify how well the study findings can be transferred to other settings, contexts, or groups (Tavakol, & Sandars, 2014). To allow transferability, the researcher provides sufficient detail of the context of the fieldwork for a reader to be able to decide whether the prevailing environment is similar to another situation with which he or she is familiar and whether the findings can justifiably be applied to the other setting. To ensure applicability, I utilised a thick description to demonstrate that the exploration study's discoveries can be material to different settings, conditions, and circumstances.

More so, interview voices were recorded while the transcriptions thereof provided a database. Finally, I provided a detailed description of the study

methodology, particularly the research approach, study participants, setting, and data analysis allowing the reader to determine the transferability or replicability of the study's results. Qualitative researchers maintain that patterns and descriptions from one context may be applicable to another (Stahl & King, 2020). A transfer is only possible when a thick description provides a rich enough portrayal of the circumstance for application and replicability to others' situations, usually at the behest of the local constituents.

3.8.3 Dependability

Meeting the dependability criterion is difficult in qualitative work, although researchers should at least strive to enable a future investigator to repeat the study. Dependability refers to the stability of the data over time and over the conditions of the study (Connelly, 2016). This means the degree of the examination could be rehashed by different specialists and that the discoveries would be steady (Janis, 2022; Anney, 2014).

To address the dependability issue, all the more legitimately, the procedures inside the investigation were accounted for in detail, in this manner empowering a future scientist to rehash the work, if not really to pick up similar outcomes. More so, I kept a review trail, that is, a point-by-point order of research exercises and procedures. As recommended by Stahl and King (2020), I also used another researcher to read and react to field notes, with their embedded researcher interpretations, a confirmation that created a tacit reality for me. Stahl and King note that this kind of scrutiny from a peer or expert provided me with an insider analysis and feedback before the study goes public.

3.8.4 Confirmability

A fourth perspective on trustworthiness is confirmability, or getting as close to objective reality as qualitative research can get. Here, researchers must take steps to demonstrate that findings emerge from the data and not their own predispositions. Confirmability is concerned with the accuracy of the study findings which are based on the viewpoints of participants (Tavakol & Sandars, 2014). Therefore, the study findings should be clearly grounded in the participants' voices rather than a figment of imaginations of the researcher's perspectives. The study findings should not be influenced by the researcher's motivations, interests, biases, or views.

As suggested by Guba and Lincoln (1994), a review trial through record management, keeping all records of the raw information gathered through center-gathering talks and interviews including the records of the data analysis accomplished confirmability. More so, a Reflexive Journal was used to keep all occasions that occurred in the field and individual reflections in connection to the investigation. Lastly, confirmability was achieved through peer debriefing and member checking to ensure that the data accurately represented the information that the participants provided and interpretations of those data are not invented by the inquirer (Ahmed, 2024).

3.9 Data Collection Procedures

The whole process of data collection took off with seeking clearance from the School of Education and Department of Educational Management and Policy Studies, Moi University to conduct this research. Further approval was sought from the University Research Ethics Committee (Uganda) which recommended me to be granted a research permit from the Uganda National Council for Science and

Technology (UNCST). Then, I sought permission from the two case universities where data was generated.

Generation of data was done using the qualitative research method and I then went through the interview schedule with questions to ensure a deep understanding of the instruments and also be aware of my role in personally collecting data. I then wrote an introduction letter identifying myself to the potential participants making known to them my research intentions and inviting them to participate in the study. The letters served the purpose of establishing contact and gaining access. To ensure the confidentiality of the participants and avoid exposing their participation to their institutions and colleagues, in most of the instances, I went directly to them as opposed to approaching them through the head of those particular institutions in the event that they were not heads themselves. In my letter to the participants, I made it known to them the urgency of my research and gave them the range of the dates when I was requesting to engage them in interviews and discussions. Then, I began the main study.

Before participants took part in the study, I asked participants to read, understand and sign a hard copy of the consent form. I then answered any raised questions from the participants while they reviewed the consent form. I audio-taped the interviews and before I concluded the interviews, I responded to the participants' questions that were raised. After the whole process of data collection, I then transcribed the audio-taped qualitative data and then analysed it. After completing this study and having it approved by Moi University management, I will send a summary report of the findings to the participants. Furthermore, I intend to make sure that I keep the data secured in a locked file cabinet and computer protected with a password in my private home office. After five years, which I believe there will be no reasonable possibility

that I will be required to defend against an allegation of scientific misconduct, I will consider destroying the data.

3.10 Data Analysis

Data analysis is at the heart of any research, whether qualitative, quantitative, or mixed methods (Lester et al, 2020). Mihas (2019) acknowledged that qualitative data analysis involves organizing, accounting for, and explaining the data, in short, making sense of data in terms of the participant's definitions of the situation, noting patterns, themes, categories, and regularities. Conversely, Creswell (2007) postulates that in qualitative research, data analysis involves the preparation and organization of the data for analysis, then reducing the data into themes through a process of coding and finally representing the data and discussion. Correspondingly, Mayer (2015) noted that data analysis is a process of the description, classification, and interconnection of phenomena with the researcher's concepts. Notably, the phenomena under study need to be described precisely. The mass of words generated by interviews, focus group discussions, observation, or document analysis needs to be transcribed and summarised.

In qualitative research, the question may require the researchers to seek relationships between various themes that have been identified or to relate behaviour or ideas to biographical characteristics of respondents such as age or gender (Ridder, 2014). Therefore, Qualitative data analysis requires knowledge for managing large data sets where obtaining a holistic, descriptive overview of the entire data set is desirable (Mayer, 2015; Gale et al, 2013).

Qualitative data generated in this study was analysed using Braun and Clark's six steps of thematic analysis (Braun & Clarke, 2006). However, the preliminary

analysis of data took place at the same time as the data generation as I engaged with the participants. Thematic analysis can be used to identify patterns within and across data in relation to participants' lived experiences, views and perspectives, and behaviour and practices; 'experiential' research seeks to understand what participants think, feel, and do (Braun & Clarke 2019; Terry et al, 2017). The authors note that thematic analysis can be used to analyse large and small data sets from case study research with 1–2 participants to large interview studies with 60 or more participants and homogenous and heterogeneous samples.

Guided by the above postulations, I went through a transcription of participants' recordings looking for segments that were relevant to the research and research questions. I further assigned a word or phrase to it that captures its meaning, generating initial codes, searching for themes, reviewing themes, defining and naming themes, present the themes (Braun & Clark, 2006). This is indicated and discussed in the figure below.

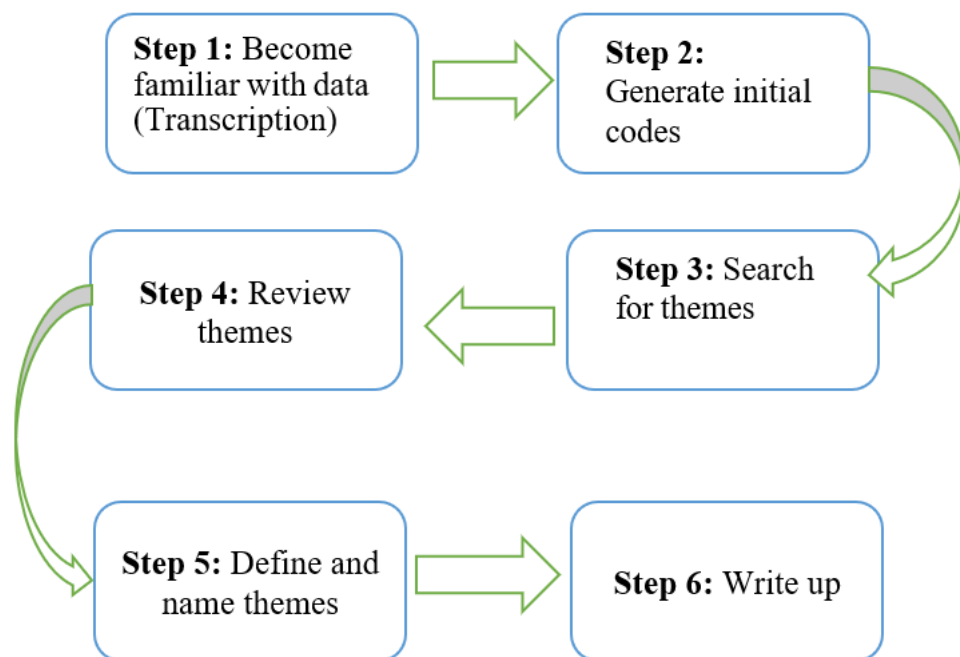


Figure 3.3: Braun & Clarke’s six-phase thematic framework (Braun & Clarke, 2006)

Since the publication of their inaugural paper on the topic (Thematic Analysis) in 2006, Braun and Clarke’s approach has arguably become one of the most thoroughly delineated methods of conducting thematic analysis. As earlier mentioned, this study too followed the above process as explained below.

Step 1: Become Familiar with the Data.

The first step in any qualitative analysis is reading, and re-reading the transcripts. Braun and Clarke (2006) advise that one “immerse” oneself in the data so that one gets “familiar with the depth and breadth of the content” to be analysed (p. 16). Correspondingly, before transcription, I listened several times to the audio recordings of the semi-structured in-depth interviews to get familiar with the data (Capano & Pritoni, 2019). At this phase, I set about familiarizing myself with the data by first listening to each interview recording once before transcribing that particular recording.

This first playback of each interview recording requires ‘active listening’ (Clark et al, 2015). I performed this active listening in order to develop an understanding of the primary areas addressed in each interview prior to transcription. This also provided me an opportunity, unburdened by tasks such as note-taking, to recall gestures and mannerisms that may or may not have been documented in my interview notes (Byrne, 2022). I then manually transcribed each interview immediately after the active-listen playback. When the transcription of all interviews was complete, I read each transcript numerous times. Some preliminary notes were made during the early iterations of familiarisation with the data.

Step two: Generating Initial Codes

Codes are the fundamental building blocks of what later become themes. The process of coding is undertaken to produce succinct, shorthand descriptive or interpretive labels for pieces of information that may be of relevance to the research question(s) (Byrne, 2022). It is recommended that the researcher works systematically through the entire dataset, attending to each data item with equal consideration, and identifying aspects of data items that are interesting and maybe informative in developing themes. Codes ought to be brief but offer sufficient detail to be able to stand alone and inform of the underlying commonality among constituent data items in relation to the subject of the research (Braun et al. 2016; Braun & Clarke 2012).

With the assistance of MAXQDA software Kuckartz & Rädiker (2019), the analyst imported the transcripts into the software for coding and proper organisation. However, using computer-assisted data analysis software did not take away the responsibility of the analyst/researcher; rather, the analyst remained in charge of the actual coding and making decisions on how to categorise these codes and later on

formulate themes. The preliminary iteration of coding was conducted using the ‘comments’ function in Microsoft Word (2016). This allowed me to note the codes in the side margin, while also highlighting the area of text assigned to each respective code. Any item of data that might be useful in addressing the research question(s) was coded. Through repeated iterations of coding and further familiarisation, I identified which codes were conducive to interpreting themes and which were deemed to be discarded.

Step 3: Searching for Themes

This phase begins when all relevant data items have been coded. The focus shifts from the interpretation of individual data items within the dataset to the interpretation of aggregated meaning and meaningfulness across the dataset (Byrne, 2022). The coded data is reviewed and analysed as to how different codes may be combined according to shared meanings so that they may form themes or sub-themes. This involved collapsing multiple codes that share a similar underlying concept or feature of the data into one single code. Equally, one particular code may turn out to be representative of an over-arching narrative within the data and be promoted as a sub-theme or even a theme (Braun & Clarke 2012).

In this step, I actively construed the relationship among the different codes and examined how this relationship informed the narrative of a given theme. I made sure that themes were distinctive (and even contradictory to other themes) but tied together to produce a coherent and well-articulated picture of the dataset.

Step 4: Reviewing themes

In this step, I conducted a recursive review of the candidate themes in relation to the coded data items and the entire dataset (Braun & Clarke 2012). At this step, it is

not uncommon to find that some candidate themes may not function well as meaningful interpretations of the data, or may not provide information that addresses the research question(s). It can thus come to light that some of the constituent codes and/ or data items that inform these themes may be incongruent and require revision. The analysis conducted at this phase involves two levels of review (Braun & Clarke, 2019). Level one is a review of the relationships among the data items and codes that inform each theme and sub-theme. If the items/codes form a coherent pattern, it can be assumed that the candidate theme/ sub-theme makes a logical argument and may contribute to the overall narrative of the data. At level two, the candidate themes are reviewed in relation to the data set.

In this step, therefore, I reviewed the candidate themes to enable the naming of the final themes that supported the reporting of findings. The analyst considered the themes themselves, where candidate themes that were not coherent with the data extracts were reviewed to check their goodness, and discarded if they were incoherent and internally inconsistent.

Step 5: Defining and Naming Themes

In this phase, I was tasked with presenting a detailed analysis of the thematic framework. Each individual theme and sub-theme was to be expressed in relation to both the dataset and the research question(s). As per Braun and Clarke's (2014) dual criteria, each theme should provide a coherent and internally consistent account of the data that cannot be told by the other themes. However, all themes should come together to create a lucid narrative that is consistent with the content of the dataset and informative in relation to the research question(s). The names of the themes are also subject to a final revision (if necessary) at this point. I thus creatively and critically

came up with names for each theme that represented the content and the analytic lens of the investigator (Braun & Clarke, 2014).

Phase 6: Producing the Report

The separation between phases five and six can often be blurry. Further, this ‘final’ phase would rarely only occur at the end of the analysis. As opposed to practices typical of quantitative research that would see the researcher conduct and then write up the analysis, the write-up of qualitative research is very much interwoven into the entire process of the analysis (Braun and Clarke 2012). I ensured conciseness, coherence, and logical, and non-repetitive flow as one writes down the narrative from various themes. I also ensured that themes connected in a logical and meaningful manner, building a cogent narrative of the data. Relevant themes that built upon previously reported themes remained internally consistent and capable of communicating their own individual narrative if isolated from other themes (Braun and Clarke 2012). Each theme was linked to the specific research question during reporting and illustrative extracts were presented for each theme to answer the specific research questions.

3.11 Ethical Considerations

Ethical considerations are an important aspect of the study involving humans. Adherence to ethical considerations encourages the researcher to have a smooth procedure for information gathering (Goodwin et al, 2020). For this reason, Institutional Review Boards are established in universities and other research institutions to act as a watchdog over these issues. In this study, once cleared by the school of education, I submitted my proposal for vetting regarding ethical issues to the institutional review boards of the two case universities. Therefore, as an ethical obligation, I formally applied for ethical clearance before embarking on the study.

After getting research ethics clearance from the Uganda Christian University Research Ethics Committee (UCUREC), I submitted my vetted proposal to the Uganda National Council for Science and Technology (UNCST) in Uganda for further vetting. Following this vetting, I was issued with a clearance letter which I used at two cases of Makerere and Ndejje Universities for seeking institutional permits to conduct research.

Apart from seeking clearance from the two institutions mentioned above, I also got consent from the administration, faculty heads, and local leaders in the areas where I collected the data. This is considered as one of the ways of being open to the research participants and their communities and making known to them the reason for the study (Rajib & Mou, 2019). As Flick (2011) congruents, it is important for the researcher to ensure that the intentions of the study are made clear to the participants. As I did this, I also sought voluntary consent from the participants before conducting any interviews or discussions with them. The participants were requested to signify their consent by signing the informed consent forms which spelled out their rights and mode of participation. These forms were also vetted and approved by the research ethics committee mentioned above. The following were also particularly made clear and known to the research participants by the researcher.

3.11.1 Researcher's Honesty on the Study Purpose.

I explained to the participants that the research was purely for academic purposes. The respondents were told what the research study was all about and what was expected of them. Honesty was paramount and needed on my part. When the study required concealment, I explained to participants the reason for that action and made an attempt to correct any undesirable consequences for the participants.

3.11.2 Confidentiality

The participants were assured that the information given would be treated with absolute confidentiality. To ensure confidentiality, the respondents of the study remained anonymous, that is, not to have their real names mentioned anywhere, instead codes and pseudonyms were used.

3.11.3 The Right to Withdrawal

Voluntary participation of respondents was encouraged and ensured and where they felt uncomfortable giving information, they were not forced. Respondents had the right to decline or discontinue from participating in the research at any time. As earlier mentioned, the informed consent forms were provided to the participants for them to read through and understand the study and the purpose of their participation. After understanding in detail, the participants were requested to sign the informed consent forms.

3.12 Summary

This chapter outlines the research design and methodology followed in undertaking the study. The research objectives and questions, the philosophy that underpinned the study as well as the research design and strategy adopted have been clearly explained. The sampling strategy used to determine study participants, the data collection methods and instruments used, data analysis, and interpretation processes, that enabled me to arrive at the key findings have been comprehensively covered in this chapter. To ensure the validity and reliability of findings, some measures of trustworthiness have also been explained above. The following Figure 3.4 provides a

synopsis of the research design.

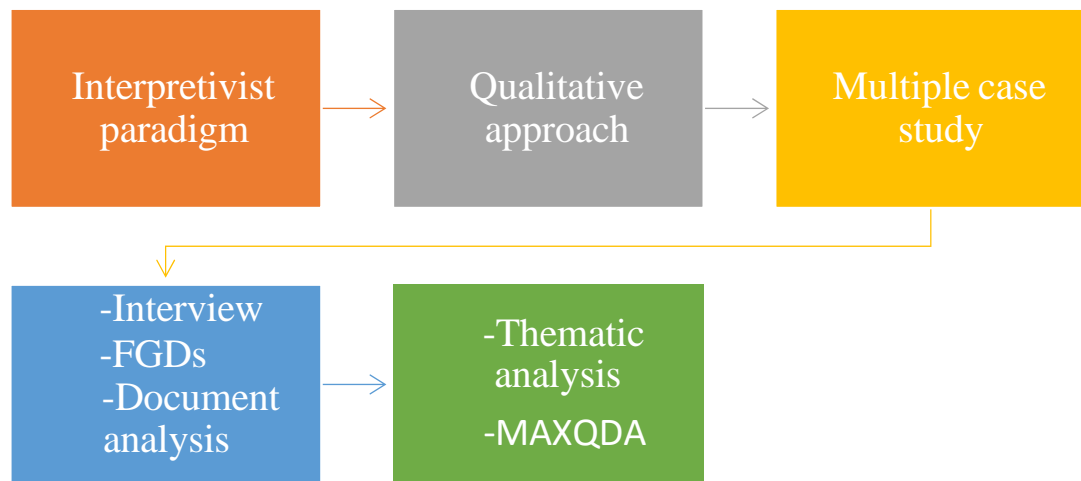


Figure 3.4 Summary of the research design.

CHAPTER FOUR

DATA PRESENTATION, INTERPRETATION, ANALYSIS AND DISCUSSION

4.1 Introduction

As an African indigenous researcher, I used Ubuntu as a theoretical lens to make interpretations in the data analysis and discussion to gain insights that are embedded within the values and beliefs of the participants and their indigenous communities. This chapter thus presents the key findings concerning the two cases of Makerere and Ndejje Universities. The chapter commences with a contextual analysis of the case by highlighting the climate change situation in Uganda and the background information about the universities. The chapter presents my interpretations and discussion of findings for the four research questions. It presents findings for engagement programs implemented at the case universities with respect to climate change action, development and coordination of engagement programs on climate change action and the major constraints in the university-community collaborations in the efforts to address climate change at the case universities. The community engagement opportunities to enhance the university's third mission and address issues of climate change at the cases, that explain the key findings per theme are also discussed in detail. At the end of each research question, a cross-case analysis is done to identify common and divergent findings.

4.1.1 Contextual Case Analysis

Uganda is a land-locked country located in East Africa and lies in both the northern and southern hemispheres, with approximate latitudes of 2°S to 5°N and approximate longitudes of 29.5° to 36.0°. The country is approximately 241,500 km² and is bordered by Kenya to the east, South Sudan to the North, Tanzania and Rwanda

to the south, and the Democratic Republic of the Congo to the West. 17% of the country is covered by water and swamp land. The central part of Uganda is a plateau, surrounded by four main mountain ranges: Rwenzori, Elgon, Mufumbira, and Moroto; the tallest point is the peak of Mt. Rwenzori at 5,110 m. Uganda has substantial natural resources, including relatively fertile soils; a high degree of biodiversity; rich vegetation; abundant water resources; and small deposits of copper, gold, other minerals, and oil (The Uganda Bureau of Statistics, UBOS, 2022a).

Uganda is stratified into various administrative units that include: Districts, constituencies, sub-counties, parishes, and villages to facilitate service delivery near to the people. In total, there are 146 districts as of 1st January 2022. According to UBOS (2022), Uganda has a total area of 241,555 square kilometers, where open water bodies cover 37,013 square kilometers, wetlands cover 8,773 square kilometers and land area is 204,540 square kilometers. Important to note is the increase of the agricultural land from 106,656 sq. kms in the year 2017 to 107,728 sq. kms in 2019. Forest cover reduced significantly by 44.7 percent between 1990 and 2019. Woodland's cover declined to 17,399 sq km in the year 2019 from 28,347 sq km in 2000. Total forest cover declined by 6.4 percent between the years 2010 and 2019.

A low-income country, Uganda has a population of over 44.3 million (2019), with an annual population growth rate of 3.6% (2019) (World Bank, 2021). Uganda's population is projected to reach 63.8 million by 2030 and 105.7 million by 2050.6. The country has a Gross Domestic Product (GDP) of \$35.1 billion (2019), growing at an average annual rate of 4.5% over the past five years. The national poverty rate increased to 20% in 2017, however, the poorest region: the Northern region, decreased its poverty rate from 44% (2013) to 33% (2017). According to 2019 data, the country's GDP is

primarily comprised of the agriculture sector, which contributed 23.1% to GDP, the industry sector (including mining, construction, electricity, water, and gas), which contributed 26.3% of GDP, the export of goods and services which contributed 17.2% to the country's economy;⁸ tourism which contributed 6.6% to GDP in 2016.

The climate change profile for the country

Uganda's climate is largely tropical with two rainy seasons per year, March to May and September to December. The northern region, which forms one quarter of the country lies outside the tropical belt and hence experiences only one rainy season, March to October. The rest of Uganda lies within a relatively humid equatorial climate zone, and the topography, prevailing winds, lakes and rivers cause large differences in rainfall patterns across the country (USAID, 2013). Its location in the tropics and across the equator results in the country's weather and seasons being determined by the large-scale Indian Monsoon, Congo air mass, Indian Ocean Dipole (IOD), and the Inter Tropical Convergence Zone. The Observed Rainfall Performance (in blue) for November 2023 compared with Long Term Mean (LTM) in Red shows a significant increase in the amounts of rainfall.

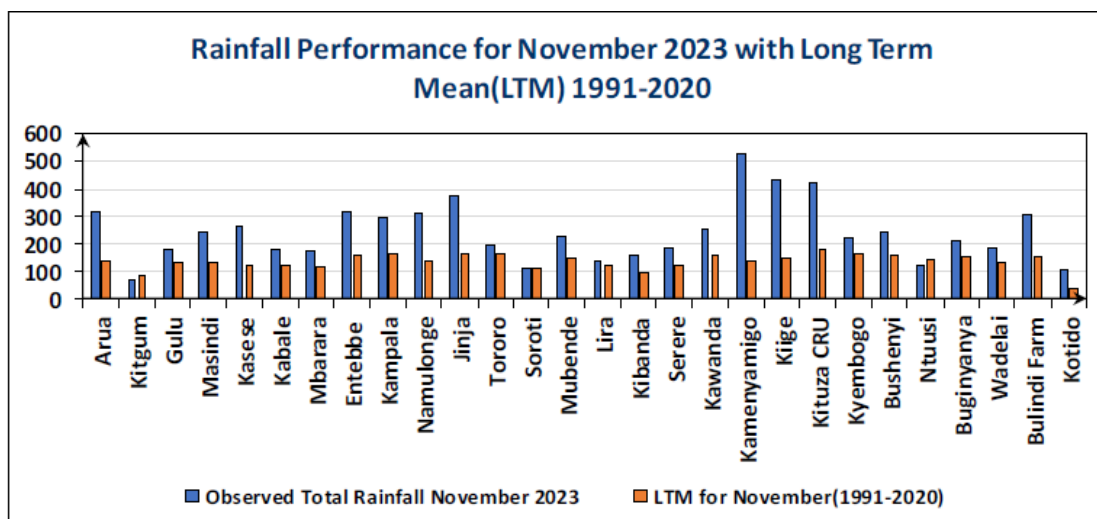


Figure 4.1: Observed Rainfall Performance (in blue) for November 2023 compared with Long Term Mean (LTM) in Red Source: Uganda National Meteorological Authority (2023)

Climate change is considered one of the top major global challenges in the 21st Century, with its impacts mainly affecting developing countries, including Uganda (UBOS, 2022). The major climatic change impact includes increased incidences of droughts, floods, and erratic rains. Overall, Uganda experiences moderate temperatures throughout the year. However, the country's diverse topography results in wide-ranging temperatures, from 0°C in the ice-capped Rwenzori Mountain Range and Mt Elgon to 30°C in the north-eastern areas of Gulu, Kitgum and Moroto. The Rwenzori Mountain Range has permanent ice caps, however, due to rising temperatures, the area typically covered by ice reduced by 49% between 1987 to 2003 and is projected to disappear by the 2040s. This has implications for the area's water resources, and livelihood activities and is likely to change its epidemiological profile.

Uganda is at risk of natural disasters. The country experiences extreme weather events which lead to mudslides, landslides, and flooding, particularly for the country's mountain regions and related districts such as Mbale in the Mt Elgon region (Broeckx

et al, 2019). Extreme events leading to disasters such as floods, droughts, and landslides have increased over the last 30 years. Flooding has become more frequent, largely due to more intense rainfall. Over the past two decades, an average of 200,000 Ugandans have been affected each year by disasters. Increased intensity of heavy rainfall has led to a greater impact of floods and is causing more damage due to expanded infrastructure, human settlement, and general development of the country.

Uganda's vulnerability is exacerbated due to its high level of poverty and its high dependence on 'climate-sensitive' sectors: agriculture, water, fisheries, tourism, and forestry. The country is at high risk of natural disasters such as flooding, drought, and landslides, however, its topographic diversity and highly marginalized segments of the population, make it additionally vulnerable (Nuwagira & Yasin, 2022). Additionally, non-climate stressors such as inadequate infrastructure to handle the increasing population are also impacting the vulnerability to natural disaster sensitivity and climate change vulnerability. With an urbanization rate of 5.4%, increasing amounts of the population are living in urban areas, putting pressure on existing infrastructure as well as scarce available land; a diminishing natural resource. As of 2017, 9.9 million people lived in urban areas of Uganda. This is projected to increase to 19.9 million by 2030 and 31.5 million by 2040, causing increased pressure on urban infrastructure with an increased likelihood of vulnerability for poorer and less resilient communities.

Economic efforts and the development of industry have put additional pressure on the exploitation of forests, lake fisheries, inner-city development, and agricultural lands, which has contributed to deforestation, overfishing, degradation of agricultural areas and forest environments as well as the pollution and unsustainable use of water

resources. Poverty, land degradation, rapid and unplanned urbanization since the 1960s, and weak enforcement of building codes and zoning regulations, and a lack of coordinated disaster response strategies present additional challenges to the country's adaption and resilience efforts (Serwajja et al, 2024). The country's debt limits available resources and thus ability to recover from disasters or provide necessary social protection. Environmental degradation, underdeveloped irrigation systems, and near-absence of disaster preparedness at the community level are contributing factors to increasing drought risk in Uganda.

Overall, according to UBOS (2022), results indicate persistent occurrence of shocks related to environmental conditions. Droughts affect more than 45 percent of agricultural households with consequences for food shortage. The higher prevalence of drought is linked to higher outbreaks of pests and diseases affecting both crops and livestock production. Similarly, higher/heavy erratic rainfall could cause diseases among humans. The agricultural households that reported heavy rainfall doubled between 2018 and 2019, which is associated with the increase in the reported prevalence of disease in humans residing in agricultural households.

Table 4.1: Agricultural households that experienced climate-related shocks (%), 2009-2019

Year	Drought	Floods	Erratic or heavy rains	Hail storms
2009	45.6	15.4	22.9	23.9
2018	81.7	16.6	14.6	7.2
2019	55.4	13.2	28.5	3.0

Source: UCA 2009, AAS-2018, 2019

Climate change is expected to increase the risk and intensity of flooding as well as increase the likelihood of water scarcity in certain areas of the country. Increased intense rainfall events, with the possibility of higher rainfall for some areas, lead to the

heightened risk of flooding, loss of life, and damage to property and infrastructure. Intense rainfall and flooding may also result in soil erosion and water logging of crops, decreasing yields and increasing food insecurity. Additionally, the likelihood of increased aridity and drought stress is expected to lead to water scarcity in some areas, resulting in increased demand for water, and raising the potential for conflict and biodiversity loss. Higher temperatures with increased aridity may also lead to livestock stress and reduced crop yields. This is likely to result in further, significant economic losses, damage to agricultural lands and infrastructure as well as human casualties. Furthermore, land degradation and soil erosion, exacerbated by recurrent floods and drought, adversely impact agricultural production, further affecting the livelihoods of the rural poor.

Background information about Makerere University

Makerere University is located at the heart of Uganda's capital Kampala, within the region of East Africa. Having started in 1922 as a technical college and affiliated to the University of London, Makerere University mutated into one of the three constituent colleges of the University of East Africa in 1963. Later in 1970, the University of East Africa was dissolved giving birth to three independent universities: Makerere University in Uganda, the University of Dar es Salaam in Tanzania, and the University of Nairobi in Kenya. Makerere then went on to become an independent university by act of parliament. This status continued until 2001 when the Universities and Other Tertiary Institutions Act was enacted. The university is harbored on three campuses- the main campus On Makerere Hill, 5 kilometers from the city Centre, the College of Health Sciences- (formerly the Faculty of Medicine and School of Public Health on Mulago Hill adjacent to the national referral hospital- 2 kilometers from the main campus and the agricultural research institute, Kabanyolo 30kms from Kampala.

The university is affiliated with several training institutions in the country that run programs certified by it. Among these include; Makerere University Business School, National Major Seminary Kinyamasika, National Major Seminary Katigondo, National Major Seminary Ggaba, Mulago Paramedical School, Fort Portal School of Clinical Officers, and Masaka School of Comprehensive Nursing among others. The university's vision is "to be the leading institution for academic excellence and innovation in Africa." Its mission is "to provide innovative teaching, learning, and research and services responsive to national and global needs". Currently, with over 40000 students, Makerere University offers a number of academic programs at Undergraduate and graduate Levels. For the academic year 2017/18 there were 139 undergraduate (12 diplomas & 127 bachelors) programs and 145 graduate (13 postgraduate diplomas & 132 master) programs. All colleges have the provision for offering doctoral degrees either by research only or course work and dissertation.

The current university Strategic Plan (2020/21-2030/31) seeks to consolidate Makerere's position as the global knowledge hub at the heart of Africa. Under her vision 2030, Makerere University is a thought leader in knowledge generation for societal transformation and development. This is further reflected in the mission statement, 'committed to providing transformative and innovative teaching, learning, research and services responsive to dynamic national and global needs. As one of the university's core values, Makerere is an equal opportunity institution that embraces diversity in order to achieve maximum potential without discrimination. This is well articulated in/and underpins the 2020-2030 strategic plan that is aimed at transforming the University into a "research-led" institution with a multi-faceted research agenda; and enhanced engagement with external communities. The current Strategic Plan

identifies four main strategic goals that the university seeks to achieve. These are outlined below:



Figure 4. 1 Makerere University 2020-2030 strategic plan goals; Source:

To accomplish this goal, Makerere University leverages existing capacities to integrate knowledge generated through research, into teaching, learning, community engagement, and the world of work in order to maximize impact. The university also Maximizes the translation of research into products and processes that impact communities, establishes an environment that supports and motivates staff and students to engage in interdisciplinary collaboration and supports or establishes new interdisciplinary research institutes. A more relevant goal to this study is number two (An engaged university with enhanced partnerships with industry, the community, and international institutions). To achieve this goal, the university prioritizes the needs of the community in which she is located; Enhancing community outreach programs and revitalizing University open days.

Before the decision to turn Makerere University into a collegiate university, the university had one constituent college (the College of Health Sciences) and twenty-two

faculties, schools, and institutes. The University transitioned from the faculty-based to the collegiate system on 1st July 2011 and as of Friday 30th December 2011, Makerere University officially transformed into a Collegiate University with 9 Constituent Colleges and as of 1st July 2014, 10 Constituent Colleges including the College of Agricultural and Environmental Sciences (CAES) (where climate change related programs are taught), all operating as semi-autonomous units of the University. Besides the university's main strategic plan, all colleges develop semi-autonomous strategic plans.

Makerere University College of Agricultural Sciences (CAES), one of the ten Constituent Colleges of Makerere University is located within the Western part of Makerere University. The College was formed through a merger of the former: (i) Faculty of Agriculture, (ii) Faculty of Forestry and Nature Conservation, (iii) Makerere University Institute of Environment and Natural Resources; and (iv) Department of Geography. The College is made up of three schools: the School of Agricultural Sciences (SAS), the School of Food Technology, Nutrition and Bioengineering (SFTNB), and the School of Forestry, Environmental and Geographical Sciences (SFECS), which together have eight Departments. In addition, CAES has two research institutes namely: Makerere University Research Institute Kabanyolo (MUARIK) and Makerere University Biological Field Station (MUBFS).

Like Makerere University's strategic planning framework, the CAES strategic plan (2020-2030) is aligned to the global and national development agenda including the 2030 global development agenda articulated in the Sustainable Development Goals launched in 2015; the African Union's Agenda 2063 and the Uganda Vision 2040 and National Development Plans (NDP). The college strategic plan is also cognizant of and

is aligned with the African Union's Maputo Declaration on Agriculture and Food Security and the Comprehensive Africa Agricultural Development Program (CAADP) to which Uganda is a signatory. Through this Strategic plan (2020-2030), the CAES seeks to fully operationalize the College system and strengthen teaching and learning, research and innovations, and community engagement in order to contribute to the achievement of sustainable agriculture systems, increased food and nutritional security, enhanced agricultural value chains, environment sustainability, climate change resilience and green growth in Uganda. The Strategic plan focuses on six key strategic areas as indicated below:



Figure 4. 2 CAES strategic plan strategic areas

CAES implements the strategic plan through different avenues like specialized centers, staff with expertise in sustainable development, climate change, and green economy, and availability of Makerere University's green growth strategy among others. Notably, Makerere University Centre for Climate Change Research and Innovations (MUCCRI) focuses on climate change training, research, information

management, and community engagement to foster climate change resilience and low-carbon development pathways in Uganda. Given that climate change is cross-cutting and multi-disciplinary, MUCCRI is pitched at the College level to enable it to easily tap into the College-wide expertise and to implement multi-disciplinary programs. It is our desire that in the future, MUCCRI can be pitched at the University-wide level to implement university-wide climate change interventions.

Background information about Ndejje University

Ndejje University (NDU) was established in 1992 as the Christian University of East Africa and is owned by the Anglican Diocese of Luweero. The university has two separate campuses located on 200 acres (81 ha), in a rural setting at Ndejje Hill, about 14 kilometres (9 mi), north-west of Bombo Town, in Luweero District, in the Buganda Region of Uganda. The main campus of the university lies adjacent to the *Lady Irene Camps* in Ndejje. This location lies approximately 42 kilometres (26 mi), by road, north of Kampala, the capital city of Uganda. Ndejje Hill is located about 8 kilometres (5.0 mi), northwest of Bombo, the nearest large town. The coordinates of Ndejje main university campus are: 0°36'44.0"N, 32°28'34.0"E (Latitude: 0.612222; Longitude:32.476111).

The university is owned by all six Church of Uganda (CoU) Dioceses in the Buganda Region, the “Ndejje University Foundation Consortium”. The University is chartered by the NCHE, and according to the National Council for Higher Education report 2020/2021 on the state of higher education and training in Uganda, Ndejje University has about 6253 students, 3757 males and 2496 females. In the same report, the university has 282 staff. The University works jointly with partners in an effort to solve local and global challenges, with the aim of improving the world and social

conditions. Ndejje University pioneered private university education in Uganda. In 1995, "The Christian University of East Africa" (as the university was known back then), with some government involvement was annexed by the Anglican Diocese of Luweero, in the Province of the Church of Uganda. The name of the university was changed to Ndejje University. In 1998, the institution received recognition as a tertiary-level institution of higher learning by the government of Uganda through the Ugandan Ministry of Education and Sports. Ndejje University was issued a University Charter by the government of Uganda in 2009.

The university offers undergraduate and postgraduate programs that are recognized nationally and internationally. As of April 2020, the university had four campuses: The Main Campus - Located on Ndejje Hill, in Luweero District, and Lady Irene Campus - Also located on Ndejje Hill. Together, the two campuses in Ndejje occupy 200 acres (81 ha), The Kampala Campus - Located at 151 Balintuma Road, Mengo, in Kampala, Uganda's capital city, and the Nakasongola Campus on 400 acres (160 ha) in Nakasongola District, housing the research facility in renewable energy and environmental management. As of April 2020, there were seven constituent faculties of the university and one school: Faculty of Arts, Faculty of Business Administration and Management, Faculty of Basic Sciences and IT, Faculty of Education, Faculty of Engineering, Faculty of Environment and Agricultural Sciences, Faculty of Social Sciences and Ndejje University Graduate School.

Ndejje University has a strategic positioning anchored on the 2017/2018-2026/2028 strategic plan. This Ndejje University Strategic Plan 2017/18-2026/27 is anchored in the global higher education context that calls upon universities to provide solutions to development challenges as well as the National Development Plan (NDP

2016/2023) that recognises higher education as the heart of education for national innovation and development systems. The University seeks to promote research and innovation, problem-solving, and talent exploitation as the overriding theme of its education. The university's vision is 'To be the leading Christian-based University for societal transformation' and the mission is 'To provide Christian-based quality and innovative teaching, research and outreach services'. This Strategic Plan is built on Eight (8) pillars that were derived after a careful study of the University's historical and contemporary context, the situational analysis involving both internal and external environments, and previous achievements and challenges. In order to realize its Vision and Mission, Ndejje University pursuing the following strategic objectives (pillars) for over a period of 10 years:

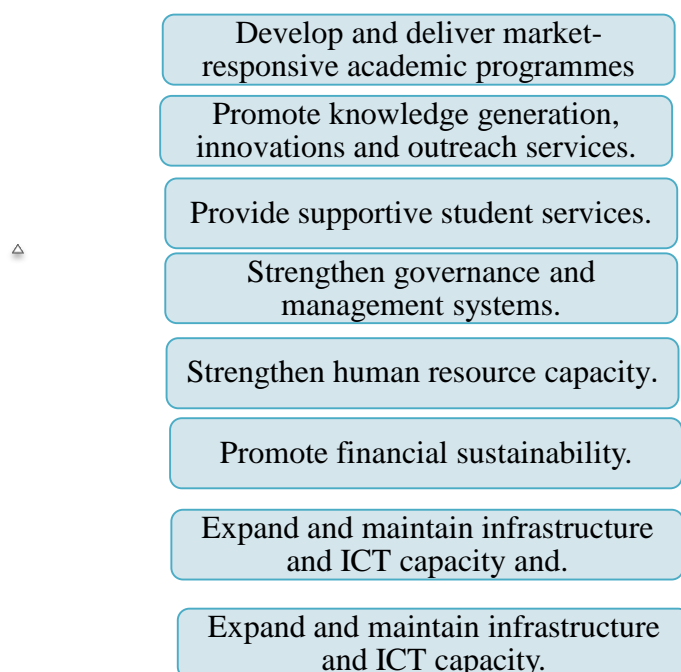


Figure 4.3: Ndejje University strategic objectives

The new Strategic Plan (2017/18-2026/27) intends to build on the successes achieved during the implementation of the previous Strategic Plan (2012-2017) and

consolidate such gains that have propelled it into the number one position among the private universities in the country. This will be achieved through exploiting ICT capacity, partnership, and collaboration opportunities in order to enhance quality teaching, innovative research, and community outreach. These initiatives presumably reverse the deficit model of university-community interactions where the community is conceived as a laboratory for researchers to ‘generate new knowledge for purposes of staff promotion or for higher degrees for students (Friedman et al, 2013). The new approach represents a drift from the unidirectional engagement where communities are considered “pockets of need and laboratories for experimentation; towards bi-directional engagement (Tagoe 2012). In the eyes of NDU, communities are not ‘passive recipients’ of university expertise; they also offer valuable knowledge reserves (Traditional Knowledge or Local Knowledge).

4.2 Community Engagement Programs Implemented by the Case Universities on Climate Change

In the first objective of this study, participants were asked to report on the existing engagement programs and activities by the case universities on climate change knowledge, mitigation and adaptation. Findings related to this objective are categorised into two main themes; ‘university initiated and led engagement programs and activities on climate change action’ and then ‘students initiated and led engagement programs and activities on climate change action’. In this objective, I present findings from the first case (Makerere University) and then the second case (Ndejje University) proceeded by a cross-case analysis of the two cases. From the analysed data at the first case university, the two main themes are further categorised into sub-themes. The university initiated and led engagement programs including rendering institutional support, research and innovations, and capacity building programs. On the other hand, data revealed that

students initiated and led programs that included partnerships with non-governmental organisations and government, and climate education and awareness creation. This is indicated in the table below.

Table 4.2: Community engagement programs at Makerere University

University initiated and led engagement programs on climate change action			Students initiated and led engagement programs on climate change action		
Sub-theme	4.2.1.1	Rendering institutional support	Sub-theme	4.2.2.1: partnerships with NGOs and government	
		<ul style="list-style-type: none"> • Supporting recess and internship programs to communities • University support to students' engagement programs • Community digital programs for smart agriculture • Collaborations with external partners 		<ul style="list-style-type: none"> • Partnerships for students' climate change trainings • Partnerships with external stakeholders for funding • Agricultural partnership programs 	
	Sub-theme 4.2.1:2	Research and Innovations		Sub-theme 4.2.2.2: Climate education and awareness creation activities	
		<ul style="list-style-type: none"> • Climate change smart innovations • Climate change-oriented action research • Conducting research findings dissemination workshops • Annual agricultural exhibitions 		<ul style="list-style-type: none"> • Advocacy and sensitisation programs • Conducting Public lectures and symposiums • Tree planting programs • Actualising research findings with community members 	
	Sub-theme 4.2.1:3	Climate education and awareness creation activities			
		<ul style="list-style-type: none"> • Conducting sensitising programs • Research findings actualisation programs • Providing expert consultancy services to communities 			
	4.2.1:4	Capacity building programs			
		<ul style="list-style-type: none"> • Training stakeholders on climate change action measures • Capacity building for African climate change researchers • Climate changes course on the curriculum menu 			

4.2.1 University initiated and led engagement programs on climate change action

The participants identified numerous programs that Makerere University management and staff engage in with communities to foster climate change action.

Makerere University portrays itself as a reservoir of the country's intellectual elite with the obligation to champion social, political, and economic change in society through professional extension services and influencing policy (Strategic Plan 2000/01-2006/07:24). Thus, University-initiated and led engagement programs on climate change action play a crucial role in raising awareness, fostering sustainable practices, and ultimately contributing to the national effort to address climate change. Participants in this study noted that the university always initiates programs and activities that often involve a combination of research, education, and community outreach. Particularly, it was noted that the university offers institutional support for community engagement, research and innovations, climate education and awareness creation activities, and capacity building programs among others. These programs and activities are discussed below.

4.2.1.1 Rendering institutional support for community engagement

The participants identified rendering institutional support for community engagement as a key program that Makerere university plays in enhancing its third mission towards climate change action. The university staff and students in this study revealed that the university offers its support for community engagement programs and activities through supporting recess and internship programs by the university students, supporting students' engagement programs both on and off campus, supporting community digital programs for smart agriculture, allocate funding specifically for community engagement projects, including research, supporting information dissemination, supporting service-learning and other outreach activities. They argued that rendering institutional support for community engagement in such programs is crucial to ensure that universities can effectively contribute to community development

and address societal challenges like climate change. These sentiments were expressed in:

I see it in the mission of training, which is the first pillar or mission for our university, for instance when we send students for internship training or field placements, that is part of community engagement because we are interfacing with the employers of the industry in knowledge transfer. The students are taking the knowledge that they have had to the communities and this is supported by the university management because it's part of our strategic plan (MAK, US1, 29-33, page 1).

Ahmm, at the end of the two years, the university supports us for internship, and recess programs where we engage community members on how they are for instance practicing forestry despite the fact that they are not in the university or they're not educated about forestry. (FGD MAK, PB, line 24-27, Page 5)

Through some funding, the university ensures that the knowledge which they create, reaches the community because one of the major mandates of anyone who is in academics at the university is to create knowledge. But if this knowledge created does not go out to impact the community, then it wouldn't be very useful. So, to me, university management supporting knowledge transfer through for instance organised workshops and seminars, the innovations that lecturers or students have come up with, trickling down to the communities, especially communities around them, but also beyond, is very vital for the community and curbing climate change. (MAK, US5, line 12-17, Page 1)

As indicated in the participants' views, the university creates a supportive environment that enables effective and sustainable community engagement, fostering positive relationships between the institution and the communities it serves. This not only fosters a culture that values community engagement as a core aspect of the university's identity but also encourages a sense of social responsibility among students, faculty, and staff towards sustainable development goals. As indicated by the participants, the university has developed clear institutional strategic plans that recognize and value community engagement as an integral part of the university's mission. This does not only establish an environment to undertake community-engaged projects, ensuring alignment with the institution's goals, missions, academic culture,

and fabric but also underpins the effectiveness of African Ubuntu values of collectivism when everybody in the community works together towards common societal concerns and challenges.

Congruently, Klentzin and Wierzbowski-Kwiatkowski (2013) have suggested that institutional support is not only about finding ways to fit community engagement into the existing higher education system but majorly transforming the culture of higher education so that it embraces the epistemologies and forms of scholarship that allow community engagement to thrive. Administrative and strategic support from higher institutions of learning can make it easy for implementers to engage with communities smoothly without delays and to achieve the objectives of the engagements (Fitzgerald et al, 2023). The university in African contexts ought to emphasise the continuance of support staff, students, and communities to participate in different workshops and meetings that are initiated by ministries and other partners in communities. This is of paramount effect in enabling the university staff and students to share climate change information, and what they have learned and researched for the local person living in local communities to easily access information.

4.2.1.2 Research and Innovation

Participants noted that the university conducts research and innovations as one of the engagement programs towards climate change action in communities. Some of the university staff noted that the university has held a responsibility to lead research projects to better understand the impacts of climate change and develop innovative solutions like digital bikes to reduce tailpipe emissions, provisions of dustbins, and measuring of wastes (in the dustbins) to ensure reusability. Resultantly, participants highlighted that research outcomes and innovations inform policy decisions,

indigenous mitigation and adaptation measures, technological advancements, and sustainable practices. As expressed by the participants, research and innovation as a community engagement program at the university creates a dynamic environment where academic expertise is applied to address real-world challenges in communities like climate change and contribute to sustainable community development.

In an interview with some of the university staff, it was further revealed that the university staff and students conduct climate change-oriented action research, conduct climate change smart innovations, conduct research findings dissemination workshops and annual research exhibitions. One of the university managers reflected that Makerere University is very central especially in designing research and development, particularly looking at the specific activities in relation to climate change. He further emphasised that the university is very key in generating research or abstracts that trigger the minds of the people of the population to think in a way that will enable them to come out with initiatives, designing innovative projects that are able to address issues related in exchange or that will promote the environmental conservation. This was expressed in:

we have also gone ahead to look into the ways of documenting and verifying, how the community members cope with climate change challenges, for instance, if I may look at areas that are prone to landslides, which to some extent are triggered by climate change, we're interested in seeing what are those factors that aggravate these landslides, what are the factors that aggravate flooding and what should be done to mitigate that and areas to be avoided for example if it is a type of soil, and may me people can avoid settling in those areas because may be they are prone to. (MAK, US1, lines 14-19, page 4)

we work very closely with community members, and to deliver our ideas to deliver our products, but also to gather information from the community that informs our idea, ideas, but also, do research, for development, action research, and we partner with various stakeholders at the national level, the government the civil society organizations. (MAK, US6, lines 10-13, Page 2)

most of the research done like at environment, and at agriculture has involved trying to come up with plants with the traits that can withstand the current climate crisis that we are facing. So, you'll find that farmers have been able to be availed with hybrids of plants that are more resistant to maybe drought, that are more resistant to pests and diseases which have become more common given the climate change impact, and so many other things. (MAK, US5, lines 24-28, Page 3)In terms of even epidemiology, we have an Institute of Infectious Diseases. There is also a tendency to study how disease transmission is changing, given changes in patterns of climate, and it is, so the examples can go on. (MAK, US5, lines 1-2, Page 4)

As indicated by the participants, the university management and staff have been conducting research in different communities to understand the drivers of climate change, what people are using to cope, sort of indigenous knowledge, and also identifying strategies that could be used to mitigate the challenges. By co-creating knowledge on infectious diseases, drought resistant plants and documenting this information is imperative form climate change adaptation on mitigation in most African communities. It is important to note that research, innovation, and sustainable education are the most essential drivers for achieving the SDGs at the global level on some specific SDGs such as SDG 4, 11, and 13, as an international survey demonstrated (Salvia et al., 2019).

By embedding research and innovation within community engagement programs, universities can leverage their resources to contribute meaningfully to local development, address societal environment challenges, and foster mutually beneficial relationships with the communities they serve as postulated in the Ubuntu values. As underpinned by Ubuntu's values of interdependency and collectivism, adopting community-based participatory research approaches that involve community members as equal partners in the research process fosters a collaborative environment where researchers and community stakeholders share decision-making and ownership.

The participant stresses that the university can support the introduction of new products through its research and innovation programs. The university can invest in technologies that help in mitigating climate change induced hazards and dealing with its disastrous effects. Such technologies can be useful in sectors such as housing, transport, and communication. Innovations and technological solutions tailored to local conditions would go the extra mile in supporting mitigation and adaptation to climate change in communities around the university. Students' revelation of plastic dust bins as an innovation and being able to measure waste in the dust bins ensure sorting, reusing, and recycling which are key climate change mitigation strategies.

Thus, research and innovations embrace knowledge discovery, application, dissemination, and preservation, knowledge that continually pushes the boundaries of understanding; that is at the frontier of relevancy, innovation, and creativity. This is organized and openly communicated to build capacity for innovation and creativity; creates energy, synergy, and community independence to assess projects and processes, providing a reason and a capacity to gain new knowledge that provides solutions to community problems (Simon, 2011). With climate change smart innovations, campuses ought to decarbonise themselves by optimising transportation systems within the institution. In order to reduce their carbon emissions and contribute to SDGs such as SDG13 (Climate Action), HEIs could also encourage smart innovations, carpooling, and clean energy transportation methods e.g., cycling (Logan et al, 2020).

4.2.1.3 Climate education and awareness creation activities

Participants mentioned climate education and awareness creation activities as essential components of community engagement and addressing the global challenge of climate change in different communities. The university staff noted that the

university plays a significant role in designing and implementing educational programs that enhance understanding, promote sustainable practices, and inspire climate change action within the university and the local communities. A university staff noted that the institution provides training and professional development opportunities for faculty, staff, and students to enhance their skills in community engagement and climate change mitigation and adaptation strategies.

Additionally, indicated that the university offers workshops on effective community collaboration, intercultural competence, and ethical considerations in community-based research. It was revealed that the university uses various communication channels, including social media, publications, and events, to disseminate information about climate change and the importance of taking action. Furthermore, a university staff talked about Makerere increasingly adopting sustainable practices like energy-efficient infrastructure, waste reduction programs, and sustainable transportation options. These initiatives serve as living examples of environmentally conscious practices in the surrounding communities. Additionally, the university staff conducts outreach programs, workshops, and seminars to raise awareness and educate the public about relevant issues. This is instrumental in helping to translate research findings into practical applications that can directly benefit the local population. This was expressed in:

We have also been implementing some projects supported by different stakeholders, projects related to waste management, we have trained youth in different communities. We have created awareness on radio and other media platforms on the importance of wise use of wetlands etc. (MAK, CL3, line 26-29, Page 4)

Makerere University launched a botanical garden, that is in Kabanyoro. Yes. And we again, as I was saying, we look at this as the layman's understanding of climate change, because you're not really going to get into the science, when you're going down to person at the

community level, telling them about climate change. So, us growing these trees not only is it a biodiversity call, but we look at these trees as regulators in this climate change fight that we actually carry on here, which I think is really vital. (FGD MAK, PE, line 7-12, Page 8)

I would love to commend a few projects that have been enacted by the university administration. And these have looked at taking climate change from a layman's understanding, they've played a role in curbing the drivers, at least on university ground level. In fact, the bikes coming here, the poor people cycling, we are reducing the tailpipe emissions when you don't have to drive about between places. Such projects are vital for creating awareness on mitigating climate change (FGD MAK, PE, line 1-6, Page 8)

As stressed by the participants in the above excerpts, the university practically provides information about climate change to communities through community-based initiatives. By combining these various mentioned activities, Makerere University contributes significantly to enhancing climate education and awareness, fostering a sense of responsibility, and inspiring sustainable actions within their communities and beyond. Climate change scholarship focuses on ideas and raises questions that are important to communities to understand how to mitigate and adapt to climate change impacts. Climate change scholarship at Makerere University is documented, publicly shared, and reviewed through various mechanisms, including presentations, publications, professional practice, creative work, and including news and other media.

As Observed by Ssekamatte (2021) for example, Makerere University has been conducting weather forecasts and producing monthly weather bulletins for the Karamoja sub-region to create awareness among the locals. This is useful, especially for the local farmers in that region who require weather information to make decisions related to their farm work. However, it is important to note that this climate education seems unidirectional and does not only clearly relate to their indigenous knowledge systems but also does not involve the communities in the co-creation of such information. Based on this experience, the university ought to develop a policy around

integrating indigenous knowledge to predict and mitigate climate change in African contexts. This conforms to the deeply held Ubuntu values of collectivism and interdependency regarding addressing community challenges. Monroe et al, (2019) have relatedly noted that as climate change education programs grow and build upon the successes of others, they can play an essential role in developing communities of such practical visionaries necessary to address climate change and other future challenges.

4.2.1.4 Capacity building programs

Participants highlighted capacity building programs at the university that aim to enhance the skills, knowledge, and capabilities of the university staff, students and institutions, particularly regarding climate change action. It was noted that programs like staff and students training, often focus on specific community engagement areas and climate change knowledge to empower participants and contribute to the overall sustainable development of the community. The university staff reported that the university offers capacity building for African climate change researchers to enhance their teaching, research, and administrative skills that enhance reciprocated engagements between the universities and communities. This encourages university members to contribute to social development through research, outreach, and community service. This was expressed in:

we are building capacity for our researchers in Africa, especially in the biophysical sciences, breeders that are breeding climate-smart technologies, crops that are resilient to climate shocks, and more food that is nutritious, all those, of course, they have different traits that they consider some of them. And climate change is one of them that is becoming important for the breeders. (MAK, US2, lines 3-7, Page 4)

we have what I would call a research group, sort of a consortium of experts who are into climate change, climate change modeling, climate change adaptation, and climate change availability. So, it's a

research thing that we have. And so those are people that we look at as experts in the field. And so, if there's anything that comes in that, too, for instance, if I receive a letter, they want someone to go and give a talk on this. It's from that team because it's a consortium of experts that formed the research group. (MAK, US1, lines 9-14, page 5)

We do trainings, trainings on specific areas. For example, the stakeholders who would be interested in ways of getting tools to enable them for example, if it is geographical information systems, it could be about doing vulnerability assessments, so, training. (MAK, US3, lines 12-14, Page 3)

The above revelations underscore the significance of university staff and students' capacity building. This gives them an opportunity to serve the communities in different capacities because of their expertise as a strategy that the university is using for the community.

Relatedly, participants further noted that the university has included climate change courses on the curriculum menu and yearly students' trainings through boot camps to enhance the knowledge and skills of university students towards community engagement and climate change action. Participants highlighted several programs ranging from the Postgraduate Diploma in Meteorology, MA in Geography, MSc. in Land Use and Regional Development to the PhD in Geographical Sciences. These are currently running. They also mentioned several postgraduate programs that have been developed and are going through the approval process. These include MSc. in Disaster Risk Management, MSc. in Climate Change and Sustainability, and MSc. Meteorology, as one participant explained:

we've also tried to streamline it so that climate change issues are actually cross-cutting issues on most of the programs that we teach. So, the students we are sending out later, are students who shouldn't be able to impact society, because they have a knowledge of climate change. In the past, you'd find that it's a handful of students, maybe we're doing geographic, more meteorology, that are doing that, by now students in tourism, forestry, in agriculture, all of them have to go to climate change. (MAK, US1, lines 1-4, page 6)

The other one is about youth engagement, whereby there is an annual training through boot camps in which the targets, fresh recent graduates and university students to orientate them in such a way that they can be impactful in their careers. And this impact has also been largely enabling them to get jobs, but also meaningfully impacting their communities when they leave the universities. (MAK, US3, lines 26-29, Page 4)

In my department, which is the Department of Plant Sciences, microbiology, and biotechnology, they have just reviewed the master's programs for botany and zoology. And they have now included a compulsory course unit on climate change. Oh, yeah. So, the students, all master students in the department who are studying masters in zoology or botany now studying climate change. Definitely, when they get back to their communities, they in one way or another benefit from that specific knowledge. (MAK, US5, lines 3-8, Page 4)

The above expressions denote that capacity building programs contribute to the overall development and competitiveness of universities, ensuring that they remain dynamic, relevant, and responsive to the evolving needs of society. As reported, some of the programs like MSc. in Climate Change and Sustainability, have been recently approved by the Senate. This is a very good step towards addressing climate change in their academic programs and enhancing research on the subject for mutual benefit between the university and the community. The recently approved academic program will develop a pool of academics in the area of climate change and risk management at the university and communities. This further emphasises strategic planning, resource management, and quality assurance.

Conversely, Ziervogel et al, (2022) and Party et al, (2018) have opined that the prospects of addressing climate change in Africa hinge on the capacities of communities and the region's national institutions to understand the environmental, economic, and social challenges in the context of climate change, and consequently self-mobilize to develop and implement responsive policies at appropriate scales. The authors further recommend that community members and their collaborators ought to

use several agricultural innovations developed from indigenous knowledge or introduce African-based technologies to improve their adaptive capacity to climate change and variability in African contexts. To achieve this, Susskind and Kim (2022) recommend widespread and continuous stakeholder engagement both for coalition building and for public learning and a commitment to experimental problem-solving so that communities can learn by doing. Most importantly, to respond to the scientific and technical uncertainties surrounding climate risks, local governments will have to enhance their adaptive and collaborative governance capabilities that conform to Ubuntu's theoretical orientations.

4.2.2 Students initiated and led engagement programs on climate change action (Makerere University)

From the analysed data, it was further revealed by the participants that there are student-initiated and led engagement programs on climate change action that play a crucial role in raising awareness, fostering a sense of responsibility, and driving meaningful change within educational institutions and the broader community. These engagement programs are initiated, planned, and executed by the students through their leadership and associations. These engagement programs are presented and discussed below.

4.2.2.1 Partnerships with NGOs and government

It was revealed by the university staff and students that students collaborate with environmental NGOs, advocacy groups, and research organizations to leverage resources and expertise in climate action initiatives. These programs include partnerships for students' training, funding and advocacy programs. These initiated engagement programs are supported by the university management and other external

partners. For instance, students noted that they partner with organisations like Go Green Uganda, Global Green Growth Institute (GGGI), the Ministry of Agriculture, and the Ministry of Forestry to jointly organize and participate in climate action events, conferences, and forums. These engagements help universities, communities, NGOs, and government agencies to share knowledge, experiences, and best practices with local communities about climate change mitigation and adaptation.

University students' partnerships with non-governmental organizations (NGOs) and government entities for climate change action are essential for leveraging collective resources, expertise, and influence to address environmental challenges in diverse communities. These collaborations contribute to research, policy development, community engagement, and the implementation of sustainable practices. Participants explained that:

At the university different associations have different partnerships with different organisations like NFA and Fair Ventures, where they engage in different activities in order to overcome climate change. (FGD MAK, PI, line 13-15, Page 7) So as an association, we are allowed to write letters to different organizations that support climate change, and fund their projects, maybe if MUCCA wants to begin a project. Let me say like, maybe collecting rubbish at the university, and they cannot afford the dust bins. We can talk to the ministry, and we can be able to fund the project. (FGD MAK, PI, lines 1-4, Page 10)

it's first of all the university, because it is getting with other NGOs, we can say like fair ventures, Triple GI, NFA because NFA can give us like free seedlings which we go and plant NEMA. So basically, the university and other related associations. So, it starts from the head, like the Vice Chancellor, the department of estates and environmental management, then also, maybe our college principals. (FGD MAK, PA, lines 16-20, Page 13)

we reached out to each local district of those districts where the study was carried out and had results dissemination and training for different tools or frameworks that we developed in a project. Then, also, for the crops that were identified, we connected with other projects almost having a similar goal to go ahead and try to identify, because we would go to different farms or different farmers, where we

would do soil sampling, and then identify the crops that would do good in that particular firm, or in that, in that particular region of the country. And that is not only for our project, even as climate-related projects. (MAK, US4, lines 5-11, Page 4)

The above voices denote that students play a critical role in establishing partnerships that advocate for and implement sustainable practices within their campus and local communities, such as recycling programs, energy conservation, and the reduction of single-use plastics. Such awareness campaigns educate the campus community about the benefits of sustainable living. These partnerships are critical because they enable universities to work with NGOs and government entities on community engagement initiatives like awareness campaigns, workshops, and sustainable development projects aimed at fostering climate resilience in local communities.

Through these partnerships, universities can contribute significantly to enhanced UCE and the broader climate change agenda, fostering an Ubuntu-centred collaborative and multi-stakeholder approach to address the complex challenges associated with environmental sustainability. As indicated by the Ubuntu theory, working with communities demonstrates positive outcomes of university-community collaborations to inspire community capacities and share success stories and the impact of community engagement initiatives through various communication channels. As earlier indicated, the work is carried out in a mutually beneficial, collaborative manner. Achievements include the co-creation of significant, creative, original, and conceptually-guided engagement through globally and locally relevant activities that systematically advance practice, teaching and learning, and/or research (Graham, 2020).

While there are still many challenges to building climate resilience in Africa, through multi-stakeholder partnerships, sub-Saharan African nations expand their capacity to pool resources and build collective action aimed at financing and scaling up collaborative innovative climate solutions. Graham emphasises that various stakeholders ought to work collectively to build climate resilience in rural and urban communities and trans-institutionally. Makerere University being at the centre of Kampala city, Kareem et al (2020) postulate that climate change resilience at neighbourhood scale often stems from collaborations that harness the local resource base and technologies for urban agriculture and forestry; alternative energy from wastes; grassed drainages for protection against erosion; recreation along dry riverbeds; fog-water harvesting; and adjustments in irrigation schedules. Therefore, Gannon et al (2021) have indicated that action and investment from donors and public sector partnerships can be in areas such as research, data access, relationship building, training, and capacity building, access to finance, and business incubation.

4.2.2.2 Climate education and awareness creation activities

Lastly, students revealed that they conduct climate change education and awareness creation activities. Overtly, the students indicated that they organise campaigns to raise awareness about the impacts of climate change in the communities, the importance of sustainable practices, and individual actions to reduce carbon footprints through workshops, seminars, guest lectures, actualising research findings with community members, and interactive sessions. Like the university staff, students too advocate for and implement sustainable practices within their campuses and surrounding communities, such as recycling programs, energy conservation, and the reduction of single-use plastics. Furthermore, through the student's leadership and associations, students organise environmental weeks, climate runs, and rides to enhance

the community's climate change knowledge and involvement in planting trees and participating in environmental restoration projects to counteract deforestation and promote biodiversity. Some of the participants noted that:

we've been having community outreaches like Katanga, Just the suburb here on the east of Makerere. We have been going to Kalelwe to clean the places, especially the slums, because we have slums of the people of especially Katanga. So, people just dispose off their waste. So, what we did was that MUCCA has identified an innovation of creating plastic bottle dust bins. So, now for example, in the university we have two of the same. (MAK, US6, lines 18-22, Page 1) We have also organized walks to walk for climate change. The other time we had a walk for water and environment from Makerere university, to Lubigi, to Parliament, the speaker flagged us and then to Minister of Water Environment and we came back. (MAK, US6, lines 9-11, Page 3)

for engagements that we normally do, well, we have seminars and lectures where we are training people in renewable energy solutions, organic farming that is making organic manure work and also about water and soil conservation measures in the different agricultural fields. (FGD MAK, PC, line 9-11, Page 7). we've had environmental week, whereby we're cleaning the university, we were sensitising the people about the cleanliness, about climate change effects that may come up due to environmental degradation and other different factors. Generally, we have sensitizing people in Makerere. (FGD MAK, PA, lines 1-4, Page 7)

From the above perspectives, it is evident that students at universities play a vital role in raising climate awareness and promoting environmental education. The organised awareness-raising events attract many people to attend. According to the participant, through such events, community members get to know about climate change and how it affects them. This means that the local community members get an opportunity to learn about the available mitigation and adaptation measures. The festival can be handy in opening up opportunities for university researchers to interact with the communities.

It is paramount to note that engaging in activities that focus on climate education helps build a culture of sustainability on campus and in the communities. These

initiatives empower students to become advocates for climate action, instilling a sense of environmental responsibility and contributing to a more sustainable and resilient future. The collective efforts of students can have a significant impact on shaping both local and global responses to climate change. By actively participating in these activities, students can contribute to building a more informed and environmentally conscious community, fostering a sense of responsibility for sustainable practices and climate action.

The universities in African contexts ought to focus on influencing their students in different fields by enhancing moral values, work ethics, commitment, sense of belonging, and sense of responsibility to the communities through meetings, workshops, etc., regarding climate change action (Bokhari, 2017). This can be with the provision of different incentives for societal response and contributions of their students in community service and societal initiatives, whether through climate education like encouraging community members to cultivate the values of conserving different resources like water, energy, and the environment.

4.2.3 University initiated and led engagement programs on climate change action at Ndejje University

Similarly to case one, the research findings revealed that there were some university-initiated and implemented engagement programs on climate change action at case two. Participants revealed that while there are diverse ways through which different universities reach out to the communities, the university administration has made efforts to actualise one of their missions (Community engagement) through various engagement programs like institutional support for engagement programs, research and innovations, climate entrepreneurship, and capacity building programs. Even more importantly, these

programs highlight the expertise, insight, and experience that emerges when community engagement at universities is anchored in a culture of mutual respect as postulated by the values of Ubuntu theory.

As per the missions and vision of the university, Ndejje University aims to bridge the traditional disengagement between universities, communities, and community agencies. The outreach programs consolidate organic linkages between NDU and society in such a way that the needs of society form the core of the NDU teaching, research, and innovation agenda. From the findings, the university initiated and led engagement programs on climate change action are:

Table 4.3: Community engagement programs at Ndejje University

University initiated and led engagement programs on climate change action	Students initiated and led engagement programs on climate change action
Sub-theme 4.2.3.1: Institutional support for community engagement <ul style="list-style-type: none"> • Administrative support for community engagement activities • Community-university open events • Water conservation and irrigation programs 	Sub-theme 4.2.4.1: Climate education and awareness creation activities <ul style="list-style-type: none"> • Community sensitisation programs • Tree planting programs • Actualising research findings with community members • Community trainings
Sub-theme 4.2.3.2: Research and Innovations <ul style="list-style-type: none"> • Alternative sources of energy • Climate change adaptive technologies • Participatory engagement research 	Sub-theme 4.2.4.2: Research and Community Innovations <ul style="list-style-type: none"> • Students' climate change research programs • Students' internship and attachment programs • Students' community initiatives and projects
Sub-theme 4.2.3.3: Climate education and awareness creation activities <ul style="list-style-type: none"> • Conducting sensitising programs • Agricultural extension and farm demonstration programs • Waste management programs 	
Sub-theme 4.2.3.4: Climate entrepreneurship <ul style="list-style-type: none"> • Partnerships in briquette making and selling • Agricultural enterprises • Setting up energy centres 	
Sub-theme 4.2.3.5: Capacity building programs <ul style="list-style-type: none"> • Community of practice trainings • Training on climate change mitigation and adaptation • Academic courses on climate change 	

4.2.3.1 Institutional Support for Community Engagement

Institutional support for community engagement involves programs and

activities, the process of working collaboratively with and through different university stakeholders to address issues affecting the communities. Participants argued that institutional support for community engagement is crucial for fostering positive relationships between institutions, and the communities they serve. Community engagement involves collaboration, communication, and active participation with the community to address their needs and concerns. The institutional support at Ndejje University is in the form of administrative support for community engagement programs, support for university-community open events, and support for water conservation and irrigation programs in the communities. Participants in the study acknowledged the university management's support for other engagement programs like community university open events, tree planting, and smart agriculture programs among others. This was noted in:

we always hold World Environmental Day. Last year, community members were invited to the university and notably on that day, over 2000 trees were planted. So, the community members were invited through notices. And they came and participated in this international environment today, where over 2000 trees bought by the university and some donated, were planted. Moreover, these trees were indigenous trees. (NDJ, CL3, lines 9-12, Page 6)

but the best one is that we have a two-month practical community engagement of students with the community. That is from June to July. They start community work on 1st June annually. I can tell you that it also depends on the season because they keep changing. So, it is on our program as a university and with specific dates are set for community engagement. (NDJ, US1, lines 14-17, Page 2)

the university has been facilitating Inter-University dialogues based on agriculture themes, food security themes, climate change themes, and it allows us to exchange this knowledge with other different communities. ... So, the university facilitates us as students, and sometimes of course, helps us to select the right themes that could allow us to challenge or to be challenged on the community tasks like water conservation and irrigation programs that are out there. (FGD NDJ, PG, lines 17-22, Page 5)

The above participants report different ways through which the university management has supported their efforts to engage with communities on climate change action. The participants agree that the members of the community who participated in the university community outreach programs like World Environmental Day, have gone back to their communities and done similar initiatives. This is a very interesting outcome of the university interventions since it promotes the sustainability of the programs and at the same time conserves the environment. Initiating tree planting practices that integrate adaptation and mitigation practices is a good outcome because it shows the change in behaviour and practices of the communities as a result of acquiring information on climate change during the interfaces on different open events. It was particularly noted that *“Sometimes the university goes ahead and provides some basic seedlings that communities will plant and grow so that it can help them and also as a strategy of enhancing the engagement and building a climate resilient community. In most cases, we actually donate those seedlings for free.* (NDJ, US1, lines 11-14, Page 3).

More so, with the university trying to come up with one of the solutions to this Climate change, *“the university and the farmers have set up a good irrigation system which is supplying water over the farm”* FGD NDJ, PH, lines 24-25, Page 7. This is not only one of the ways to adapt to climate change impacts like drought due to changing seasons but also getting closer to creating another way of growing crops boosting environmental protection and carbon sinks. Mtawa et al, (2016) contend that the success of university-community engagement in fostering social and economic development significantly relates to how much the practices of engagement are supported and foregrounded in the universities's core policy and practice.

Mugabi (2015) identifies key indicators of institutional commitment to community engagement in African contexts which include incorporation in the; mission; hiring and promotion policy and practices; organisational structure; faculty involvement and commitment; student involvement; community involvement; campus publications and communication; and leadership and support. Particularly, Mugabi reports that in terms of mission, the universities should acknowledge community engagement as one of its core functions sharing equal attention and prioritisation. With regard to organisational structures, Mugabi notes that the university has specialised and multidisciplinary units and personnel that coordinate and provide community-related activities and services.

In addition, the university has to incorporate community engagement programs and activities into its budget, the roles of the academic staff, the undergraduate programs and the policy on the appointment and promotion of academic staff. This can be key in enhancing community engagement and collaborative anchoring the engagement programs on Ubuntu values engaged and collaborative communities to address societal challenges like climate change.

4.2.3.2 Research and Innovations programs

Universities play a crucial role in driving research and innovation that directly benefits communities. Participants indicated that both students and faculty engage in research on various disciplines. They mentioned that Ndejje University conducts research in social sciences to understand societal issues, such as climate change, disaster preparedness, response strategies, and recovery efforts among others. Relatedly, innovations in community engagement models, social programs, and policy recommendations are seriously considered by the university to help address social

challenges, emergency management, early warning systems, and community resilience which are essential for dealing with crises. It was clear in participants' responses that participatory engagement research on sustainable practices, renewable energy, and environmental conservation is given attention to help communities address challenges related to climate change and resource depletion. Innovations were cited in sustainable agriculture, alternative sources of energy, waste management, climate adaptive technologies, and urban planning to promote eco-friendly living within the local communities. This was echoed in:

We have established numerous agriculture enterprises at various farms that not only act as carbon sinks but also set examples to community members. For example, we have a farm in Kakutta where we established a fish and aquaculture unit. These are some of the small farming in Kisuba where we have approximately five acres of coffee being established. This also allows actually research, small community engagement and even student or university-engagement because we have people visiting these farms from the community and seeing that it's possible. (FGD NDJ, PD, lines 7-13, Page 6) ...we are having establishment of protective cultivation units such as the greenhouse, which also helps to tackle the issue of food security, which is also brought up by climate change (FGD NDJ, PF, lines 6-7, Page 7)

there's that project we are on about the production of gas. And the way we looked at it, if farmers could use cow dung to make biogas so that they can cook with it, then they wouldn't cut down trees. But they will plant more trees for agroforestry purposes. And then you know, that using gas it is clean and healthy fuel for the women, so that women like that, their source pans stay clean, they don't have to buy so much steel wire. So, we are in fact, we are going to put in more effort in that. Even last week, we had that meeting and we want to focus on that, to develop it further. (NDJ, US3, lines 5-10, Page 4)

Even rearing pigs using IMO (indigenous microorganism) yes, indigenous microorganisms. Yeah, because they are the ones responsible for the decomposition at recycling of nutrients. Such innovations look simple, but community members take time to understand them. So, when we have them, we do demonstrate on the farm for community members. (NDJ, US2, lines 4-12, Page 5)

The participants report that the researchers at the university are engaged in conducting research and coming up with innovations on climate change to understand

processes, the scale and impact in the communities. Research is conducted on the various innovations that have been advanced to deal with the effects of climate change. This kind of research enables academics to provide scientific evidence on the reality of climate change, its effects on the ground and how it should be dealt with.

At Ndejje University, the Faculty of Environment and Agricultural Sciences connects the university to the community through Research, Innovations and Community Outreach (RICO). In this regard, the Environment and Agricultural Research and Development Centre (EARDC) was initiated to develop the capacity of stakeholders to adopt innovations in environmental management, agriculture, and forestry at the university. The innovations are aimed at addressing issues and challenges created by the growing population and the consequent demand for food, water and energy. EARDC was thus initiated to develop innovations in environmental management, agriculture and forestry to increase the resilience of communities towards various forms of vulnerabilities. Smart agriculture, variety of tree species planted, production of organic fertilizers, biocides and disinfectants, and commercial scale production of renewable energy; briquettes, biogas and solar.

Documents reviewed revealed that the research and innovation policy at Ndejje University spells out the rules and regulations that shall guide research at the University (Ndejje University Research and Innovation policy, 2014). This spells out provisions for coordination of internally and externally funded research and innovations. It includes policy on dissemination and publication of research findings and results, as well as policy for property and copyright. It outlines the procedure for establishing research institutions and centres, and laboratories and also spells out the requirements for internal University structures for the award and management of external research

funds. This research policy applies to all members of the University involved in research in any capacity. It includes but is not limited to faculty, professor emeritus, sessional lecturers, staff, trainees, clinical faculty, undergraduate and graduate students, visiting professors and scholars, professional affiliations, associate members, residents, and postdoctoral fellows at the University.

To support research and innovations, a competitive staff research and innovation fund was introduced in 2007 and raised from the initial UGX. 50,000,000 to 100,000,000 per academic year in 2015. A public lecture program is in place for students through the Graduate School and for Staff by the Directorate for Research and Innovations. Currently, the University's Unit of Renewable Energy is partnering with that of Makerere University to enhance research in the production of more efficient alternative fuel including briquettes, an innovation for the university. Clearly, universities in African contexts have the potential to contribute significantly to community sustainable development through a wide range of research and innovation initiatives across various disciplines within the university and external communities (Bokhari, 2017). The goal is to create sustainable, inclusive, and thriving communities by addressing pressing environmental challenges and fostering climate-smart communities.

4.2.3.3 Climate education and awareness creation activities

It was noted by the participants in this study that Ndejje University often engages in community outreach initiatives to conduct sensitisation programs and raise awareness about climate change. This includes workshops, seminars, and educational programs conducted for local communities to share information about climate science, sustainable practices, and the importance of environmental conservation. The university

achieves this by collaborating with local environmental organizations, government agencies, and businesses to address climate-related issues. These partnerships facilitate the exchange of knowledge, resources, and expertise for more effective climate action.

Furthermore, the university tries to ensure effective climate communication strategies by studying the most impactful ways to convey information about climate change to different audiences, considering cultural and socio-economic factors in rural setups and misconceptions that currently surround the climate change phenomena. Also, the university contributes to climate literacy by incorporating climate-related topics into the curriculum across various disciplines particularly in the faculty of environment and agricultural science. This ensures that students, regardless of their major, have a basic understanding of climate science and its implications. The university staff noted that agricultural extension and farm demonstration programs, and waste management programs are also conducted to enhance community engagement. This too enhances experiential learning, field trips, and interactive simulations, to make climate education more engaging and impactful. To this, participants noted that:

The university is a source of knowledge, we all know that, so, if the university can educate the community members, about bad practices of agriculture like overgrazing, like deforestation, and burning bushes, so, in so doing, this will help them. It is vital that the community has this training, has this education and they know the negative impacts of such practices that are dangerous to the community. (NDJ, CL3, lines 4-8, Page 2) With the issue concerning waste management. The university has tried to sensitize the community as one way of combating climate change. (FGD NDJ, PG, lines 19-21, Page 3)

During some functions that are at the university, they always teach parents how to manage and recycle waste, for example, the black soldier flies, they feed their flies on other decomposing residues. So that waste that decompose is used to feed the black soldier flies in their larval stage. (FGD NDJ, PC, lines 24-27, Page 6)

you know, we've gotten a bit more into soil management. And there is a bit which I think has been successful, is when we would talk to

them about rearing these earth warms. Because they rear them to make manure, that is solid manure, liquid manure and then the earth warms, if they are many, they can feed them to their chicken. And for sure people like that activity very much. (NDJ, US3, lines 24-28, Page 3)

As noted above by the participants, NDU has initiated platforms to promote stakeholder interactions between the key players on a wide range of ventures to educate the university and local communities about climate change. These awareness activities are conducted by both the university staff and students all tailored towards climate change knowledge, mitigation and adaptation. For example, NDU convened the first international scientific conference on bio-waste recycling in September 2016 in Kampala. This attracted 70 poster and oral presentations; and exhibitions.

In August 2017, NDU organized a Mission Green Youth Expo at St Kizito High School Namugongo. The aim of these events was to create public awareness of the prospects of bio-waste recycling; and to share insights on opportunities and challenges with key stakeholders. NDU has participated in numerous events organized by public and private sector organizations related to energy, water, environment, and others. Also, joint projects and collaborative ventures include those between NDU and Kampala Capital City Authority (KCCA). The projects and activities focused on waste collection and planting of trees in the five divisions of Kampala City (Rubaga, Makindye, Kawempe, Nakawa, and Central Division). Besides, NDU has conducted several awareness and consultative workshops with the municipalities of Masaka, Mbarara, Kira, and Jinja.

According to the university's strategic plan for 2017-2027, the university has set up a publication and publishing committee to manage staff and students' publications. Ndejje University organised the 1st University Scientific International

Conference on Grassroots Sustainable Development on 26-28 September 2016. The focus of the conference was on enhancing frameworks for inter-sectoral collaborations and synergies around the energy-food-water-ecosystem nexus. As postulated by Ogunsanya and Govender, (2019), by integrating these various elements, Ndejje University contributes significantly to climate education and awareness creation, fostering a generation of individuals who are well-informed and equipped to address the challenges of climate change within various communities.

4.2.3.4 Climate Entrepreneurship

Climate entrepreneurship refers to the development and implementation of business ventures that address climate change challenges, promote sustainability, and contribute to environmental conservation. Entrepreneurs in this field focus on creating innovative solutions to mitigate and adapt to the impacts of climate change. Entrepreneurs in this space work on developing and implementing renewable energy solutions such as alternative sources of energy. They aim to replace or reduce dependence on trees, thereby decreasing cases of deforestation. The university staff noted that Ndejje University has established partnerships with the local communities in briquette making and selling, agricultural enterprises and setting up energy centres. This was articulated in:

As I've said these Germans came and taught our local communities how to make charcoal locally using for example briquettes. And it is another source of income. Because when you have people who are so much poor, that is why they are forced to go to the trees and cut them, but when they have a source of income, it improves their livelihood. And this was an initiative of the university much as it is not so often, but once in a while we get some connections and collaborations with the university through helping the local communities, (NDJ, CL2, lines 20-26, Page 1)

If you have visited the faculty of Environment and Agricultural Science, I think, they have a very big store and even a machine that is

used to change the collected maize cobs into Brickettes and then sell to the community. It's a very good way of protecting the environment. But also, I think the community must directly be brought on board, be trained in this innovation and at the end of the day, they are able to make these briquettes for themselves and earn a living. (NDJ, CL3, lines 26-30, Page 1) we must note that the communities selling these maize cobs to the university, they are also earning a certain money and also collecting their waste, turning it into energy, which energy is used it to cook and other activities which also serves the environment because, like I've told you, they will not want to cut trees, or at least it minimizes. (NDJ, CL3, lines 3-6, Page 7

We also participate in biogas digesters. We always encourage farmers who have animals to use biogas as an alternative source of energy. So, that is the energy centre and how we prepare for such activities like buying those smaller machines and I have already mentioned the schools. (NDJ, US2, lines 22-25, Page 4)

As indicated by the participants in this study, climate entrepreneurship plays a vital role in driving innovation, creating economic opportunities, and contributing to the global effort to combat climate change. Participants state that when these community members sell their maize cob for briquettes, and community members also buy briquettes from the university, it not only diversifies income generation but also, they are protecting the environment through that reciprocated engagement as postulated in Ubuntu values. By developing and scaling sustainable solutions, these entrepreneurs contribute to building a more resilient and environmentally conscious economy. Universities in African contexts ought to initiate startups that focus on energy efficiency work and creating technologies and solutions that help industries, businesses, and individuals reduce their energy consumption. This includes innovations in building design, smart grids, and energy-efficient appliances. University and community entrepreneurs in sustainable agriculture ought to develop technologies and practices that reduce the environmental impact of farming. This includes precision agriculture, agroforestry, organic farming, and sustainable water management solutions.

In tandem with participants' views, Sim et al, 2023 suggest that the climate entrepreneurship of a university is a competitive advantage and should be nurtured actively nurtured by formalised policies and practices in support of climate entrepreneurship. Therefore, university administrators and public policy managers should pay particular attention to developing and sustaining entrepreneurial climates within universities as a means of addressing drivers of climate change like poverty. Indeed, where farming is no longer feasible, off-farm employment opportunities should be supported (Gwali, 2014). Developing and supporting small business development would be an appropriate strategy to boost off-farm sources of income and enhance the adaptive capacity of smallholder farmers in different African communities.

4.2.3.5 Capacity building programs

Capacity building programs at Ndejje University are designed to enhance the skills, knowledge, and capabilities of the university staff and students, particularly in the fields of community engagement and climate change. These programs aim to strengthen human resources, organizational structures, and overall capacity to meet the evolving needs of community engagement and expertise in the field of climate change knowledge, mitigation and adaptation. The interviewed university staff and students indicated that the university offers a community of practice trainings, trainings on climate change mitigation and adaptation, and offers academic courses on climate change to the university students. This enables both the students and the university staff to engage with local communities to understand their unique climate challenges and involve students in community-based projects that address those challenges. These sentiments were expressed in:

“we have also done some training with the communities on other renewable resources they would use other than encroaching on the forests and trees”. (NDJ, US1, lines 9-11, Page 3)

So, we even have it in our curriculum which was designed so that engagement is part and partial of the content that students get. For example, in the faculty of Agriculture and Forestry, students learn of climate change mitigation and adaptation measures, and environmental management and are required to transmit that knowledge to the communities. (NDJ, US1, lines 17-21, Page 4)

And they also engage in training students with energy efficiency and more renewable energy. So, they go to outreaches in communities, especially in northern Uganda, and they're able to help out. So, we have done outreaches, especially in communities far from central Uganda to communities that are really in need of more knowledge, especially about climate change. (NDJ, US5, lines 10-13, Page 3)

As noted by the dean faculty of Environment and Agricultural Science, the university aims to offer systemic approaches to introducing innovations in teaching and learning that can enhance the university's third mission of community engagement. Students at NDU are provided with experiential learning through practical and attachment programs, among other approaches. Attachment on farms in communities provides students with an opportunity to learn and utilize theoretical knowledge acquired in class, understand the opportunities and challenges that farmers deal with, and propose mitigation approaches to some of the challenges. The farm attachment program provides linkages between the university and farming community stakeholders so as to enhance agricultural productivity and competitiveness. This is because the platform allows students to interact with surrounding rural communities and businesses through students' farm attachments across the years in a continuous relationship that strengthens the scholars' experience and the uptake of technologies by communities.

Indeed, Climate change is a complex issue that requires a multidisciplinary understanding. Capacity building programs should integrate various disciplines such as science, engineering, social sciences, economics, and policy to provide a holistic perspective. Universities ought to offer engagement programs that focus on building research and innovation capacities to help researchers and faculty members stay

updated on the latest methodologies, tools, and trends in their fields. This could include workshops on research ethics, data analysis, or grant writing.

Congruently, in the Ugandan context, capacity building programs are crucial for fostering a dynamic and responsive academic environment, ensuring that individuals and institutions remain adaptable and effective in their respective roles towards climate change action (Mfitumukiza et al, 2024; Ampaire et al, 2017). Uganda's Vision 2040 (GoU, 2015) acknowledges climate change as a challenge and lays down clear strategies for dealing with it including strengthening coordination systems at national and local levels and capacity building of local governments and decision makers, among others.

4.2.4 Students initiated and led engagement programs on climate change action

Students-initiated and led engagement programs on climate change action at Ndejje University are the plans and activities that have been started and implemented by the students towards climate change action within the local communities. These programs play a vital role in raising awareness, mobilizing communities, educating the community about climate change, and promoting sustainable practices. These programs further empower students to take an active role in addressing climate change issues. Students at Ndejje University noted that they have not only initiated climate education and awareness creation activities but also engaged in research and innovation programs that enhance engagement with communities, particularly regarding climate change action. This is presented below.

4.2.4.1 Climate education and awareness creation activities

Climate education and awareness creation activities are crucial for addressing the societal challenges posed by climate change and its impacts. Data from the focus

group discussion with the students noted that they have initiated tree planting campaigns within and outside the university to increase climate change knowledge among community members, contribute to carbon sequestration, and promote environmental conservation. These initiatives not only combat climate change but also enhance green spaces on campus and in the local communities. It was also revealed by some community leaders that students make efforts to actualise their research finding through dissemination programs with local community members. To this, the community members get sensitised and receive trainings that feature expert speakers, discussions, and interactive sessions to enhance climate literacy among different members of local communities.

In the faculty of Arts and Social Sciences, there are students who always come to the community and educate the community members about the environment, and about manufacturing artificial fertilizers, like doing general cleaning, and clearing our trenches. (NDJ, CL3, lines 26-29, Page 2) Through the students' associations, the university collaborates with the local communities in those areas for good sanitation and depolluting the environment. Community members are also always appreciative of the advice that we get from the students. So, that is another way of corroboration. (NDJ, CL3, lines 1-3, Page 23)

last year, students in university engaged in very many climate change awareness programs e.g., they had a run in Masaka, it was under a company called Eco bricks, Uganda, which deals with plastic recycling. So, we were there for a day, we had a training on a marathon. In this marathon, it was able to increase awareness. A lot of awareness was pushed out to our communities. (NDJ, US5, lines 1-5, Page 3) we also engage in tree planting, tree planting in communities where many outreaches like Adjumani, we went there through JEEP (Joint Energy and Environment Projects) Uganda, I think you've heard of Jeep Uganda, we have also done tree planting through fair ventures, tree adoption where many companies really play a role in involving students. (NDJ, US5, lines 6-9, Page 3)

As indicated by the participants, students contribute significantly to raising climate awareness within communities by promoting a culture of sustainability and environmental responsibility. By implementing these students'-initiated climate

education and awareness creation activities, students create a comprehensive approach to community engagement with a clear trajectory of climate education and awareness creation, fostering a more informed and engaged community in addressing the challenges of climate change. Participation in climate action events such as tree planting days, Earth Day, climate strikes, or other relevant initiatives amplify the students' voices and promote awareness. Students' efforts to disseminate their climate change related research findings using workshops and other ways on what individuals can do to contribute to sustainability is of paramount effect in empowering communities to develop innovative solutions to environmental problems or propose ideas for community-wide sustainability improvements.

In Uganda, it is true that several communities, households and individuals with least resources have the least capacity to adapt to the impacts (Gwali, 2014). Gwali denotes that since the linkages between climate change and land degradation are very high, there is a real need to devise community adaptation and resilience strategies that include sustainable land management.

4.2.4.2 Research and Community Initiatives

Some of the students reported that they conduct climate change related research and promote climate-resilient agricultural practices that can help local farmers adapt to changing climate conditions, such as drought-resistant crops or sustainable irrigation methods. Such research programs enable the students to Conduct surveys and interviews to understand how community members perceive climate change, and its causes, and propose improvements based on research findings. Through their internship and attachments to different communities, students start community gardens or support local sustainable agriculture initiatives to promote food security and reduce the carbon

footprint of food production. Participants noted that such students led community initiatives and projects have the potential to enhance community resilience to climate change, such as building climate-resilient infrastructure, implement and promote waste reduction initiatives, including recycling programs and educational campaigns on proper waste disposal. Students noted that:

Two, another aspect has been in terms of, having a sort of a mobile clinic, where students identify particular diseases e.g. cassava mosaic and a variety of other diseases, then they go to the community, call upon farmers to present any challenges. These are later discussed among the agricultural faculty, investigated and the solutions are presented back to the community. (FGD NDJ, PF, lines 8-12, Page 3)

Personally, I'll give my own my own view. I feel it has been mandated to me to pass on the knowledge and share the knowledge with the community. In this aspect, we have tried to introduce new high value crops to the community such as sweet peppers. Of course, this was a very challenging initiative because most people know sweet papers to be greenhouse crops, however, we are students of agriculture, we know that you can really do this in an open field, given the right agronomic practices. So, in last year, we were trying out, even right now, from the sweet paper projects, we are able to demonstrate to the community that it's possible to grow these high value crops even without protective cultivation. (FGD NDJ, PD, lines 4-11, Page 4)

For example, we do have energy centres where we are looking at renewable energy, that's using agricultural biomass like briquettes that could reduce deforestation as one of the drivers of climate change. Then, we have also engaged the schools around to start using briquettes and to start modifying their stoves. We also went to Ssemuto village where we trained some community members to make briquettes. (NDJ, US2, lines 16-20, Page 4)

By combining research initiatives with community-driven projects, students contribute significantly to climate change action, fostering a sense of responsibility and collaboration within the community. As postulated by the Ubuntu values, engaging with local stakeholders and building partnerships is crucial for the success of initiatives and innovations aimed at solving community environmental challenges. These initiatives further contribute to both the understanding of climate change through research and the

implementation of practical solutions at the community level. Anchored on the Ubuntu tenets of effective communication, collaboration with local stakeholders, and sustained community engagement, students can be able to evaluate the vulnerability of different African contextualises communities to climate change impacts, considering factors such as geography, socio-economic conditions, and existing infrastructure which are key drivers of climate change.

It is important to note that these student-led engagement programs not only contribute directly to climate action but also foster a sense of responsibility and environmental stewardship among the student body, creating a lasting impact on campus and the local communities. Participants demonstrate that students'-initiated research projects are of paramount effect in assessing the environmental impact of the communities and proposing sustainable solutions. This means that these projects significantly contribute valuable data to inform institutional decision-making regarding outreach programs and climate change action. Oliveira et al, (2020) have argued that students' engagement with local communities is critical in understanding their specific climate-related challenges. This provides an opportunity to collaborate with communities to develop sustainable solutions, conduct workshops, and implement projects that address local environmental issues and climate change impacts.

Sharma and Sharma (2019) have further indicated that university Students can volunteer in various community-based programs and initiatives thus universities ought to support such students led engagement programs on climate change action, to enable them organize workshops and webinars on climate change science, policy, and solutions. These events can feature expert speakers, discussions, and interactive sessions to enhance climate literacy among participants. Research should focus both on

scientific and societal impact and should preferably give special attention to joint and collaborative research projects involving multiple institutions and stakeholders on climate change action. High priority should be placed on helping to strengthen university-community engagement channels, largely through research funding policies.

4.2.5 Cross case analysis

The common and divergent findings on this theme across the case universities are as follows:

Common key findings regarding the engagement programs implemented by the case universities on climate change

There were similar revelations regarding the engagement programs implemented by both cases. These programs were both university initiated and students initiated. Participants from both case universities reported that the universities offer institutional support to university-community engagement programs implemented by both students and university staff. There was congruency on relative institutional support for university staff and students' climate smart engagement initiatives like community digital programs for smart agriculture, water conservation and irrigation programs, and recess and internship programs that enable students and their supervisors to interact with communities regarding climate change.

Participants across the cases agree that generate the much-needed scientific knowledge through research and come up with climate change mitigation and adaptation initiatives. This knowledge is disseminated to communities through annual agricultural exhibitions, conducting research findings dissemination workshops, and participatory action research among others. While participants at Makerere University revealed that they have been involved in climate change smart innovations like smart

bicycles to reduce tailpipe emissions, creating plastic bottle dustbins, and measuring waste in the dustbins to determine what is reusable and what is not, similarly, Ndejje University reported innovations of creating energy centres where the university looks at the renewable energy and using agricultural biomass like the briquettes that could reduce on deforestation as one of the drivers of climate change. This research and innovations are tailored towards empowering community members to knowledgeable and resilient towards climate change and its impacts.

Participants at both cases also agreed that they conduct capacity building programs where they train different stakeholders like students, university staff and external partners to ably engage climate change action with community members. Participants from both cases revealed that their institutions have introduced and incorporated climate change related courses on their academic menu which equips both the students and staff with knowledge and skills on how to mitigate and adapt to climate change impacts.

Relating to students-initiated engagement programs on climate change, participants from both universities reported their involvement in climate education and awareness creation activities that they conduct with community members. This is through their recess and internship programs, organised advocacy and sensitisation programs, tree planting activities, and community trainings. His is critical in carrying out sensitisation and providing guidance to communities, policy, and decision makers on climate change.

Divergent key findings regarding the engagement programs implemented by the case universities on climate change

There were divergent findings that emerged from the case universities. For example, participants from Ndejje University identified climate entrepreneurship for solutions for climate change mitigation and adaptation as a key engagement program between the university and the community. Particularly they reported that the university has engaged the community members and schools around to start buying and using briquettes and to start modifying their stoves instead of cutting down trees. This was not mentioned by participants at Makerere University.

Students at Makerere University partnerships with NGOs and government as key activities conducted at Makerere University to enhance engagement with the communities. This was not mentioned by the students at Ndejje University as they largely depend on institutional support for their engagement programs with communities on climate change action.

Therefore, although the process of implementing and transforming community engagement programs into a core function would vary from one university to another, participants from both cases agreed that it usually “entails a redefinition of the university culture, includes curricular change, involves and empowers faculty and staff, community members and necessitates new institutional infrastructure and policy developments that enhance the universities’ third mission.

4.2.6 Synthesis

In this sub-section, the implemented university-community engagement programs regarding climate change action have been presented and discussed. Notably, these programs have been presented and discussed in two categories: university-

initiated and implemented engagement programs and students-initiated and implemented engagement programs. Particularly, offering institutional support to both students and university staff engagement programs, generation of climate change knowledge and climate smart initiative, conducting capacity building, climate education and awareness creation were common engagement programs implemented at both cases. On the other hand, climate entrepreneurship programs for climate change mitigation and adaptation were a unique finding at Ndejje University. Relatedly, partnerships with NGOs and other external government entities was a unique finding revealed at Makerere University. By combining these engagement programs on climate change action, it has been indicated that universities contribute significantly to climate change mitigation and adaptation efforts, preparing the different generations of leaders, professionals, and experts to address the challenges posed by climate change within different African communities.

University community engagement programs implemented by the case universities are of paramount effect in the mitigation and adaptation of climate change impacts and ultimately ensuring community sustainable development. In Uganda, where agriculture contributes 24.6% of the national gross domestic product (GDP), and is a livelihood of over 72% of the economically active population, and a source of most of the raw materials of the agro-based industries (UBOS, 2015), such university engagement programs on climate change action have the potential to address climate change impacts and ensure sustainable development.

Out of the rural communities like Luwero where Ndejje University is located, 67% of them practice mixed farming (UBOS, 2014). This implies that there is animal waste to run biogas production. As exemplified in engagement innovation programs by

the case universities, biogas by-products can be used as fertilizers in gardens. Bio-fertilizers and biofuels provide a sustainable and eco-friendly renewable energy and agro-production system. On the students' side, conducting outreach programs provides students with practical experience to validate and appreciate the attained knowledge and skills, especially regarding climate change action. After graduation, the students become change agents to propagate the technologies, provide technical backstopping as well as becoming entrepreneurs of the same technologies.

However, although the mission statements of universities continue to purport a commitment to social purposes, higher education's efforts to address current and important societal needs do not occupy a prominent or visible place and the commitments are lacking. This calls for a renewed emphasis on the quality of the staff and student experience; a broader definition of scholarship-based teaching, research, and community engagement on climate change related programs; implementation of true university-community partnerships based on reciprocity and mutual benefit as suggested by the Ubuntu values and an intentional focus on the resolution of a wide range of societal problems.

4.3 Development and Coordination of Community Engagement Programs on Climate Change Action

The second objective sought to establish how university-community engagement programs on climate change action are developed and coordinated at the two cases of Makerere and Ndejje Universities. The study was interested in establishing how the case universities guide the development and coordination of community engagement programs by their academic and administrative units to strengthen their ability to improve partnerships, outreach programs, and engaged scholarship with

community partners. Findings under this objective centre the discussion around the strategies, frameworks, and templates used to develop and coordinate the engagement programs and activities and the role they play in institutionalizing community engagement at the case universities. A further look is taken at the preamble to the community engagement plans mentioned, the mission statement, and the role of the missions and strategic plans to help the university units fulfill the mission of the institutions.

4.3.1 Development of engagement programs

Under this main theme, it was revealed by the participants that the advancement of engagement opportunities involves a myriad of strategies adopted by the university management for the desired university-community engagement programs towards climate change action. University staff and students at Makerere University viewed the development of engagement programs as enhancing the capacity of the staff and students to be able to reach the grassroots level of people to influence their future for the better. Notably, this is through enhanced strategic capacity building, strategic planning of engagement programs, and formulation of guiding frameworks for community engagement. This is presented below.

Table 4.4: Development and coordination of engagement programs at Makerere University

Development of engagement programs	Coordination of engagement programs
Sub-theme 4.3.1.1: Strategic Capacity Building <ul style="list-style-type: none"> • Formation of a Consortium of experts to deal with climate change engagement programs • Streamlining climate change knowledge across academic programs 	Sub-theme 4.3.2.1: Guidance of university strategic and action plans <ul style="list-style-type: none"> • Structured offices for engagement • Established thematic categories of communities • Guidance of research ethics committees • Following the established systematic procedure of engagement
Sub-theme 4.3.1.2: Planning of engagement programs and activities <ul style="list-style-type: none"> • Establishment of a coordination centre • Establishment of funding partnerships • Seeking and granting of engagement permits • Establishment of students' chapters for engagement 	Sub-theme 4.3.2.2: Climate change coordination centre <ul style="list-style-type: none"> • Coordination through the centre for climate change •
Sub-theme 4.3.1.3: Formulation of guiding frameworks for engagement <ul style="list-style-type: none"> • Benchmarking university outreach guiding policies • Formal and due registration of students' associations for engagements • Formulation and Signing of MoUs 	Sub-theme 4.3.2.3: Coordination through Partnerships <ul style="list-style-type: none"> • Partnerships with external stakeholders • Coordination through local community leadership • Coordination through students' associations

4.3.1.1 Strategic Capacity Building

University staff and students from Makerere University revealed that building strategic capacity among the staff and students at the university is a core part of developing engagement programs between the university and the community. This strategic capacity building involves processes of developing and strengthening the engagement skills, climate change knowledge, and resources of different members of staff and students. This is to enhance their abilities to effectively engage community members on climate change knowledge, mitigation, and adaptation, and sustain their engagement programs over the long term. This has resulted in the formation of a

consortium of experts to deal with climate change engagement programs with different communities. This kind of strategic capacity building aims to build the ability of the university to produce graduates with the 21st-century key competencies needed to think systematically, act entrepreneurially, and be experts in climate-smart agriculture when they get into communities.

What we have is what I would call a research group, sort of a consortium of experts who are into climate change, climate change modelling, climate change adaptation, climate change availability. So, it's a research thing that we have. And so those are people that we look at as experts in the field. And so, if there's anything that comes in that, too, for instance, if I receive a letter, they want someone to go and give a talk on this. It's from that team because it's a consortium of experts that formed the research group. (MAK, US1, lines 9-14, page 5)

the first thing we realized was to involve the local level technical people and lead us, as I told you. So, we are able to explain to them that they need to be on board and we train them, some of them have no ideas, but we've trained them intensively, and they really appreciate it. And once people get to know what to do, actually, they do it, (MAK, US2, lines 21-25, Page 11)

The participants further reported that the development of engagement programs requires funding and hence they often seek funding from the university and other external stakeholders as part of preparations for engagement programs. According to them, most of the engagement programs require large amounts of funds which often forces the university staff and students' leadership to seek funding to ensure that climate change training and capacity building programmes are designed and delivered based on local needs. They explained that:

So, as a students' association, we are allowed to write letters to the university management, and to different organizations that support climate change, and fund their projects, may be if MUCCA (Makerere University Climate Change Association) wants to begin a project. Let me say like, maybe collecting rubbish in the university, holding environmental weeks, climate runs. We can talk to the ministry, and we can be able to fund such an initiative. (FGD MAK, PI, lines 1-5, Page 10)

I would say funders, for instance, NORAD, EU, and several other donors. The way we structure our grants is that there has to be a dissemination plan to the end user and so, ah, the funders have in that as part of the requirement, they are definitely stakeholders because, they have an interest in the research that we are doing, the extension work that we are doing. (MAK, US1, lines 22-27, page 3)

Relatedly, the university is steadily integrating climate change content in numerous academic programs to enhance the knowledge and skills of the students and staff to enable efficient engagement programs on climate change action. For example, the review of the academic programs in the College of Agriculture and Environmental Science (School of Forestry, Environmental and Agricultural Science) revealed that the college has made significant strides to establish a Master of Science in Climate Change and Sustainability particularly to equip students with adequate climate change knowledge and skills. Consequently, this establishes fiscal stability to support training, research, and outreach activities of students and staff and boosts the capability to engage communities and address climate change issues. This was expressed in:

We've also tried to streamline it so that climate change issues are actually cross-cutting issues on all the programs that we teach. So, the students we are sending out later, are students that shouldn't be able to impact society, because they have a knowledge of climate change. In the past, you'd find that it's a handful of students, maybe we're doing geographic, more meteorology, that are doing that, by now students in tourism, forestry, in agriculture, all of them have to go to climate change. This is essential for enabling engagement activities on climate change. (MAK, US1, 1-6, page 6)

It was also noted that the university organizes annual climate change specific boot camps which usually have intensive short period training and field-based activities within the communities which generate ideas for students on how global issues like climate change are reflected in the local environment and addressed. Bootcamp workshops usually have participatory sessions where students from different backgrounds and campuses share experiences, observations, and views about climate change to support the understanding that climate change knowledge can be applied in

different aspects of their lives in different communities. This further encourages students to confidently plan for engagement programs with communities and become change agents for addressing climate change challenges in their universities and communities. Besides the boot camps for students, participants revealed that they reach out to local leadership for engagement orientation and training to prepare them for the engagement programs to come. This is stated in:

The other one is about youth engagement, whereby there is an annual training through boot camps in which the targets, fresh recent graduates and university students to orientate them in such a way that they can be impactful in their careers. And this impact has also been largely enabling them to get jobs, but also meaningfully impact their communities when they leave the universities. (MAK, US3, lines 26-29, Page 4)

Also, we are working with the local district structures, we train them, and they also train the men and women. So, you don't need to duplicate efforts, if they're, district agricultural officers, the gender officers, why would I go to train the women, yet they're the ones who always train them and they know their needs, they know their problems, they know their times schedules. So, one time we brought them to Kampala, we trained them, we went to the communities, also trained them and they are the ones that help to monitor and this helps the implementation and sustainability of the efforts as well. (MAK, US2, lines 9-14, Page 8)

As the participant noted, the university has ensured creating capacities for their students and staff as part of developing an engagement program, to ably conduct research on various aspects of climate change. This capacity building breeds experts who can ably investigate its effects and propose mitigation and adaptation measures across several divisions of the community. Together with the community, the university has the ability to “bring out the real picture of what is happening” regarding climate change issues, through research.

University staff and students ought to be equipped with a combination of knowledge, skills, values, and motivation to be able to engage and make a difference in

sustainable development in different communities around and within the institutions. The undergirding modern approach to community engagement requires an understanding that the knowledge and expertise that resides in the teaching and scholarship enable the staff and students to recommit to their societal contract by using their expertise to fulfil their university mandates and missions of community engagement (Fitzgerald et al, 2016). Conversely, Shiel et al, (2016) argue that capacity building entails approaches and processes that contribute to community empowerment; universities may either lead such approaches or be key partners in an endeavour to empower communities to address the challenges posed by the need for sustainable development. Capacity building and the promotion of sustainable development locally should be the agenda for African universities that take seriously regional engagement.

Indeed, for universities in the African context to meaningfully contribute to transformational change in society, there is a need to act and make engagement scholarship a central aspect of its work, spanning the spectrum of its academic programs, curricula, and institutes (Fitzgerald et al, 2012). Notably, Capacity building for university-community engagement programs is often a long-term and iterative process that requires ongoing commitment and collaboration among stakeholders within the university and communities. It is therefore a crucial component of developing sustainable engagement programs with the ultimate goal of creating resilient and self-sufficient climate change engagement programs that can adapt to changing circumstances in HEIs and effectively pursue their missions and strategic plans.

4.3.1.2 Planning of engagement programs and activities

Planning was another identified core aspect of developing engagement programs at Makerere University. The university staff and students noted that developing engagement programs on climate change action with the communities requires careful planning with consideration of the university's missions and strategic plans, the needs of the community, and the resources available. Thus, planning builds the institution's readiness to engage with communities. Participants noted that in alignment with the community engagement action plan, the university establishes different funding partnerships that support engagement programs and grants sought permissions to staff and students for the engagement programs on climate change action.

Relatedly, students revealed that in an effort to have effective engagement programs, the university has established students' chapters where different students' associations interested in climate change engagement programs can register and be supported. A student member of Makerere University Climate Change Association (MUCCA) said that through such establishments, students seek engagement permissions from the university management for their climate change related outreach activities. This was expressed in:

So always, on our end, we have always called it co-planning. Where we believe that the natives of a given place need to be part of the planning. So, before we come up with the program or the outline of activities that we expect to carry out at the Genesis, we would go to the ground, do that quick survey and have an engagement like a talk with the communities. We get their knowledge about what they have to say about the climate of the area and how they think it has changed. And after meeting those different community people, we would come back and now develop a methodology on which we are able to execute or pass on the knowledge or have the community engagement being successful. But initially, we engage the community, call them to table, talk with them. (MAK, US4, lines 25-31, Page 4)

Planning is very key! As you go to the communities, where are the climate change issues as you design a project? is it climate change sensitive? as you start a development, have you factored in how climate change might affect that development? So now, I think it's starting to pull together because climate change has become a very important issue that it's now integrated into more aspects, the teaching, the research, the outreach. (MAK, US1, lines 9-13, page 6)

like I said, to have this program successful, we seek permission from the university. OK, the good thing is that the university also supports this. Because for example, the people who head the environment are also environmental activists. So, we organize this in support and with permission from the university. To plant trees here at the university you have to get permission from the director of estates, yes. And also, sometimes you have to get permission from the deputy Vice-chancellor, DVC finance and administration. So, we try to make sure that we have permission but also we get permission from the academic registrar especially if it is like public lectures which are academic (MAK, US6, lines 7-14, Page 6)

The above sentiments from the participants denote that the university staff and students go through strategic planning to ensure the successful implementation of engagement programs. Planning is a fundamental process that contributes to the success and efficiency of various endeavors within institutions of learning. It is a proactive approach to shaping and structuring community engagement programs within universities, enabling university staff and students to navigate challenges and capitalize on the available climate change action engagement opportunities. Planning helps identify the most efficient and effective ways to achieve university outreach goals and minimizes inefficiencies and unnecessary efforts by outlining the most direct path to successful engagement programs on climate change. In such complex engagement activities involving multiple individuals or teams, planning later facilitates coordination and collaboration.

The engagement plans serve as a road map to get each unit engaged with the larger community and institutionalize engagement across the university. Engagement plans, if properly developed and introduced across the institution, can help

institutionalize community engagement through their university-wide implementation within both academic and administrative units (Cunningham & Smith, 2020). These plans guide community engagement efforts within the institution, addressing core principles as outlined in an institution's strategic plan and mission, further enhancing the institutionalization of community engagement. In addition to serving as the vehicle to institutionalize community engagement, engagement plans can be used to address critical areas that are deemed lacking or deficient within the institution or areas of priority. To be effective, academic staff may need continued retooling and training in principles of effective community-engaged scholarship, but also excellence in UCE should be recognized for merit and career incentives.

4.3.1.3 Formulation of Guiding Frameworks for Engagement

Another important aspect of developing engagement programs at Makerere University, as indicated by the participants is formulating guiding frameworks for university-engagement programs that ensure smooth and efficient implementation. The university staff and some of the university students noted that for engagement programs to take place, there must be benchmarking outreach policies and guidelines, formal and due registration students' associations. Before starting any engagement with external stakeholders, particularly local communities, the university anchors on university missions, and formulates strategic plans, and other policy frameworks to have a clear guideline of what needs to be achieved and how it should be achieved.

Guiding frameworks are also critical in identifying which particular communities to engage with, what their interests, needs, expectations, and influence are, and reaching different agreements and understandings for signing. Participants noted that such frameworks guide communication channels and tools for the university

staff and students; the resources and budget; the risks and mitigation strategies; and the roles and responsibilities of the team intending to engage with different communities.

These sentiments are expressed in:

the university has a strategic plan and the strategic plan outlines various things that need to be done by the university to relevant communities. When we talk about developing engagement programs, it must be followed. So, the university in its strategy clearly presents a position that for the university to be relevant to communities, it must position itself in such a way that it is providing linkages that enable the generation of knowledge, and capacity building mandates that are very much linked to these communities. So, the strategies are there. And accordingly, even different colleges also outline themselves, outline how they implement the university strategy in terms of community outreach in a way that's connected to teaching, research, and also knowledge transfer, (MAK, US3, lines 9-17, Page 2)

There are frameworks and policy documents that normally guide our partnerships with different stakeholders. We also have our legal teams, that prepare to guide us with those documents that really help us to understand who we should work with, and how and what would be the roles for each. So, we have those systems in place. (MAK, CL3, lines 19-22, Page 3)

Students come together, they are registered in the institution or university and they are formally recognized by the Dean's office, normally they are different student led groups or associations, and these associations are normally registered, they are recognized by the University, so the same for youth go green chapter, it is also another platform for the students. It's like an association of students interested in environment and climate-related engagements. (MAK, CL3, lines 14-19, Page 3)

Besides guiding frameworks, participants reported that the university prepares and signs memorandum of understanding with external partners and communities. Participants noted that, for instance, the stakeholders that the university has had long-term working relationships with, they do prepare and sign a memorandum of understanding between the parties and the vice chancellor normally signs on behalf of the institution and a leader on the side of the organization or partner. This was expressed in:

There is usually a memorandum of understanding and mostly it has been the common approach, I should say. It's been a memorandum of understanding. And of course, those other things come in after that. That's when the body may be created, we get two representatives from the two parties to carry on that MOU into action. But it is the first step that when we have to reach out, and we get positive feedback, it has always been the first signing, maybe an MOU. And then, yeah, we get the team in place that is to ensure that MOU comes to life. But it's commonly first is the MOU and then other things come in later. (MAK, US4, lines 17-23, Page 6)

As indicated by the participants, formulating guiding frameworks and structures is another important stage for setting the ground for the development of engagement programs between the university and communities. The purpose of such a framework is to provide the university staff, students, external partners, policymakers, funders, and other stakeholders with a clear, consistent approach to community engagement, including an understanding of the different forms and levels of engagement.

The CE framework further aims to provide guidance on when and how to undertake engagement activities and what steps and processes should be followed and considered. One of the leaders of external collaborators indicated that they have what they call 'youth go green chapters' in these universities. The establishment of Youth Go Green University chapters not only helps to provide information and guidance to the students but also helps to trigger the minds of the students to think in line with environmental and climate action engagements. He noted that *"Having structures or systems of this nature, like this chapter, which is like a branch of youth Go green in the University, and is composed of students from different backgrounds. We have those studying forestry and environmental science, we have students studying agriculture and some students are studying other humanities which is vital for developing and guiding engagement programs"*. (MAK, CL3, lines 8-14, Page 2).

The participants acknowledge of existence of formal structures with legal fittings which the university has and guide the signing of agreements by the Vice Chancellor on behalf of the university. Thus, as participants initiate the innovations and the ideas, being employees of the university, the head of the institution must be in the know of the proposals and the engagement development processes and aims. Du Plooy and Von Moellendorff (2024) have argued that universities in African contexts need institutional structures specifically dedicated to the guidance and support of community engagement programs. This can be for example coming up with a directorate of engagement in an institution, where there are people who are qualified and take it seriously.

Notably, Makerere University's commitment to community engagement is evident in its mission statement, which includes the phrase "providing engaged service and outreach that improve the quality of life for local and global communities". As guided by Ubuntu principals of communalism/collectivism/solidarity, the CE frameworks ought to be developed through a collaborative approach with representatives from both the university and communities; non-governmental community-based organizations, and other community stakeholders, all forming recipient engagement working groups on climate change action.

Tutu (1999) posits that people in a community practicing *ubuntu* show openness, acknowledge others, and engage with them without being impeded by others' competencies. As earlier indicated, such a view of human engagement is more than just for humans to participate. In other words, for humans to participate as a corollary of *ubuntu* is to assume that they merely need to collectively work towards a common cause. Such Ubuntu framings ought to underpin strategic planning and structuring in

African universities for efficient and effective engagement programs in African contexts.

4.3.2 Coordination of engagement programs

The university staff and students revealed that the coordination of community engagement programs on climate change action is done across academic, co-curricular, and non-academic programs within and outside the university. The institution helps the university staff, students, and community partners to understand, access, and navigate all of its community-based activities regarding a wide range of programs and activities regarding climate change action. From the analysed responses from the participants at case one, it was revealed that university community engagement programs regarding climate change are coordinated through the guidance of university strategic and action plans, climate change centre and partnerships with external stakeholders as indicated in table 4.4. This is presented below.

4.3.2.1 Guidance of University Strategic and Action Plans

Stimulated in part of the university mission, it was revealed from the university staff, students and university documents that coordination of university-community engagement programs on climate change actions is anchored on the university missions, strategic plans and action plans. It was noted that the university has strategic offices that are responsible for coordinating engagement programs. Such offices adhere to both overall university strategic and action plans and relevant college strategic plans. For instance, in the College of Agricultural and Environmental Science, participants noted that these guidelines provide established thematic categories of communities for engagement programs, research ethics to follow and established systematic procedures for the university staff and students to engage with the communities. These must

coordinate with the local leadership for authorization and coordination of the engagement programs. This was expressed in:

I will say that, from my perspective, whatever we do, we follow the university guidelines. The university has guidelines on how engagement must be conducted, and even gives us the different interests of engagement, and thematic areas through which we have to be aligned as the university, but also at country level, you don't just do engagement, that is not going to contribute to the wellbeing of the government or of the university mandate, but also our people. So, we have a scope of kind of a basket, to think about e.g. what are the priorities? So, we have those guidelines and of course, natural resources and climate change issues are the top priority, in the university research fields, (MAK, US2, lines 1-6, Page 3)

There are people who we have to work with at the community level, you know, the leaders, even if you have those university letters, you need the district authorization. And then once you're there, you work with the people there to engage them. And then you're able to do a better job that is more impactful than having no, no guidelines, it's not that they're not happy with their guidelines. So as a researcher, as a scholar, I'm the practitioner of that community outreach. That's how we do the engagement. (MAK, US2, lines 15-20, Page 3)

the district people are in charge, you can't go to the community without authority from the district authorities, you have to the CAO (Chief Administration Officer) who writes for you a letter, and tells you which office to work with and from the office for instance, I used my example when we in the Isingiro, the chief administration officer sent us to the production office, who leads the agriculture-related aspects. So, the agriculture person selected for us even the sub-counties who we were going to work with focused on issues that we wanted. (MAK, US2, lines 23-28, Page 8)

The participants report on the guidance of the university's strategic and action plans and the procedures that the university staff and students go through to engage with the communities on issues of climate change. The participant underscores the importance of working within the frameworks of the objectives of the strategic plans and ensuring that local leadership authorises and organises community members for engagement programs. This is critical for easing engagement programs and making

citizens knowledgeable on climate change so that they can go back to their communities and spread the message to the rest.

The Makerere University Strategic Plan 2025 captures CE as part of the University's strategies, which has been embedded in the university's research, teaching, and learning (MUK 2011). To reinforce the CE mission, it is endorsed as a required credit-bearing module of several undergraduate programs to conduct internship and placement programs. Moreover, CE is understood in civic responsibility and citizenship, which benefit internal and external communities. Abd Rahman et al, (2019) argue that community engagement ought to comprise linking the best research and teaching skills of the staff and students to the specific needs of diverse communities through rightful procedures and processes as prescribed by guiding frameworks. In turn, students are enriched through service learning and engagement.

By embracing community engagement as a central component of their strategic plans, institutions can position themselves as responsive, adaptable, and socially responsible entities that contribute meaningfully to their communities and address the evolving needs of society (Wendling & Evans 2023). The authors argue that smooth coordination of community engagement must begin with a university's strategic planning efforts and fundamental areas in which to align community engagement including faculty, staff, and student recruitment efforts, fundraising and alumni relations, faculty teaching and research, and workforce and economic development.

4.3.2.2 Climate Change Coordination Centre

One of the other key means of coordinating university community engagement programs on climate change action is the Makerere University centre for climate change Research and Innovations (MUCCRI). The university staff and the reviewed documents

revealed that the centre's primary role is to generate and disseminate quality climate change knowledge and innovations to foster climate change resilience and sustainable development in Ugandan communities and Africa at large. MUCCRI was established in 2013 in the Schools of Agricultural Science and College of Agricultural and Environmental Science to raise awareness and build a climate change knowledge base that are beneficial to communities by engaging in research and conducting outreach activities. Particularly, the main goal of the centre was to build Uganda's capacity and proficiency in addressing climate change and becoming a hub of academic, professional development and research excellence in climate science, climate adaptation, and related disciplines. Participants revealed that MUCCRI acts as a pathway through which the university connects to the community, particularly regarding climate change action.

I think the best example to give is the Makerere University Centre for Climate Change Research which sits in the College of the Environment. Strictly their mandate is issues to do with climate change. And they are involved in research, climate change research, but they're also involved in climate change knowledge dissemination, that is in terms of publications and community engagement, but also, they do hold public lectures. I don't know when the last public lecture by the Centre for climate change research was organized. (MAK, US5, lines 18-23, Page 3)

the university has centres, which I would say are gateways, gateways, through which the university connects with the communities in a much more thematic way, for example, with other Centre for Climate Change, research and innovations. And that centre of research and innovations essentially is the entry point for whoever wants to meet with the university let's say on that aspect climate change would say okay, they have a centre and that way they can. (MAK, US3, lines 3-8, Page 4)

The centre is currently playing a facilitative role in fostering collaboration with external stakeholders like local governments and the government of Uganda's climate change related departments to translate staff and students' research findings into simple, comprehensive, cost-effective, and accurate guidance. This guidance is disseminated

through appropriate channels to reach the communities particularly farmers and farmer communities. Dissemination channels include; public lectures, university events, a system of extension services at the district and sub-county levels, popular radio programs, use and application of ICT, and through community Agents.

I think the best example to give is the Makerere University Centre for climate change research which sits in the College of the Environment. Strictly their mandate has issues to do with climate change. And they are involved in research, climate change research, but they're also involved in climate change knowledge dissemination, that is in terms of publications, but also, they do hold public lectures, and media programs among others. (MAK, US5, lines 18-23, Page 3)

Because they have tried to organize public lectures and research dissemination, symposiums at the climate change centre. And even by the way, we have, normally we call it the Science Week, where there is an exhibition is on science, and even environment, agriculture and all the surrounding communities are allowed to come in the university and set up stores. There was a time when we had a Congress, the International Congress for ethnobiology. The community was allowed to come because we're interested in how men can use maybe wild plants to better themselves in terms of health and social being economic. And yet people came and set up stores from different communities and organizations. (MAK, US5, lines 13-20, Page 4)

As noted, this Centre (MUCCRI) is one of the efforts and is one of the institutional arrangements to make sure that the university serves as one gateway to link to the communities that need knowledge, skills, and research projects that can support people who are involved in dealing with the change in climate in different communities in African setup. MUCCRI raises climate change awareness, and build a climate change knowledge base engaged in research, innovations and climate policy formation and community outreach programs.

The participants indicate that the coordination of climate change outreach programs is fully operational, with encouragement and participation of university staff and students in climate change awareness activities like open seminars, tree planting, public lectures, boot camps, conferences, and MUCCRI publications among others. As

reported, the centre holds community-based adaptation learning forums and public research action labs that enhance action research on climate change adaptations in the agriculture sector. Reviewed documents revealed that the centre coordinates engagement programs by offering lecture series and short courses to ensure that climate change considerations are effectively integrated into community-based climate change response action (Ssekamatte 2021; Twinomuhangi et al, 2019). Some of the notable courses that have been offered by the centre are climate change and natural resource management short course and the Education and Research to Improve Climate Change Adaptation Activity (ERICCA) short course.

Relatedly, the centre has developed Climate Change Adaptation Knowledge Base (CCA KB) and Climate Change Knowledge Management System (CCKMS) to ensure that knowledge and capacities are strengthened in different communities of Uganda. The systems provide and promote outreach programs, sharing of information and knowledge on weather and climate, climate change adaptation interventions/technologies, disaster risk reduction, and post-harvest reduction and marketing of produce. Additionally, some of the university staff indicated that the coordination of engagement programs at the centre is also done through partnerships with other external community-based stakeholders who share a similar vision of climate-smart and resilient communities. For instance, a university staff noted that MUCCRI partners with the Uganda Climate Change Champions Network (UCCCN) to promote innovative, coordinated, and harmonised community-based strategies for climate change mitigation and adaptation. Such partnerships have eased the coordination of engagement programs on climate change and further built household resilience to climate change impacts in communities.

As indicated, MUCCRI plays a critical role in the coordination of community engagement programs regarding climate change action through different activities and also informing the university and communities about the evolving understanding of the science of climate change. Through the research, trainings and engagements by the teams at the centre, the external community through outreach activities are able to comprehend climate change knowledge, adaptation, mitigation, governance, finance, and other related knowledge systems.

As specified, coordination through other external partnerships is key in enhancing the centre's capacity for sustainable resource mobilisation, and enhancing the support service for efficient and effective implementation of community engagement programs on climate change mitigation and adaptation strategies. Wendling and Evans (2023) argue that higher education institutions should seek to establish or maintain units to facilitate and coordinate faculty's engaged research and engagement programs on issues that affect communities to "increase interdisciplinary centres to address community needs," demonstrating one example of resource allocation and/or re-prioritization of university's third mission. Arguably, training and service centers can be potential research and outreach avenues for demonstration, testing adaptability of the technologies, as well as training and consultation venues (Kitinoja et al., 2011).

4.3.2.3 Coordination through Partnerships

Makerere University has partnered with the Government of Uganda, mainly through the line Ministries and other autonomous/semi-autonomous agencies to manage and coordinate engagement programs on climate change action. From the reviewed documents, it was identified that as of Friday 30th December 2011, Makerere University officially transformed into a Collegiate University with 9 Colleges and one

School, in accordance with the Law governing Universities. These 9 constituent colleges and the School of Law actively partner and collaborate with a number of external stakeholders regarding different aspects. Some of the notable partnerships that the university has created to (among other aims) enhance effective engagement programs include; African Research Universities Alliance (ARUA), the Consortium for Advanced Research Training in Africa (CARTA), Global Green Growth Institute (GGGI), Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Centre for Research in Energy and Energy Conservation (CREEC) among others. Congruently, participants confirmed such partnerships for engagements when they noted that:

In our department, we deal a lot with Nature Uganda, because Nature Uganda is more or less an NGO, that is concerned with the environment, biodiversity, climate change, and those aspects. But they always come here to seek help in terms of expertise in maybe doing biodiversity studies. They also come to seek expertise in delivering public lectures because Nature Uganda, for example, holds public lectures every month, and at times, they will come and ask a professor here to address a certain topic to the public. But they're also international organizations. (MAK, US5, lines 24-30, Page 2)

For example, the National Environmental Management Authority, National Forestry Authority, and Uganda Wildlife Authority are government institutions that directly link with us and are our external stakeholders with our community engagement. If we are for instance, we were promoting a new technology on waste management in Kampala, we have to work with KCCA, we have to work with NEMA, and the communities where we are introducing that technology, so, those are our partners under government agencies. (MAK, US1, lines 6-12, page 3)

Participants report that partnerships are a cycle and a chain of connections through which the university operates its third mission of community engagement. For the university to operate and coordinate engagement programs on climate change action, it must have the students, it must have the consumers of knowledge, but also

those who demand knowledge. Equally important, the university requires funders for the institutional capacity to coordinate the engagement programs thus the partnerships.

In the college of agricultural and environmental science, where most of the climate change engagement programs take place, there have been several memoranda of understanding that have been signed between the college and other external stakeholders to enhance outreach programs. One of our core functions of the college is to partner and coordinate with local, regional, and international organizations by promoting collaboration, mobilizing partnerships, and galvanizing efforts of different actors to respond to national and global agricultural, environmental, and food challenges. For example, the CAES signed several Memoranda of Understanding (MoU) with other external stakeholders. These include:

Table 4.5: External partners of the College of Agricultural and Environmental Science, Makerere University

SN	External Stakeholder	Year
1	Combating Arthropod Pests for better Health, Food and Climate Resilience, ICIPE	2019-2023
2	Development Smart Innovation through Research in Agriculture (DESIRA)	2022 –2025
3	World Food Program (WFP)	2020-2024
4	Ministry of Agriculture, Animal Industry and Fisheries (MAAIF);	17 th Jan, 2017
5	Australian Partnership Program in Higher Education and Research for Development (APPEAR);	30 Jan 2017
6	International Fund for Agricultural Development (IFAD);	15 Feb, 2017
7	The World Agroforestry Centre (ICRAF);	10 May 2017
8	FAO under the Global Climate Change Alliance (GCCA);	9 May, 2016
9	National Environment Management Authority (NEMA);	5 Apr, 2016

Source: College of Agriculture and Environmental Science annual report (2023).

Internally, participants also noted that the university partners with students' associations and chapters to coordinate engagement programs for climate change action. These are meant to ensure outreach programs reach communities through their leadership structures and members. Participants noted that:

But also, like I said the most active association here with students is the Makerere University Climate Change Association. This is a student-led organization with the aim to sustain a global mobilization against climate change and it does that through local action. It is based on other ethos that change on the local level and must drive change on the global level and so works to make impacts from the grassroots. (MAK, US6, lines 18-22, Page 4)

But Makerere in particular, especially under the school of forestry where we find that Department of Geography where I am attached to, the students' associations, we have quite a number of associations. These are meant to increase the outreach of university activities to the community, we have an association for students under forestry containing tourism and forestry students. Some of the activities they do is to reach the community and do tree planting. Their mission is to increase carbon sinks. Then we have also the meteorology students' association who usually reaches out to communities and primary schools or lower institutions of learning. For them, their sole objective is to increase awareness of climate and weather and other related impacts that are to come if we are to continue experiencing climate change. (MAK, US4, lines 12-20, Page 2)

As indicated above, partnerships are very critical of coordinating engagement programs in higher education systems, particularly regarding university climate change knowledge and resources with the external communities to enrich engaged scholarship, research, and innovations; enhance curriculum, teaching, and learning; prepare educated, engaged citizens; strengthen democratic values and civic responsibility and address critical community issues like climate change.

Implementation of true university-community partnerships based on reciprocity and mutual benefit. This study challenges higher education in African contexts to enhance its covenant with society and to embrace the problems of society in shared partnerships with communities for sustainable development. Particularly, higher education out to become more engaged with communities through collaborative partnerships rather than as experts with pre-conceived unilateral solutions to complex problems like climate change.

The above standpoint recognises that institutions are living systems that exist in communities upon which they depend to meet many of their needs like funding, student enrolment, research knowledge, and dissemination audience among others. The prosperity of engagement programs depends on institutions' understanding of their communities acknowledging the interdependence between themselves and continuously working to achieve a suitable balance (Kapp & Rauch, 2017). This view of understanding institutions as living systems that operate in specific communities inspires a break from the heavily bureaucratic thinking institutions may easily fall victim to and encourages institutions to increase flexibility and adapt more quickly to the needs of their communities and community problems. A deeper, more nuanced understanding of their external communities inevitably pushes institutions to adapt to meet the evolving climatic challenges.

Strong relationships and the development of trust are priorities in engaged partnerships (Butcher et al, 2011). As postulated in the Ubuntu theory, effective coordination requires honesty, reciprocity, and mutual respect as the building blocks for strong partnerships between the universities and communities which are created through the involvement of people across the partnership and its projects. Partners must be realistic in the allocation of their resources, including people, time, and money, and need to be committed to individual projects and the partnership as a whole. They must be committed to sustaining a project for its planned duration, and hopefully beyond.

4.3.3 Development of Engagement Programs at Ndejje University

Correspondingly to case one, I was interested in establishing how Ndejje University develops and coordinates community engagement programs geared towards climate knowledge, mitigation and adaptation. Findings are categorized into two major

themes; development of engagement programs and coordination of engagement programs. These are further discussed in different sub-themes. Findings reveal how the university administration and planners advance community engagement programs towards climate change action. This entails how the engagement programs are comprehensively planned, and designed in great detail at the outset through centrally controlled systems and procedures of university administration and community local leadership. Many of these programs aim at achieving their intended goals. It was found out that the development of engagement programs is advanced through strategic capacity building of the stakeholders, through planning of engagement programs and formulation of guiding frameworks for university-community engagement programs. These are presented below.

Table 4.6: Development and coordination of engagement programs at Ndejje University

Development of engagement programs	Coordination of engagement programs
Sub-theme 4.3.3.1: Strategic Capacity Building <ul style="list-style-type: none"> • University support for engagement programs • Teaching and researching climate change programs 	Sub-theme 4.3.4.1: Guidance of university structures and plans <ul style="list-style-type: none"> • Coordination through university engagement focal persons • Guidance of strategic and action plans
Sub-theme 4.3.3.2: Planning of engagement programs and activities <ul style="list-style-type: none"> • An up-bottom approach to planning • Establishing external partners 	Sub-theme 4.3.4.1: Coordination through Partnerships <ul style="list-style-type: none"> • Partnerships with local community leadership • Coordination through students' leadership
Sub-theme 4.3.3.3: Formulation of guiding frameworks for engagement <ul style="list-style-type: none"> • Benchmarking on university strategic plans • Signing of engagement agreements 	

4.3.3.1 Strategic Capacity Building

Study participants revealed strategic approaches that the university uses to optimize resources for improved service delivery, focusing on identifying and

addressing gaps in, knowledge, skills, processes, and technology to ensure efficiency of engagement programs. One core part of the university's development of engagement programs is to play an important role in providing the new knowledge and skills needed to meet the challenges of sustainable development in communities, in raising public awareness about climate change and providing preconditions for informed decision-making, responsible behavior, and climate change action choices. It was noted by the university staff and the students that the university is assigned to produce highly skilled manpower and research output to meet perceived engagement targets. Additionally, it was noted by the participants that the university is instrumental in the building of new institutions of civil society, in developing new climate change knowledge, and in training the students on new approaches to engagement programs. The university staff and students noted that:

We have to be unique from other institutions. So, that uniqueness must come in whereby you give prior training and vivid examples or practical skills that students must go with and give credit to Ndejje University. Every student who graduates from Ndejje University has the capability to design and implement engagement programs. So, they give them a chance to be linked to other organizations and communities where they join after campus. So, we always do that, to support them. Make sure that they are capable of doing and knowing how and what they are supposed to do. (NDJ, US1, lines 22-26, Page 3)

First of all, we teach climate change knowledge. Because all starts in class with students and lecturers sharing knowledge and research on climate change. climate change is one of the separate courses that we teach our students for our undergraduate programs. we also conduct master's programs on sustainable agriculture and rural development. This is more related to climate change as we have specific course units about climate change within this program. sustainability development now, this is a new phenomenon through which we must teach towards the direction of SDGs. (NDJ, US2, lines 4-10, Page 4)

I can identify with some of the lecturers who are mostly entitled to teaching course units regarding those points, like the agroforestry cost units. So, I've seen some of those key lectures emphasizing more

of like 1 million tree gorilla projects. Whenever they come to classes, they could emphasize it, to be strongly practiced in the event, not only within the community around the university but even the various places of residence where the students come from. (FGD NDJ, PC, lines 21-26, Page 10)

As noted by the participants, Universities play an important role as leaders in teaching and learning, education, research, and technology development and transfer (Bozic & Dunlap, 2013). In teaching activities, universities provide the professional training, as well as the education necessary for the development of knowledge, skills, and experts that later scale the coordination of engagement programs in different communities. Lecturers at Ndejje University noted that new learning paradigms including interactive learning, the incorporation of climate change knowledge and the use of participatory methodologies are lately being introduced and adopted by Ndejje University to prepare their students for engagement programs on climate change action. These have started to show early signs of capacity transformation and laying strong grounds for community engagement programs (Kalule et al., 2016).

To be adequately capable in light of contemporary societal sustainability challenges, Africa needs to improve its development processes and adopt an innovative spirit. African universities have the capacity, knowledge, and research necessary to help achieve these goals. In order to be more relevant in climate change action, rural universities like Ndejje University administration may influence more community engagement programs in the wider developmental space. Sheil et al (2016) congruently propose that Universities should ensure that skilled and adequate technical and human resources are developed to guarantee that the right collaborative learning skills and enabling platforms are developed. Additionally, a continuous dialogue with community stakeholders and government (local and national) is also crucial to feed the investment in projects aimed at capacity building between HEIs and the community.

4.3.3.2 Planning of engagement programs and activities

Analysed data revealed that the planning of engagement programs is the function of university management that involves setting objectives and determining a course of action for achieving specific community engagement objectives. This involves establishing an organizational structure and allocating human resources to ensure the accomplishment of engagement objectives. Planning is the fundamental management function, which involves deciding beforehand, what is to be done, when is it to be done, how it is to be done, and who is going to do it. It is an intellectual process that lays down the university's engagement objectives and develops various courses of action, by which the institution can achieve those objectives. The university staff and students opined that the university management has an up-bottom approach to the planning of community engagement programs and also sources for partnerships to ensure smooth coordination and implementation of the climate action-oriented engagement programs. This was expressed in;

what happens is that the development is done at the University. After, they will come and inform me and then as a committee, we mobilize the communities and I'm citing one example of the Germans who came to train my community members. So, challenges still exist in the way it only flows from the top to down, which is unfortunate because we would want also to present our ideas, there is nothing as you had said, nothing like a memorandum of understanding or a specific structure that is followed, in my opinion. (NDJ, CL2, lines 10-16, Page 5)

When we are doing the planning, we engage with them afterward. We don't actually invite the whole community. We set up a plan and go and talk with the local council chairmen, or maybe the one in charge of women. So, we organize with them and make a program. Then, when we are doing the activity, they come in to engage. (NDJ, US3, lines 27-30, Page 2)

As noted by the participants, through the planning process, an institution not only gets insights into future engagement programs but also helps the institution to

shape how engagement programs may be developed and implemented. In the planning phase of the engagement programs, the university management thinks about how it can build the institution's readiness to engage the communities. Major issues like the climate emergency and related impacts on local communities are challenging with the need for a well-thought-out plan for a transformative response.

As indicated by the university staff and community leader, it is thus vital to develop a robust action plan for community engagement that harnesses stakeholder involvement. With the right action plan in place, it makes it smooth for institutions to connect with the community on an appropriate level to enhance climate change action. Congruently, institutional plans ought to convey engagement program priorities. The planning process at the institutional level typically guides the planning and prioritization that occurs within the university engagement units. This planning is critical if higher education institutions are to achieve synergies not only throughout the institution but also within and across the communities (Kaplan & Norton, 2006).

4.3.3.3 Formulation of Guiding Frameworks for Engagement

The university staff and students noted that for the university to develop engagement programs, the management benchmarks on the existing university strategic plans, a particular set of rules, ideas, or beliefs that guide and decide what to do. NDU ventures in proposing institutional frameworks and regulatory instruments needed to ensure that there is compliance with environmentally sustainable activities and practices. The university staff revealed that urban authorities and central government agencies are called upon to give requisite support to encourage communities and private sector agencies to engage meaningfully in environmentally sustainable activities. It was further noted that another core element of developing engagement programs was the

signing of engagement agreements with collaborating partners. These included memoranda of understanding, that are essential for defining how engagement programs will work, clearly setting each party's expectations, and ensuring mutual understanding of collaborations.

I think we have a mandate as a university to engage communities like local communities, organizations, civil society, and other external stakeholders. For example, in our strategic plans, we have a strong concern about the community. (NDJ, US3, lines 3-4, Page 2)

We have a well-established office for fieldwork coordinator, then assisted by the community engagement coordinator, and then you find that we are using the community liaison people who always meet on some discussions on how to make it, on previous exercises, like that. You know, what is supposed to be done by the university, because without these engagement activities by the university, it would be incomplete, because some have looked at universities as towers of knowledge and that knowledge might be useful in solving the problems within the community. But we also have it as mandate and strategy, the development, like how is it developed and at what level. (NDJ, US1, lines 11-17, Page 2)

The university staff reports that the development of engagement programs is anchored on the university's strategic plan. NDU engages in socio-economic incentives that are extended to communities and local entrepreneurs who engage in environmentally sound practices. Thus, NDU follows the university structures and sets guidelines to partner with relevant local, regional, and international agencies to develop a comprehensive framework for developing engagement programs at the university. Such frameworks provide a guide to establishing a realistic basis for the comprehensive advancement of climate change-oriented programs by the university management, staff, and students. Notably, besides the strategic plans, the university staff indicated that there are other set rules like signing the memorandum of understanding with engagement partners. It was noted that;

But we have initiated efforts in terms of research and engagement and we are developing memoranda, after going through this review

and university charter, which is also reviewed after 5 years, we shall effectively engage the community. (NDJ, US2, lines 24-27, Page 3)

we are engaging more in the memorandum of understanding while developing these engagement programs. Because of course, we are currently in the process of making a memorandum of understanding with the Uganda National Apiculture Association. Because we want to go really into beekeeping, we have our local forests. There is also a Memorandum of Understanding which we are going to make with Egerton University, we've started on it. With KCCA (Kampala City Council Authority), there was one for that activity which we did with them. And we are pursuing another one with the organization that makes tissue culture bananas. (NDJ, US3, lines 14-20, Page 4)

While the university staff indicated that there are set rules for engagements like the signing of MoUs, this is always barely done especially with local community leadership where engagement planning is unidirectional. This contravenes what Wendling and Evans (2023) posit that it is crucial for leadership in planning to operationalize the re-envisioned image and identity of a campus in ways that are interpretable not only by senior leaders but also by faculty, staff, students, and the external community following specific set plans and guideline. This could ably guide the university staff and students as well as community members explicitly know the procedures and guidelines for community engagement programs.

Clearly, substantive strategic-planning efforts demand reconsidering how the campus' existing identity and image may be concretely re-envisioned in future-oriented, aspirational terms and include articulated standards for interpreting and assessing the stated goals to advance organizational change (Balaji et al., 2016). When it comes to strategically changing their approach to community engagement, institutions must reflect on how organizations change and how their strategic planning efforts will convey the realignment of community-based priorities. Organizational plans, alongside mission and vision statements, convey priorities and identities, as well as short- and long-term goals and objectives at the campus level (Kezar, 2018).

4.3.4 Coordination of Engagement Programs at Ndejje University.

The university staff and students at Ndejje University elaborately expressed how the university organizes and ensures the smooth running of community engagement programs towards climate change action. Coordination allows a unified and harmonious workforce of different university staff and students to engage with local communities to work toward climate change knowledge, mitigation, and adaptation. Coordination also allows for the more beneficial and efficient allocation of resources at the university and communities, which can reduce conflict and redundancies between individuals or university departments. Therefore, the management of the university endeavours to achieve optimum coordination through its basic functions of planning, organizing, staffing, directing, and controlling engagement programs towards climate change action. From the participants' responses, it was indicated that the coordination of community engagement programs at Ndejje University is largely done through the guidance of university structure and strategic plans and through partnerships with other external stakeholders. This is deliberated below.

4.3.4.1 Guidance of university structures and plans

It was noted by the participants that the coordination of community engagement programs is done under the guidance of the existing structures and strategic plans of the university. Some of the university staff noted that there are focal persons within the university structures that fix the time and manner in which the various engagement programs geared toward climate change action are performed in the institution. It was further revealed that the focal persons in relevant offices integrate, unify, and synchronize the efforts of different departments in the university to provide unity of action for pursuing climate-smart goals within the university and local communities. The university staff indicated that all the coordination of community engagement

programs is done under the guidance of the university's current strategic plan for 2017-2027. This was expressed in;

You're aware that the University is an academic institution, they have for example the Department of Environment and Forestry, which is headed by the dean. They are supposed to work with the Department of Outreach and Extension. So now, I think the Department of Environment and Forestry go to the extension office for instance about tree planting and contact the community leaders. (NDJ, CL3, lines 3-7, Page 6)

We have always had some engagements and these were being coordinated by our former faculty Dean, Madame Maria Mbatudde, she's the one who was coordinating it. And, of course, we would write proposals that some of our groups went through, and some of us never went through though and we would ensure they go through rightful procedures. (FGD NDJ, PJ, line 7-10, Page 8)

Then the engagement proposal is taken to the faculty Dean, the faculty, Dean will then pass them on to the top administration for say, funding. Then, of course, from the top administration, the financial system comes back down to the faculty Dean, then back to the student body, which is the agricultural association and then implementation is done by the university staff or students. A good example is the likes of a greenhouse, which was initiated by the students. However, of course, funding comes from the administration to the dean, then management is taken care of by the students and that is how the management of engagements is. (FGD NDJ, PD, line 24-27 Page 8)

In the quotations above, participants highlight examples of university structures and processes through which engagement programs are coordinated at Ndejje University. They mentioned that through different offices like the office of the dean, finance, and other administration offices who endorse and fund some engagement programs at the university. It is clear therefore that the existence of various structures within an institution can be very helpful in the implementation of community engagement programs. For colleges and universities seeking to adopt an identity as an engaged institution, such efforts need to be strategically woven into future-oriented campus-level planning and assessment. As noted by Wendling and Evans (2023), the establishment of a campus-wide strategic plan that positions community engagement

as both a singular, identifiable goal and an integrated strategy throughout all planning efforts is essential for coordinating university community engagement programs at higher education institutions. While this is true, metrics to assess community engagement efforts are crucial to ensure its sustainability and importance to the institution.

4.3.4.2 Coordination through Partnerships

As the oldest private University in Uganda, it was noted that Ndejje University partners with different organizations and the Government of Uganda, mainly through the line Ministries and other autonomous/semi-autonomous agencies to coordinate engagement programs on climate change. For example, the university through its faculties and departments, collaborates with the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Research and Education Network of Uganda, Research Education Network Uganda – RENU, and Norwegian Petroleum Academy among others. The university through these partners reaches out to different communities with different sustainable development agendas, with climate action inclusive.

Another notable example from the participants' responses was the collaboration between Ndejje University and Fair Ventures Uganda, on 3rd March 2023, where 1500 trees were planted while commemorating International Forests Day at Kiyanda in Luweero district. The day was established by the United Nations in 2012 to raise awareness about the importance of forests and the role they play in sustainable development. The partnerships are also with community leaders who are key in mobilization of community members. To achieve this, some of the university staff and students noted that the university reaches out to the local community through students'

leadership and local community leadership to provide unity of action in the pursuit of common goals climate action, and smart communities. This was expressed in;

we have so many stakeholders, we have community leaders, local leaders one, two, and three, we have civil servants who participate in some activities like community development officers, governmental officers, agricultural and environmental officers, and those are civil servants. Then, sometimes we find that we have NGOs that work directly in certain faculties in certain periods, as I have told you from June to July. (NDJ, US1, lines 24-28, Page 2)

But otherwise, we've engaged with the Bukalasa Agricultural College, that one which brings out diploma graduates. We've engaged with the KCCA on matters of waste management and we are at the advanced stages of Involving ourselves with Egerton University on research. We even went there. A group went there to visit. (NDJ, US3, line 14-17, Page 2)

I believe they coordinate with area local councils, mobilize the community members so that they can meet these students and meet on a certain activity or program. (NDJ, CL3, line 9-10, Page 4) ...Secondly, as I told you earlier, Ndejje University has a briquettes factory. So, those briquettes like I told you are got from maize cobs. So, what happens, the University through the environmental department, sends some people to the community, to encourage them to grow maize and cassava, because the products to make those briquettes are majorly derived from those two crops. And once they do that, after harvesting, come and sell those maize cobs to the university. And then they make briquettes. I'm sure that is a very good way of saving the environment because it takes our people from charcoal and cutting down trees. (NDJ, CL3, line 20-26, Page 6)

The above responses reveal that the university in partnerships can play a key role in enabling individuals to chart pathways for coordinating engagement programs on climate change action. While higher education institutions work to align internally, they also must work with external partners to align externally to manage engagement programs. The participants talk of participants' partnerships with local community leaders who are very vital in mobilization of community members, sensitization, and giving platforms for engagement. To ensure the credibility of partnerships, the University signs a Memorandum of Understanding (MOU) for collaboration with

Kirchner Solar Group in Germany in the area of student field trips, industrial training attachments, and the development of renewable energy in Uganda; Glasgow Caledonian University and KHT Royal Institute of Technology, Sweden, for a grant agreement for Uganda Doctoral and Research Technical Support; RUFORUM (Regional University Forum) for capacity-building in Agriculture and Science. Thus, participants argued that efforts to solve problems in society require new approaches to knowledge generation and sharing, generally described within the context of partnerships, collaboration, exchange of knowledge, and co-creation of solutions.

Similar findings have intensified calls for knowledge-based institutions such as universities to act as catalysts for partnerships on social innovation within regional contexts highlighting the importance of equity and inclusion, flexible program design and an institutional culture that supports engagement programs on environmental sustainability (Groulx et al, 2021). However, Cooper and Orrell (2016) advise that while establishing university community partnerships, universities should be aware of possible scepticism due to perceived exploitation and lack of power. The authors argue that Poor communities and community organisations subsist on short-term, one-off grants and often feel exploited and marginalised because of their perceived lack of power over that of universities seeking partnerships. This can however be addressed if there is enough inclusion and sensitisation of community members and anchoring the engagement programs on the values of Ubuntu which are close to many African communities.

4.3.5 Cross Case Analysis

Common key findings with respect to the development and coordination of engagement programs at the case universities.

Participants at both universities reported that their institutions develop engagement programs by ensuring capacity building to their staff, students and through providing strategic support to enable the formulation of the engagement programs. In the development of the engagement programs, both universities offer their students and staff knowledge and skills to particularly engage community members on climate change sensitization, mitigation and adaptation. Participants from both universities noted that they streamlined and supported teaching and research on climate change to enable the formation of a consortium of experts to deal with climate change engagement programs. Additionally, both participants reported that they conduct thorough planning of engagement programs and activities in which they have established funding and external partners that support the development of engagement programs with an up-bottom planning approach. Through this planning, participants reported that both institutions formulate guiding frameworks and guidelines for the advancement of engagement programs. These frameworks provide benchmarks of strategic plans and action plans that ultimately guide the development of engagement programs at the case universities.

Regarding the coordination of engagement programs, participants at both institutions reported that they are guided by the existing institutional structures and plans to manage and implement engagement activities on climate change. They noted that as it is in the development of engagement activities, university strategic plans and structures too offer guidance on how the coordination of engagement programs should be implemented at the case universities. The guidance at both universities includes focal

offices and officers responsible for coordinating engagement programs, established procedures, specific strategic plans with targeted engagement objectives.

Furthermore, participants from both cases reported similar means of coordination, through partnerships. Participants from Makerere University reported that the university partners with numerous external stakeholders on different local climate change adaptation initiatives that aim at helping communities to deal with the effects of climate change. Students and staff at Makerere University noted that they effectively manage engagement programs, the partner with government agencies and line ministries, NGOs, civil society, local government leadership, and students' associations, among others. Similarly, the students and university staff at Ndejje University reported that their coordination too is through partnerships with external and internal stakeholders like local community leaderships, students' associations, and NGOs among others.

Divergent key findings with respect to the development and coordination of engagement programs at the case universities.

However, a unique finding at Makerere University was that the availability of a climate change centre that is involved in various community sensitisation activities including; organising events for action on research findings, carrying out community outreaches to raise awareness, holding climate change and environmental festivals, and engaging students in community work as part of their fieldwork. This key finding is unique to Makerere University. On the other hand, Ndejje University is yet to have a specific centre to assist in coordinating climate change related engagement programs. Rather, the university uses the existing institutional structures. For instance, participants reported that coordination of engagement programs on climate change is coordinated

through focal persons like the the dean's office, faculty of environment and agricultural science, dean's office, art and social sciences, and internship offices among others.

4.3.6 Synthesis

In this subsection, I have presented and discussed how engagement programs regarding climate change are developed and coordinated at the two cases of Ndejje and Makerere Universities. These programs have been presented through two major themes; development of engagement programs on climate change action and coordination of engagement programs regarding climate change action. It has been indicated that the case studies make efforts to promote UCE by providing systematic capacity building to staff and students in the areas of community engagement, climate change action and mutual learning to value local community knowledge as the basis on which new knowledge is developed is challenging for students and faculty. This enables the university staff, under the guidance of existing strategic plans, structures, and policies to ably plan and develop a wide range of engagement programs with external communities to mitigate and adapt to climate change impacts.

The university staff, management, students and external community partners play an important role in the coordination of the developed engagement programs on climate change action at the two cases. Likewise, the coordination of engagement programs at the two cases is done under the guidance of university strategic and action plans in partnership with internal and external stakeholders. This coordination allows the university and community workforce to work towards a common goal especially when enough capacity and enough planning are utilised. Ultimately, this can possibly allow more beneficial and efficient allocation of resources to climate change engagement

programs in higher education institutions, which can reduce conflicts and redundancies between university staff, students, or faculties.

4.4 Major Constraints in the University-Community Collaborations in the Efforts to Address Climate Change

This objective sought to solicit participants' views on challenges faced by the case universities in their efforts to collaborate and engage communities towards climate change knowledge, mitigation, and adaptation. Participants at the two cases revealed various constraints that can hinder the effectiveness of university-community collaborations in addressing climate change. I first present findings from case one (Makerere University) and later on case two (Ndejje University). This presentation and analysis are proceeded by a cross-case analysis that involves the in-depth exploration of similarities and differences across cases and a synthesis of findings on this objective.

4.4.1 Enemies of engagement programs on climate change action at Makerere University

Makerere University faces challenges as it implements its community engagement programs on climate change action. I was interested in exploring experiences, perceptions and views of participants on the key challenges that affect the university in planning, coordinating and implementing university community engagement programs that address issues of climate change. This theme covers the critical challenges that were identified by participants and these have been categorised into five: institutional constraints, resource related barriers, COVID-19 and its impacts, myth and misconceptions about climate change, and policy gaps. These are presented, interpreted and discussed below.

Table 4.7: Enemies of engagement programs on climate change action at Makerere University

Enemies of engagement programs on climate change action	<div>Institutional constraints</div> <ul style="list-style-type: none"> • Unreciprocated engagements and lack of community representation • high bureaucracy in engagement program implementation • Unbalanced focus on the three university missions • Absence of clear communication channels <div>Resource related barriers</div> <ul style="list-style-type: none"> • Inadequate funding for climate change engagement programs • Insufficient expert human resource and capacity • Limited incentives to facilitate mobilisation • Time constraints <div>COVID-19 and its impacts</div> <ul style="list-style-type: none"> • Impact of COVID on funding of engagement programs • Impact of COVID-19 on engagement programs • COVID-19 aggravating already existing CC challenges <div>Myths and misconstructions about climate change</div> <ul style="list-style-type: none"> • Language and cultural barriers • Negative attitudes and biases towards sensitization programs • Cultural resistance from some communities • Diverse fallacies on climate change in communities • Ignorance of engagement strategies <div>Policy gaps</div> <ul style="list-style-type: none"> • Political interferences by the government on community Activism • Turning engagement programs into sources of income • Misplaced attention for policymakers • Inclusion constraints
--	--

4.4.1.1 Institutional constraints to engagement programs

This category of challenges arises from institutional failures and weaknesses that hamper the success of climate change interventions in the university. These are constraints to engagement programmes that are within the control of the institution as a whole although they are often difficult to deal with since the institution is larger than the programmes it offers. The university staff, students and community leaders argued that these institutional constraints can significantly impact the success and sustainability of university-community engagement efforts. These constraints often arise from within the university's organizational structure, policies, and practices. Particularly, the university staff noted high bureaucracies in securing funds for engagement programs with enormous focus on academic programs than engagement programs, coordination challenges due to fragmented approaches among others.

Although it's now starting to be streamlined, where you find that there is limited coordination in the sector; you might find a study being done by three different people in three different areas. And that it's to me, it's a waste of resources, that the consortium would have worked together. If you come together, and you address the problem in a cohesive way, but bringing the different players on the same table to address these. So, I would say a fragmented approach. Reason being that you know, there's a lot of money in climate change. Everyone seems to be putting money into climate change. But the more we put in money without coordination means that we are going to waste more money. And so that element I think, is also a big challenge. (MAK, US1, lines 1-9, page 7)

The university staff further noted that there is still a lot to do with the local context in terms of the existing knowledge, and experiences. One staff member noted that the challenge is that in a university environment, they are still in a situation where the institution does not present them as collaborators with the communities but rather presents them as authorities, knowledge creators, and so on and so forth, rather than having a relationship that is two-way. He argued that the institution ought to think about

having two-way mechanisms through which members can engage communities so that they also learn from the communities and be responsible for what they do. This was supported by other participants from the university and community leadership who stated that:

I think, whereas the universities have that mandate of community engagement like we called it, in essence, it has been a more or less a traditional paradigm of a one-directional engagement arrangement whereby it's top-down whereby it's universal assumption that they know everything and speak to communities and will come with knowledge and there is less intentional learning from communities, and especially when it comes to climate change, climate change is really contextual, especially when we talk about climate change adaptation, there's a lot of contexts to deal with. (MAK, US3, lines 7-13, Page 5)

Because the local people out there somehow feel a bit detached from these universities. They think this is where people have been very much educated and for them, they have nothing to do with the university. So, you find that even when public lectures or exhibitions are organized, you find it's the educated from the community who have a lot of interest. So, I just don't know how these engagements are going to reach the common person, the illiterate person, the local farmer, or a local peasant. (MAK, US5, lines 1-4, Page 5)

I also want to note that even at the management, as committees in the university, we don't have representatives. So, the decisions they make, they make on their own without having local community participation so that our voices can be heard. They have been our neighbours, actually for a very long time, so we should live on with neighbors through collaborations, which is currently not enough and very, very low. (MAK, CL1, lines 3-8, Page 2)

Notably, the participants highlight the absence of meaningful direct engagement platforms with local communities, unreciprocated engagements and lack of community representation in the development and coordination of engagement programs at the university. This accentuates the noted absence of clear communication channels between the university and local neighbouring community leaders regarding different engagement opportunities on climate change action.

Despite the decry of limited involvement of community leaders in the planning and development of engagement programs at the university, one of the community leaders reported about bureaucracy. He reported that in case of any intention to engage the university on any particular issue, they pass through a lot of prolonged procedures without well-known specific officers to go to. One university staff reported that Makerere has been supportive but “sometimes, they delay because of the bureaucracies of obtaining funds, you apply for money, then it has to go through the long process” (MAK, US2, lines 25-26, Page 10). A community leader recommended that “there ought to be straightforward engagement, without passing through many procedures that not only take a lot of time but also disable engagement completely” (MAK, CL2, lines 3-4, Page 6).

The other serious challenge that was pointed out by the participants is the university’s unbalanced focus on its three missions (teaching, research, and community engagement). Some university staff and community leaders reported that the university’s biggest share of focus is on the teaching and research with minimal focus on community engagement. This translates to limited intersectionality of different engagement stakeholders in climate change action.

As I told you, they focus so much on students and academic programs. So, engagement programs are not given good attention. And I'm sure effective engagement programs and activities would be of great impact on the community if they were given equal attention and also the environment at large. So, I will say that there is a gap between the community and the university in terms of engagement. (MAK, CL2, line 11-15, Page 5)

you see, as a university, you generate knowledge, you generate a science. But there is limited capacity, on how you influence that science, or that knowledge to be implemented. We can publish in papers, we can publish our dissertations. But then who takes that information and translates it? So, the interface between the policymakers, the technocrats in the local government who are

actually involved in implementing policies and action plans, how they are tapping into this knowledge to integrate it, we're still miles apart. The knowledge is there. But integrating it into the actions is something that I see as a problem (MAK, US1, lines 18-24, page 7).

the reason is that currently the university management or the people who are in charge of the university focus so much on academics. I think they believe that the university is all about imparting knowledge to the learners. nothing more. So, on the side of the community, I think very little is being done. I can authentically express that as a leader, I am not seeing enough to my satisfaction. (MAK, CL2, lines 25-29, Page 1)

As indicated by the participants, the institutional constraints highlight the limitations and barriers that the university faces when implementing engagement programs on climate change action within and outside university communities. The participants illustrate the challenge of inadequate representation of diverse community voices in decision-making processes which has the potential to lead to initiatives that do not fully address the climate change needs and concerns of the community. This clearly denotes unfulfilled engagement as a central aspect of the mission.

As indicated, bureaucratic procedures may impede the agility required for effective engagement initiatives by both the university staff and community members. Complex decision-making processes or hierarchical structures could be responsible for delays in implementing engagement programs by both the university staff and students. While Makerere University, as an African university, is making strides in aligning community engagement with existing university structures and functions, participants' revelations underscore the ineffectiveness of efforts towards engagement initiatives and the institution's ability to fully connect with its stakeholders to address climate change.

According to Swanson and Schlutt (2015), an explicit proactive effort to align an institutional structure with the broader African institutional mission ought to focus on different contexts to be able to address contextualised environmental challenges (like

climate change). To address global challenges like climate change, African universities need to work with local communities both in the planning and implementation of university-community engagement programs. This is remarkably consistent with the definition and conceptual framework of the Ubuntu values in that they advocate for engaged scholarship, interdependence, and private and public partnerships to advance the power of working together towards a common community goal, moving away from an expert service delivery mode to one that is demand-driven, creating a culture that reinforces reciprocity and integrating more fully with community partners.

4.4.1.2 Resource-related barriers

In this category, participants cited inadequate funding for research, the high cost of training amidst high levels of poverty, and poor delivery of training due to inadequate resources and facilities. The university staff and students argued that limited budgets can restrict the allocation of funds for engagement programs, limiting the institution's ability to implement comprehensive engagement programs on climate change action with the communities. Despite being a government-funded university, some of the university staff revealed that government funding has so many pressing allocations like in teaching, research, and salaries among others thus engagement programs usually receive inadequate funding. Some university staff decried the lack of adequate government funding and grants in most African universities including Makerere University. To this, they noted that:

Then the other issue that is still another biggest issue is the funding. We for instance came up with a project. And our issue was to hold regional activities. And that project was entailing to increase knowledge of climate change and weather usage in our day-to-day lives. We try to work with the Uganda National Metallurgical Authority, but this is an authority that is meant to issue the information to the general public. Because their structure is not well established, we created dissemination structures, but the funding we're receiving

was not enough to which each and every region of this country to share those platforms that have been created to receive such information. We tried to get some funding from the Red Cross Weather Climate Center. But still, the funding is not always enough. (MAK, US4, line s16-24, Page 7)

Another constraint would be of course, finances, not poverty, I've said poverty on behalf of the masses, but finances when it comes to the university, all these engagements have to be funded. If it is climate change related research, it has to be funded. And research is very expensive. And even dissemination and publication are not easy things, you find that you have to pay money to publish. But if those constraints continue, you'll find that many Students may not be able to undertake climate change research because they're very expensive. So, there is a lack of funding for research in that area. (MAK, US5, line 11-17, Page 6)

Resources are very limited. Now, for instance, funds may be part of the resources but like maybe you want to do an innovation or you have an idea in the head to promote climate change. But you don't have any resources, you don't have any sponsor, you don't have anything like, you don't even have the tools to begin with. Maybe I want to go let me say Buikwe, you need to do some research. So, resources are very limited. (FGD MAK, PF, lines 20-25, Page 14), Then also mobilization, like mobilizing people to take part in those activities is very hard, university students and even community members ask for facilitation, lunch, and breakfast, and they always ask. So, mobilizing people becomes really hard. (FGD MAK, PF, lines 26-29, Page 14)

The participants further highlighted the challenge of insufficient staff or expertise dedicated to engagement activities on climate change action in African contextualised communities which ultimately hinder program development, implementation, and maintenance. It was surprising to discover that, despite Makerere University being number one in the rankings of universities in Uganda, it is still faced with a lack of enough expert human resources to fully engage communities on climate change. To this, one university staff attributed it to the contemporary nature of the phenomenon and the lack of enough climate financing in most African contexts. This was noted in:

of course, come as a result of limited resources because sometimes we want to do a certain engagement but because of limited resources,

it becomes hard. And when I talk of limited resources, I do not mean only money, I am talking about other resources. Okay. it could be human resources because human resources we lack, for instance, enough experts in some of these fields. (MAK, CL3, lines 3-7, Page 5)

We have had limited members with interest to take part in this. Human Resource. This may be human resource. We have had a failure of implementation of our recommendations and this has made us lose interest. Yes, whenever we recommend, people don't put our recommendations in place. (MAK, US6, lines 13-17, Page 10)

Participants' revelations could be attributed to a lack enough incentives provided by the university and government to individuals who dedicate ample time and other resources to community engagement. A participant noted that:

Now, whereas universities are expected to do community outreach, in essence, the incentive regimes do not promote that. In universities, you hardly have any incentive, for example, promotion because you've been doing community engagement, at least for Makerere University. The incentive regimes are in such a way that someone in a university is going to be promoted because of how many publications he/she has written to fellow scientists, but it's largely not about how much community impact they have. I don't see I don't know where that is anywhere in the universities in Uganda. (MAK, US3, lines 17-25, Page 6)

Relatedly, the other challenge noted by the participants having limited time for engagement programs. Some of the university staff revealed they are given tight and fixed programs within the first missions of the university (teaching and research) which limits the time, effort and focus on engagement activities. It was argued that limited time for engagement programs limits commitment and dedication to engagement programs. This means that if the responsible people are not committed to engagement efforts, it can undermine the success of the engagement programs and activities. Regarding the challenge of limited time for student research, one of the participants noted:

In terms of if you are teaching and marking all the time, you can never get work time for research and engagement programs. Engagement programs need time, sometimes it takes you away from family responsibilities. And that has to be considered but also for us

as women scholars, we want support from a gender perspective, we want convenient time, work times can use flexibility. If you are scheduling me for teaching, you have to ask me if the time is compatible, you don't put me at six or 7am when I'm supposed to drop my child school, I'm not going to teach someone's child and mine does not go to school. Engagement programs actually need more time than teaching, so it is a complex situation (MAK, US2, lines 13-19, Page 13)

most of the constraints, people not committing time, but I've learned from that and I mitigated the constraint. Sometimes you work with people, and at the end of the day, they are too busy with other things, they have excuses rather than deliverables. So you find that you are working alone, that makes you know, overwork, or even not produce results in time, you don't become efficient. (MAK, US2, lines 15-19, Page 10)

The participant notes that inadequate funding, time, and human resources hamper progress and timely implementation of engagement programs on climate change in different African communities. The lack of enough time by university staff could be due to a heavy workload since they have to engage in teaching, research, and community outreaches. However, as mentioned by the participants, the remuneration for academic staff is still low and they have to do additional private work to make ends meet. This situation compromises the quality of teaching and research since the volume of work to be done is huge compared to the available time.

Participants' revelations denote that in Africa, most universities, not only in Makerere, the engagement programs are not entirely funded by institutions which significantly hinders efforts toward community engagement. This most often forces (especially) the university staff to spend a lot of time writing proposals, submitting them everywhere, and who can fund, which at times frustrates the staff's initiatives and innovations to engage communities. Rather, the university staff and some students depend on the interest of donors who usually provide funding for specific aspects based

on the political and national interests of their home countries that do not align well with African contextualised approaches and values.

Ampaire et al, (2017) have noted that NGOs, and civil society representatives in different Ugandan contexts have attested that they did not have sufficient skills and other related resources to enable long-term planning in climate change adaptation and mitigation. Resultantly, Inadequate technical capacity coupled with low integration of research evidence leads to, what is perceived as, poor strategic planning and ineffective policies. Particularly, there is limited knowledge and practice regarding spatial modelling, socio-economic scenario mapping of current and future climate variability, and economic valuation of the benefits of adaptation and sustainable natural resource management, which limits the development and implementation of appropriate adaptation and mitigation technologies by numerous institutions, organisations and even governments in most African communities.

4.4.1.3 COVID-19 and its impacts

This category relates to how the COVID-19 pandemic has had significant impacts on university-community engagement at Makerere University. The university staff and students noted that the pandemic has shifted university budget priorities, diverting attention and resources from other community-focused engagement initiatives. This has had implications for ongoing projects aimed at engaging communities to address local needs like climate change action. Some community leaders echoed that social distancing measures and lockdowns restricted traditional face-to-face interactions, affecting community service initiatives, interruption of engagement programs that were in progress, student volunteer programs, and outreach

activities that are crucial components of university-community engagement and climate change knowledge dissemination. Some university staff noted that:

of course, we know that during that time, visiting the communities was very difficult. And doing fieldwork, and of course, some activities stalled. For example, I lost a whole year of a project that was supposed to do knowledge co-creation activities in Kiboga, of course, this becomes more problematic because of connectivity, where people were doing online engagement at a global level, but connecting the university to the community was very difficult because of the limitations that surrounded. (MAK, US3, lines 9-14, Page 6)

it was really a big impact because by the time the pandemic took place, there was a project that was running. We had received the first quarter of money and that project entailed seven districts where we had districts in West Nile, Northern Uganda, and Eastern Uganda, and we were supposed to reach out to those communities. Actually, by the time COVID came in, that project was supposed to increase awareness of what could be the impact of tree cutting and then increase the tree population in different districts. (MAK, US4, lines 14-20, Page 8)

It was funded externally from an international organization and partly from the world bank but when we went into COVID and after COVID I should say the funding was cut off and we need to cut out any activity in that line. So even the tree seedlings that we got, we had given them to the communities. I personally have been trying to do a call, follow up on those from those different stakeholders, the contact persons that we had in those different districts and you find that they had served out a few seedlings yet even them but most of the people are never taking it seriously and do not do what they are supposed to do. (MAK, US4, line 19-26, Page 8)

The participants cited COVID-19 and its impacts as an existing impediment to engagement programs at the university. As noted, the pandemic has had serious impacts on budget priorities with already funded projects having their funding cut. Notably, the university depends on in-person events such as seminars, workshops, and community outreach programs to engage with local communities on climate change issues. The pandemic forced the cancellation or postponement of these events and funding of existing projects, disrupting the flow of engagement activities with community members. Many university community engagement programs involve fieldwork and

research activities conducted in collaboration with local communities. The pandemic restrictions, including travel limitations and safety concerns that exist up to today, have hindered fieldwork opportunities, delayed research projects, and limited direct engagement with communities.

The participants further reported that the pandemic aggravated already existing climate change challenges like limited poverty, environmental degradation, and limited financing among others and this has called for double effort and funding from African universities in order to be able to have meaningful, impactful, and effective engagement programs on climate change action. To this, one university staff noted that:

I don't know how to talk about that. I mean, COVID-19 Yes, did affect me, All sectors, all sectors of the economy, what I would possibly say is that COVID, possibly aggravated the already existing challenges to deal with climate change. For instance, when it comes to financing, the new areas emerged for financial support, meaning that there was less money available for programs that were meant to support, climate change mitigation. So, I wouldn't say that it created that COVID-19 could have created a new challenge. But I would say it aggravated the existing challenges within the institution, but also within the nation (MAK, US1, lines 21-26, page 8).

definitely COVID-19 had a very big negative impact on climate change-related activities. So, if there's any engagement when on climate change that had to be carried out during the peak of the pandemic, that was not possible to be done. There was little interest in engagement programs, and actually, in such dire times, people are thinking about survival, they think climate change would not be an existential threat. People are interested in getting food and you even can't tell them about climate change and they have to find what to eat, then, where the next meal will come from. They don't have any issues, cutting down the trees and setting charcoal. So, if I am rating the impact of COVID-19 on given a scale of one to 10, it would be nine. (MAK, US5, lines 25-31, Page 7)

As noted in the above voices, the COVID-19 pandemic has presented African universities with an enormous challenge and has impacts on social, economic, and environmental systems. With many African communities already living in poverty, the

economic impact of the pandemic has affected both universities and the communities they engage with. Funding constraints and financial uncertainties have contributed to a reduction in community outreach programs or partnerships with communities to address climate change issues. The economic downturn resulting from the pandemic has led to budget cuts and funding constraints for universities. This has affected the resources available for community engagement programs, potentially reducing the scope and scale of climate change initiatives.

The Pandemic control measures forced the majority of researchers to stop or amend their planned CEI activities. Most face-to-face community engagement activities were replaced with remote methods, such as online communication (Kroese et al, 2021). Virtual engagement enabled university staff and students to maintain already established relationships with community members but was less effective when developing new relationships or addressing challenges around climate change and sustainability in most local community groups. However, up to today, the impacts of the pandemic are still glaring with continued diversion of resources and prioritising other key areas like teaching. Du Plooy and Von Moellendorff (2024) posit that community engagement activities in African universities fall in the portfolios of the Deputy Vice-Chancellors responsible for either teaching or research and are therefore still institutionally subsumed under the two missions of higher education institutions.

The impacts of the pandemic have not only re-shape communities' and universities' priorities but also intensified anthropogenic impacts of climate change. Increasing anthropogenic influence on the natural environment over many centuries during the pandemic has intensified drivers of climate change. For instance, the global economic consequences of COVID-19 have been dramatic with many increased cases

of poverty (Clenert et al, 2020; Summer et al, 2020)). In 2020, the International Monetary Fund (2020a) predicted that global GDP would contract by 4.9% in 2020 globally, far greater than during the 2008–2009 Global Financial Crisis. The COVID-19 pandemic impacts continue to challenge the world's economic and environment systems and justify the need for interdependencies and collaborations anchored on African Ubuntu values (Barouki et al, 2021).

4.4.1.4 Myth and misconstructions about climate change

Participants reported that engagement programs are also hampered by numerous myths and misconceptions that local communities have about climate change. The university staff noted that while Climate change is a complex and scientifically well-established phenomenon, various myths and misapprehensions exist in some sectors and communities that derail their outreach efforts towards climate change knowledge, mitigation, and adaptation. Participants argued that these misconceptions underpin negative attitudes, biases, and cultural resistance from some communities towards engagement programs. It was also noted that different communities have different fallacies on climate change where some community members believe that climate change is a conspiracy or a hoax created for political or economic reasons. These were expressed in:

when you look at issues of climate change, climate change is an issue that is multi-sectoral. There are so many players. Now, the more players you get in a sector, the more complex the issue becomes, because the people in the transport sector think they should have a bigger say, and the people in the environmental sector think they should overtake, then the ones in agriculture. So, when you have multiple sectors involved, it becomes very complex, because you have to bring all of them on board, you cannot just bring environmentalists and you live out of culturalism (MAK, US1, lines 21-17, page 6).

But at the same time, we are dealing with a community that has certain cultural values and trends, the changes that are happening

could be more dramatic, more drastic than what the communities can cope with. For instance, if you come and start telling people to plant maize that is drought-resistant, you still have to consider that you're dealing with communities that are used to planting a certain type of maize. So, it's a cultural issue that you need to carefully navigate, not to push them first. (MAK, US1, lines 10-15, page 7)

We have had uncooperative community members. We have failed to implement some of our activities because the people are uncompetitive and also some community leaders have what they believe in and sometimes become unwelcoming. Similarly, we have also had uneducated leaders who it becomes hard to convince about our programs and activities. (MAK, US6, lines 7-10, Page 10)

Relatedly, some community leaders attributed the misconstructions and misconceptions to communities' ignorance of engagement strategies employed by the university to reach communities. Community leaders in the Makerere-Kikooni community revealed that they are less involved in engagement planning and coordination by the universities which in the end hinders effective participation. They further noted that some university staff perceive themselves as holders of expert knowledge and community members as holders of unconstructive knowledge. They noted that:

We do not have adequate training for our members to do certain initiatives. So in in terms of capacity building, I think we have some gaps, and those are some of the challenges that I am talking about. of course, financial resources also are very key. We know we have proposals, we have initiative, and people have ideas, but we don't have enough knowledge about that phenomenon. (MAK, CL3, lines 7-11, Page 5)

Those students, professors, and doctors in the university are looked at as educated people and for us as illiterate, that is my opinion. I think there is that difference. We are looked at as people who maybe don't have an impact in the community and maybe I think the university does not see the need to engage us, which would actually be the opportunity, if you have people who are not educated, then tap and share their knowledge, but that is not what is done. So, this perception is very bad, it puts a gap between us and the university. (MAK, CL4, lines 28-31, Page 3)

According to these community leaders, there seems to be a misconception that often stems from a lack of awareness about the global nature of climate change and its

impacts on all regions, including Africa. University staff talk of different comprehensions of climate change and competition for knowledge powers which brings a lot of difficulty in harmonizing climate change knowledge dynamics, overwhelmingly creating diverse knowledge about the primary drivers of current climate change trends, mitigation, and adaptation. Due to different cultural and religious beliefs and political ideologies and inclinations, communities are not so receptive to these diverse and unharmonized climate change knowledge varieties. They may not appreciate and adopt such knowledge, which demotivates scientists and experts to undertake more research and innovations on other climate-related solutions.

Machingura and Museka, (2022) have indicated that in some African communities, community members have associated the impacts of climate change with the anger of the divine or African spiritual world and may not give a good reception to engagement programs on climate change mitigation and adaption. The authors noted that some African communities believe that ancestors constitute membership of the living community and their presence is always acknowledged and invoked individual, family, or clan life is threatened with danger. They do it at the expense of disregard for engagement programs and activities on climate change action. Dumenu and Obeng (2016) attribute this to the flux of climate change-related awareness creation and other activities of institutions and non-governmental organizations (NGOs) to sensitize inhabitants of local and regional African contexts on climate change effects and adaptation. This has predisposed the region to information on climate change in different forms.

Addressing these myths and misconceptions is crucial for building a shared understanding of the urgency and seriousness of climate change. This requires raising

awareness, improving education and communication efforts, and promoting an evidence-based understanding of climate change within African communities. It also involves fostering dialogue and collaboration among diverse stakeholders to develop context-specific strategies for knowledge, adaptation, and mitigation.

4.4.1.5 Policy Gaps in environment-related engagement programs

Participants in the study decried shifting government priorities and inconsistent environmental policies at the national, regional, or local levels which disrupts the effectiveness of university-community collaborations. Some university staff noted that communities and universities face uncertainties regarding the stability and support for collaborative projects due to unreliable policies that do not support engagement activities on climate change action in most African communities. They argued that this makes it difficult to plan for long-term collaborative programs on climate change since there is a double-sided implementation of environmental laws in Uganda. Students also decried regulatory hurdles and bureaucratic processes while planning activism activities especially with security authorities despite a connotational obligation to freely conduct activities like climate change activism. They argued that this slows down the establishment and progress of community-engaged initiatives since security authorities at times interpret activism as political movements hence not clearing them. Time-consuming authority-clearing procedures may discourage both universities and communities from engaging in collaborative environmental advocacy projects, as the university and communities perceive the process as overly complicated and time-consuming. This was explained in:

I think it has been the double-sided implementation of our laws. Because if there's a certain rich man in a critically climate-bad area, and nothing happens to them, their house is not demolished. And then a poor man is growing Yams, the arms are slashed. I think that takes

our trust from the public, from all these people come and educate them or tell them about climate change. So, I think if there is fairness in how we address issues of environmental destruction, in terms of making sure that people are brought to book, that can earn the government and other than major players some trust in the public. (MAK, US5, lines 4-10, Page 6)

But it's a common problem in our general society, regardless of the level of one's education, because you find in the end, policymakers think they know this thing better, but when sometimes they don't know anything. So, you battle trying to get funds for certain activities, when you say we need to sponsor a given activity, let's say tree planting, sometimes, our government feels that that is something they don't need to fund themselves. No clear policy on such. So, we only need to get funding for climate change from the international community, not knowing that, even as we eat, it could start with us. And then they happen to give attention to other things and they feel maybe climate change is not something that is to be given attention, even when we look at our media and media houses. (MAK, US4, lines 1-6, Page 7)

Participants particularly cited the absence of clear frameworks and policies that either bid them to collaborate with the university or create a platform for community members to initiate efforts and reach out to universities to develop and coordinate engagement programs on climate change action. They noted that:

There is no specific law, policy or mandate that enables us to engage with the university. Otherwise, we would have approached them but we don't have where to base on to tell them to engage with us. They are in those big offices. So as a community, we don't have a policy basis or a mandate or something that can enable us to engage with the university, if the efforts don't come from the university, it's very hard. (MAK, CL1, lines 17-21, Page 2)

I'm not aware of any policy strategies that have been put in place either by the government or the university so that we can have opportunities to engage with them. As I've already mentioned, there is a gap in my opinion, there is a gap between local communities and universities, in terms of engagement, particularly, according to the study, protecting the environment. (MAK, CL1, lines 25-28, Page 2)

sometimes we have some political interferences. Sometimes you want to do advocacy in different ways. Eg you can peacefully walk, through a demonstration, a peaceful demonstration, or maybe a peaceful strike. Those are some of the strategies that we have that create awareness, but in doing so, we normally have some bit of resistance here and there, because our part is to promote environmental and climate justice. And when we come up to raise

voices sometimes, you know, we are hindered by maybe the States.
(MAK, CL3, lines 13-18, Page 5)

Moreover, some university staff expressed disbelief of policy makers' disregard of institutional policy briefs by university expertise which can be a significant obstacle to the successful implementation and sustainability of such partnerships. Some university staff referred to this as a "Misplaced attention for policymakers" which is derailing collaborative efforts towards environmental protection and sustainability. Another university staff noted that such misplaced attention for policymakers affects inclusion in the fight against climate change and other societal challenges. To this, participants complained that:

But we have frameworks or policy briefs that have been published in newspapers, even submitted to different ministries in line with climate change, and have not been put into action. So, the question would remain; what can be done from the other end of the government? If these policy beliefs have been formulated, then, how can they be put to life? Because usually sometimes funding is good externally and you come up with a policy brief, published in the newspapers or to the ministry. And nothing is done after that. I think if they could learn how to embrace such knowledge that has been generated. (MAK, US4, lines 20-26, Page 9)

And for us as gender experts, what we see is the exclusion of women, when you exclude women, nothing will work. that one is clear knowledge, when you exclude the majority who work, we know that in Africa, women are the most hardworking, especially when it comes to issues of agriculture, of labor, because they're the ones who are laboring in the household. So, if programs are going to exclude women, even climate change will never end. Yet they're the most affected. So for me, the research, people are doing research, climate change, without bringing the gender dimensions, they're wasting their time, their interventions will not work, we have to know; how are women going to be integrated into these innovations, men and different groups, we have to segment these groups, we have to know who is going to do what. (MAK, US2, lines 25-31, Page 9)

Participants' views denote that Universities and communities may encounter difficulties when there is a lack of institutional frameworks or policies that explicitly support and guide collaborative initiatives. Without clear guidelines, both parties may

struggle to define roles, responsibilities, and expectations, leading to confusion and potential conflicts. Wamsler et al, (2023) and Mbah (2019) agree that attention in most African governments has not been paid to actualising existing environmental policies that could enhance community engagement programs on climate change by different institutions and organisations. Authors argue that this has created gaps in the forms of citizen involvement and of policy that can explicitly address these human interactions, inner dimensions of thinking about and acting on climate change, and the underlying social paradigms.

Engagement efforts toward climate change action need substantive supportive policies that guide community members to put a lot of environmental protection measures into practice (Hügel & Davies, 2020). Particularly, in African contexts, government, and civil society ought to enhance policy support for institutional and political mechanisms that support citizen engagement and the systematic consideration of human inner dimensions (values, beliefs, emotions, and associated inner qualities/capacities) across all sectors of work, by systematically revising organizations' vision statements, communication and project management tools, working structures, policies, regulations, human and financial resource allocation, and collaboration; and nature-based solutions and other approaches to support the human-nature connection.

4.4.2 Constraints to engagement programs on climate change action at Ndejje University

This theme presents the multiple realities of participants regarding the challenges that the University of Ndejje University faces in the development and implementation of university community engagement programs related to climate

change education interventions. The theme is categorised into Five: institutional constraints, resource-related barriers, COVID-19 and its impacts, unawareness challenges, and local priorities and livelihood concerns. These are presented below:

Table 4.8 Constraints to engagement programs on climate change action at Ndejje University

Constraints to engagement programs on climate change action	Institutional constraints
	<ul style="list-style-type: none"> • Unidirectional planning of engagement programs • Unclear engagement structures • Limited attention and focus on engagement programs
	Resource related barriers
	<ul style="list-style-type: none"> • Insufficient funding for engagement programs • Inadequate time for engagement programs • Inadequate Human resource • Limited land for engagement programs
	COVID-19 and its impacts
	<ul style="list-style-type: none"> • Severe impacts of COVID-19 • Restrained funding due to Covid 19 • Disruption of engagement programs by COVID
	Unawareness challenges
	<ul style="list-style-type: none"> • Community members not aware of the engagement mandate • Inadequate sensitisation • Ignorance about cc and engagement • Resistance and Rigidity in terms of adaptation measures
	Local priorities and livelihood concerns
	<ul style="list-style-type: none"> • Poverty among community members • Students' financial incapacity

4.4.2.1: Institutional constraints

This category relates to those challenges that stem from institutional weaknesses and inefficiencies within the university management system on engagement programs.

It was noted by the participants that there is limited attention and focus on university-community engagement programs by the university administration. Some of the university staff noted that the university administration is preoccupied with academic and research programs with minimal attention to engagement programs. Even with the available minimal engagement, participants revealed that there is bureaucracy in securing authorisation and support from the university administration. This is despite Ndejje University being perceived as a fully engaged university grounded in a strong intellectual foundation that relates to its mission dimensions. To this, participants noted that:

You know, the challenge has been, that our university has concentrated on teaching and research, really most universities. Actually, largely teaching, because like undergraduates, most of the courses, like education, they only do school practice and not even research. Even those who do research, their research findings end on shelves, most don't go to the fields or communities to solve the problems they promised during defenses. So here, the point I'm noting here is that one, community engagement has not been given the required attention, has not been implemented effectively, and has not been coming out clearly. (NDJ, US2, lines 19-24, Page 3)

The challenge I can mention specifically is about like projects, which require some funding, whereby there was some sort of bureaucracy whereby you have to write out to different offices in order to get some funds maybe from the university. So that caused some delays in work. And even maybe some programs not coming out as it was expected. (FGD NDJ, PC, lines 3-6, Page 11)

And I would want to start with the one that we have just talked about of not completing the programs that they bring to our communities and community members end up not fully benefiting. An example is that of Briquettes made by the Germans. So, that was a challenge and they did not come back to complete the program. The university shouldn't be doing this. (NDJ, CL2, lines 19-22, Page 6).

The community leaders also noted that their voices are not institutionalized at different levels of the university regarding engagement programs. They noted that the planning and budgeting process does not reflect the centrality of public involvement as a core institutional mission. This makes the community members feel that the university

does not take seriously their intellectual role. They argued that this kind of unidirectional planning of engagement programs does not favour their involvement. Some community leaders argued that none-involvement of community members in community engagement planning and disregarding input from community members, the university may fall short of understanding local priorities, concerns, and perspectives related to climate change. This can lead to the development of initiatives that are not well-aligned with community needs, preferences, and capacities, reducing their relevance and impact. They explained that:

what happens is that, the development is done at the University. After, they will come and inform me, and then as a committee, we mobilize the communities I'm citing one example of the Germans who came to train my community members. So, challenges still exist in the way it only flows from the top to down, which is unfortunate because we would want also to present our ideas, there is nothing as you had said, nothing like a memorandum of understanding or a specific structure that is followed, in my opinion. (NDJ, CL2, lines 10-16, Page 5)

Actually, as a community, like I have already mentioned, we asked the university to give us a slot on the committee that runs the university, but they did not give us one, so we also kept quiet because we believed that this is our university. We started it. We felt we deserved a position on the management council. But our wish was not granted. If so, basically, there are no formal structures that I'm sure for sure, so I can try. (NDJ, CL2, lines 9-13, Page 6)

As indicated by the participants, Community involvement in planning engagement programs regarding climate change action is essential for fostering a sense of ownership and buy-in among local community members. When communities are not actively engaged in the planning process, they may feel disconnected from university-led initiatives and be less likely to support or participate in them, undermining the core Ubuntu values of collectivism and interconnectedness. Clearly, limited community involvement in university community engagement planning can significantly hinder the effectiveness and sustainability of initiatives aimed at addressing climate change.

It is paramount to note that African universities ought to prioritise community engagement and the involvement of local community members/leadership in the planning and implementation of engagement programs. Notably, African indigenous community members often possess valuable knowledge, expertise, and resources that can contribute to the design and implementation of effective climate change programs on climate change at African universities. When their perspectives are overlooked, universities may miss out on opportunities for innovation, co-creation, and the development of contextually relevant solutions to pressing environmental challenges (Reed et al, 2018). Most African communities typically have unique contextualized assets, including cultural heritage, social networks, and grassroots organizations, which can serve as valuable resources for climate change engagement and adaptation efforts.

Without meaningful engagement, universities may overlook these African contextualized assets and fail to leverage them to their full potential, limiting the scalability and impact of their initiatives. By fostering meaningful community involvement in university-led climate change engagement efforts, universities can enhance the relevance, effectiveness, and sustainability of their initiatives while strengthening partnerships and building resilience at the local level.

4.4.2.2 Resource-related barriers

It was clear from the participants that the lack of sufficient funding hampers the development and sustainability of community engagement programs on climate change action. The university staff complained of budgetary constraints that limit the ability to allocate enough resources to engagement and climate action initiatives, including funding for staff, research, outreach, and infrastructure. It was argued that without strong financial support from university leadership, government, or civil society

organizations, community engagement programs struggle to gain traction, limited access to facilities, and inadequate recognition for faculty and student involvement.

This was expressed in:

I think the major one is the lack of finances. Sometimes you find that we are lacking some gadgets to use. Sometimes the students complain of long distances. And they cannot be using motorcycles every day, no. not all places for their workplaces have the vehicles to use. So, this requires a lot of funding for effective engagement programs with the number of students that we have. Notably, we largely depend on students' tuition and thus resources financial resources are very limited. (NDJ, US1, lines 25-30, Page 4)

So, I have to tell you that these missions are very expensive. Like Makerere University thrives and is ahead of us because the government supports or because it is a very prestigious university, every donor wants to associate with Makerere, even the government. (NDJ, US2, lines 6-9, Page 3) When you say you're supporting this institution and not the other, what about the private university, I mean we are all teaching and engaging the people of Uganda. Everything is going to Makerere, when you go with your project, you are not considered. So, we are just developing that emphasis on research and engagement, but you realize, the funding is not the direction, but for us, the academics, we know that without that, we are going nowhere. (NDJ, US2, lines 9-14, Page 3)

In the above excerpts, participants decry the lack of enough funding for engagement programs at Ndejje University. They complain that the Government has not been providing a lot of support in terms of funding with continued favouritism of government-funded institutions. Some participants cannot understand why the government continues to favour public universities while they all teach Ugandan children. This makes the programmes donor-driven which also comes with other challenges. Thus, Ndejje University staff find themselves in a situation where most of the funding used for the programs is obtained through writing grant proposals to foreign donors and such funding comes with conditions.

Du Plooy and Von Moellendorff, (2024) reveal that funding for engagement programs at African universities is consistently a huge challenge, especially in the

current financial climate. The authors note that outreach programs by the university staff and students are expensive ventures and there are always limited funds. The university funding being very low, their support for engagement keeps going down, thus relying on a limited budget. Du Plooy and Von Moellendorff further denote that funding challenges have a great potential to impact the attraction and retention of students and staff for university community engagement programs especially on climate change-related activities. Too few well-skilled and expert staff members can be very problematic for a project, especially when community engagement activities are structurally and systemically relegated to a hierarchically “third” position, with teaching and research regarded as higher priorities.

Participants further reported inadequate human resources that would execute numerous engagement programs. They note that this stems from inadequate financial resources that would ensure the hiring of enough climate change expert staff both at the university and in communities. They explained that:

When it comes to human capacity, unlike the government or public universities, you find that we do not have enough staff and most of them are part-time, not on a permanent basis, so they teach and go, they are just here for a few days, so engaging them in the community becomes hard. So, administratively, if you have many part-timers, you will not have efficiency, research needs enough time which they do not have, and community engagement needs good planning and ample time, so it's a challenge in terms of human resources. (NDJ, US2, lines 5-10, Page 7)

And maybe human capital. Being a private institution, it is hard for the university to employ enough staff. Usually, we lecturers are very few. And you find the students sometimes are so many, now you know the community is expansive, we don't have engagement equipment like a vehicle to take us around. So, this makes it hard for the university to effectively reach out to the community members, especially about environment management and climate change action. (NDJ, US3, line 6-10, Page 5)

The university staff at Ndejje University feel that the institution is underprivileged due to the fact that it is a private institution that receives little or no direct funding from the government. This is common in almost all private universities in the country that find it difficult to hire enough human capital and facilitate their engagement programs on climate change.

Relatedly, university staff and students decried of limited time for engagement programs which hinders the implementation. It was noted that the university staff and students already have demanding schedules filled with learning, teaching, research, and administrative duties, leaving little time for engagement with external communities on climate change issues. This makes it problematic to sustain long-term partnerships and initiatives that require an ongoing commitment to engagement programs and involvement in climate change action especially within communities. A local leader also reported that even when the university staff and students initiate an engagement program on climate change action, after the completion of a project or engagement program, there may be a lack of follow-up and continuity in such engagement efforts. Participants argued that this is challenging because it hinders cross-cutting efforts to have effective responses to complex challenges like climate change and also limits the scope and impact of community engagement programs, preventing meaningful dialogue and action on pressing environmental challenges. To this, participants noted that:

Another one is timeframe. For example, our students, when they come to the communities, it is always a very short time and they can come like once a year and don't come back. If there is a program from the university, the community members don't get enough of the desired knowledge that could be sustainable in terms of implementing what they are trying to show us or to teach us. So, the timeframe is always very limited, the university through whatever programs they wish to do, they don't give us enough time or enough follow-up. (NDJ, CL3, lines 25-30, Page 8) For example, I can tell you that they come like

once in a year. And by the time they come back, what they told the community has already been forgotten. Even this model that they had started on, has already gotten destroyed. So, the timeframe is a very big factor. They take a long to come to the community. (NDJ, CL3, lines 1-3, Page 9)

say the year one students of this year are supposed to partake in such an initiative. However, when they reach in year two, they will have to take on another initiative for the year twos. So, you find that then you have eight months to do whatever they're doing in year one. So later on, they leave the project halfway and it becomes a challenge. Sometimes the project may not be completed, and all these people, the next people come up, they haven't had time, especially if they're new year ones, and they don't know anything. (FGD NDJ, PD, lines 1-5, Page 12)

I would say it starts with the available time and financial capacity. The students in the university at large, don't have finances if you want to run a project or to do any activity, it may take you six or three months, earliest maybe three months, but you need to start the process early if you to do an event or any activity in the university, you need to engage it like three months before or six months before. So, it's a really long process that needs enough funds to implement. (NDJ, US5, lines 23-28, Page 5)

Of the many concerns that the participants in this study expressed about community-engaged teaching and research regarding climate change action, possibly the other frequent is that it takes a lot of precious time. Indeed, it takes significant amounts of time to develop a productive working relationship with a community partner, to design projects that meet both learning and community goals, to manage the logistics of the projects as they unfold, to engage students in special skills training, and to reflect on the meaningfulness of projects with students. In defining a mutually beneficial project with communities Bandy (2011) emphasises that it is important for university management and guiding policy frameworks to set community engagement goals that are manageable for the university staff and students within the time frame of their projects and courses. Further, it is important to communicate these goals clearly and ensure they have a clear sense of what will be expected of them at every step in the engagement program. Finally, participants decried the lack of enough land to showcase

participatory engagements in the field of climate change mitigation and adaptation. Despite the university being in a rural setup, participants complained of inadequate land to have demonstration farms. One participant noted that:

And then in terms of limited resources, the biggest I think challenge will be land because our own main goal was to expand our Demonstration Farm. But as you can see, right now, we are at the boundaries of the university. And yet, of course, Kakuta is, as it is, it has a lot of bureaucracy, I would say in terms of operating from it's not so free. So, it becomes difficult for us to tell farmers, to tell anyone in your community that let me take you to Kakuta because it's three kilometers or four kilometers from here. (FGD NDJ, PD, line 14-19, Page 12)

Participants report the university's budget constraints, which significantly hinder the implementation of climate change engagement programs at Ndejje University. This includes limitations on funding for research and dissemination of research findings, enough human resources, infrastructure, land, and outreach efforts. Ndejje University has diverse missions, including teaching, research, and community engagement. Climate change action receives enormous competition with other institutional priorities, making it challenging to allocate resources and attention to sustainability initiatives. With already established structures, policies, and cultures that largely focus on teaching and research, there are reported bureaucratic processes, and inertia that impede efforts to implement new sustainability initiatives or modify existing practices on climate change engagement programs.

Ampaire et al, (2017) have observed that the limited technical capacity in public institutions results in failure to plan appropriately for climate adaptation, limits access to available climate change funding, and uses of participatory approaches that would ensure inclusion and ownership of relevant stakeholders. Tumushabe et al. (2010) confirm the small budgets and funds that are tagged to institutional priorities demoralize innovative capacity and constrain university staff and students from innovative

adaptation planning. Limited resources also constrain university staff, students, and external stakeholders from translating engagement planning and implementation guidelines to action in numerous communities. The analysis of adaptation actions by Biagini et al. (2014) shows that capacity building is very important in enabling adaptation at the local level. Yet building the capacity of communities demands capacitated human resources in extension delivery.

In an exploratory study conducted to determine the experiences and perceptions of participating representatives from ten African Centres of Excellence, located in their different and specific regional and societal contexts, about their university-society community engagement (CE) or TM activities, it was revealed that perpetual institutional restructuring in higher education institutions, contributes to inconsistencies in terms of commitments made to communities by university staff and students (Du Plooy & Von Moellendorff, 2024). The authors note that this constrains human resources, if contracts are cancelled or not renewed, if people are moved around in the institution, workloads and job descriptions are changed, and if vacant posts are not filled after retirements or resignations. In the latter case, the workload of and burden on the remaining staff become untenable. While these factors affect all mandates of higher education institutions, community engagement activities suffer more in structures that prioritise teaching and research.

4.4.2.3 COVID-19 and its impacts on engagement programs

This is yet another category of challenges that implementers of university-community engagement programs face. Participants revealed that the COVID-19 pandemic has had significant impacts on university-community engagement programs focused on climate change action, disrupting traditional modes of collaboration and

outreach. University staff noted that with restrictions on in-person gatherings and travel limitations, many university community engagement programs have had to transit to virtual formats or restricted engagements. While this shift has enabled some level of continuity, it has posed challenges for engagement initiatives that rely heavily on face-to-face interactions, such as fieldwork, community workshops, and public lectures among others.

Correspondingly, the university staff decried restrained funding dues due to the impacts of the pandemic. They noted that since Ndejje University is solely a private institution, it largely depends on the tuition of university students. They revealed that COVID-19 and its impacts have led to reduced numbers of students and the tuition generated. Resultantly, this has prompted universities to reallocate resources and reprioritize activities to address immediate academic and research. As a result, community engagement programs focused on climate change action receive less attention and support from university administration, potentially leading to a decline in funding and institutional backing.

getting the funds during and after COVID has been very hard, especially after because the university was hit hard, being a private institution, they do not have enough money. We are just regaining. Like this year, we did not get fresh entrants and even for the 1st year students that we have, the numbers were significantly reduced, we still had the carryover, so, you can see that the university's financially limited. by our policy as well. The impacts of COVID-19 are still with us. So, the impact of the pandemic did not only affect the funding of university programs but the number of students is being affected. (NDJ, US2, lines 22-28, Page 7)

Our source of income was affected since I told you that much of our income comes from the University. Students who stay within us of course were so much affected in terms of finance, that is income, and also in terms of engagement activities that might have come from the university. (NDJ, CL2, lines 19-21, Page 8)

COVID also affected funding and budgeting. I can say there is hardly any funding. The students are now few. And you know we've

gone online mostly. So, part of the time it is actually the online part, which is the effect of COVID-19. Engagement in an online era becomes very hard, because when students are studying from home, how can you engage with the communities, eventually, it becomes hard, becomes hard, in fact, impossible. (NDJ, US3, lines 21-25, Page 5)

Students also noted that COVID-19 has disrupted their engagement experiences, with remote learning, social distancing measures, and limited extracurricular opportunities affecting their ability to participate in community engagement activities. This has resulted in decreased student involvement in climate change action initiatives and reduced opportunities for hands-on mitigation and adaptation practical experience. Other university staff noted that there were increased livelihood challenges that still exist in the communities. They argued that such challenges resulting from COVID-19 continue to drive community members towards illegal encroachment on the environment to earn a living. From the analyzed data, there were reports that the environment had deteriorated, people encroached on the environment more as an alternative for source of income like bricklaying and most of the policies were not working during lockdown. Participants noted that this derails the university's engagement efforts towards climate change mitigation and adaptation.

And for sure, one of the reasons why these people encroach on the forest, encroach on the environment, because imagine we have a lot of trees, this is where the 1986 liberation War took place. So, it is not inhabited so much and we still have some protected environment but when there is pressure from poverty, the pressure of debts from the lockdown, people end up getting into that business of cutting trees to sell and feed their families. (NDJ, CL2, lines 26-30, Page 8)

There was an increase of pressure on debts resulting in the biggest percent from COVID-19 cause businesses were not moving on where people go into debt, they do not have what to do, at the end of the day, you find them now encroaching on trees to sell timber, to sell charcoal and other sources. They go to swamps to lay bricks, so because sometimes they have good clay soil that is marketable here for the bricks, they are very expensive. So that's why they encroach on the environment. (NDJ, CL2, lines 1-6, Page 9)

So, people encroached on the environment more and nothing was coming from the university. Unfortunately, some of the staff were laid down during COVID. So, it was a war. At the end of the day, these parents, like I've said were forced to start making bricks, which bricks, good ones are made in swamps. After making those bricks, they would need firewood to burn the bricks. So, all these were the impacts of COVID. Apart from affecting the collaboration effort and opportunities from The University, it also forced people into a deeper poverty which fostered the community to go to an environment. (NDJ, CL3, lines 11-15, Page 927-31)

Overall, COVID-19 has presented significant challenges for university community engagement programs on climate change action. The inability to meet in person and collaborate effectively strains these relationships and later impedes progress on joint climate change projects and initiatives. The economic repercussions of the pandemic have strained university budgets and resources, leading to funding cuts and staff layoffs in some cases. As a result, community engagement programs may face constraints in terms of staffing, funding, and access to essential resources, hindering their ability to carry out climate change action initiatives effectively (Milugo et al, 2023).

According to Marinoni et al. (2020), by May 2020 different higher institutions of learning across the globe were closed in 177 countries with restrictions on face-to-face activities, impacting the three missions of teaching/learning, research, and community engagement. In the case of university-community engagement, the report showed that a third of the HEIs (424 in 109 countries) had observed a decrease in activities. These findings revealed that the restrictions negatively affected ongoing university community engagement programs and the capacity to carry them on in the post-COVID-19 era.

The trajectory of higher education institutions' engagement and its institutionalisation and valuation both within the university and in the surrounding

communities are important factors in understanding the impact of COVID-19 on UCE and the university as an organisation and institution more generally (Cristofolletti & Pinheiro, 2023). They posit that higher education institutions have an important role in co-constructing a post-pandemic society and also that they need to legitimise themselves socially and politically in the face of new and future scenarios. Moving forward, universities will need to continue adapting their engagement strategies to navigate ongoing uncertainties and build more resilient and inclusive partnerships for climate change action.

4.4.2.4 Unawareness challenges

Participants in this study reported that the lack of awareness about university-led engagement programs on climate change within the community poses significant challenges to the effectiveness and impact of these initiatives. Some community leaders revealed that most community members are not aware of university engagement mandates and when community members are unaware of engagement programs, they miss out on opportunities to get involved in efforts to address climate change. Some university staff indicated that this can limit the diversity of perspectives, skills, and resources available for tackling environmental challenges and hinder the implementation of comprehensive and inclusive solutions. Community leaders of the Ndejje local council one decried a lack of effective communication between the communities and the university regarding the engagement programs. They argued that without effective communication and outreach efforts, universities may struggle to reach and engage with diverse segments of the community, including marginalized or underserved populations. This can perpetuate disparities in access to information, resources, and decision-making processes related to climate change action.

A related challenge posed by the participants was that some community members resist engagement and adaptation strategies due to limited sensitization and awareness. They argued that low community awareness has resulted in limited visibility and recognition for university-led engagement programs, undermining their credibility, influence, and long-term sustainability. This hinders efforts to mobilize support, attract funding, and build partnerships with other stakeholders, including local community agencies, non-profit organizations, and community members at large. A participant explained that:

We have sensitisation concerns because climate change is now with in the elite and the community members completely do not understand what it means and what it looks like. Even when we reach the local people, and explain it, it is hard for them to comprehend it. Even in research at post graduate level, findings have been revealing that there is a lack of awareness and sensitisation about the concept of climate change. And no matter what I've been bringing, bringing that question over where they the awareness, yes. (NDJ, US2, lines 16-21, Page 6)

I think there has been some change, but we need to sensitize more. It is not yet enough, there is still a lot needed to be done. Because the community members don't know the implications that are in cutting down the trees, they don't understand the whole concept. Now the issue of climate change, even as leaders, is still confusing us. So, much as the university comes, the issue of sensitization! They have not done enough or we feel they need to come and teach us more about that issue of climate change, how does it affect us? How do we control it? Why is it bad to tamper with the wetlands, with the trees, so, there is not much knowledge? So, I might say they have not been so much effective because of lacking knowledge. (NDJ, CL3, lines 9-16, Page 7) ... Moreover, the university has not yet come up, particularly with a program on climate change engagement with clear engagement channels to communities, and maybe enough sensitization, it hasn't happened very well the way I think it should have happened. The way I've told you indirectly, it happens through a few activities. (NDJ, CL3, lines 8-11, Page 5)

there are some communities that are resistant, and sometimes they are not receptive to our engagement programs. Some are always expectant of financial assistance due to their financial statuses but as I have told you, we also don't have enough. So, at the end of the day, they ignore our programs. (NDJ, US1, lines 1-3, Page 5)

As indicated in the excerpt above, some members of the community are sceptical about the reality or existence of the climate change phenomenon. They do not seem to accept that climate change exists. This becomes a serious challenge impeding the progress on engagement programs and climate change mitigation and adaptation activities. Notably by the university staff, the universities especially in rural settings like Ndejje University ought to act as an example as they still use fire as their most source of energy, which is actually the leading cause of deforestation. The university has the possibility to use coal, or even sometimes they can use briquettes to show the community what and how it should be done. These key findings are in consistence with how sensitisation by university staff and students is significant for communities Andama and Suubi, (2015). The authors argue that sensitisation sessions with staff, students, and the community prove very helpful in raising awareness among the community members as they get more informed about living sustainably. The community gets the ability to work towards environmental sustainability and is keen to participate in activities that encourage sustainability. It is however disparaging that community leaders noted the absence of explicit communication channels which derails proper planning and effective sensitisation.

Hlalele et al, (2015) emphasise that student groups, with the support of the staff, ought to be deeply involved in community outreach activities, which are appreciated by the community at large. Particularly, the authors opine that various sustainability programs and projects should be started on and off campus and various initiatives like tree planting should be scaled up to have a broader reach. Carrying out collaborative sustainability projects in the community around the university encourages the community to take responsibility for the environment and to be aware of their ways of living.

4.4.2.5 Local priorities and livelihood concerns

Participants reported that communities have local priorities that hinder effective community engagement with the university to address climate change issues. Some local leaders note that some local communities often face a myriad of pressing issues such as poverty, healthcare, education, and infrastructure development. They revealed that climate change, while important, is not always perceived as an immediate concern compared to these more immediate challenges. As a result, engagement programs focused on climate change struggle to receive sufficient attention and support from community members and leaders. Some university staff and community leaders reported that most community members who live in poverty often prioritize meeting their basic needs for food, shelter, and healthcare over longer-term concerns such as climate change. When faced with daily struggles to survive, they may lack the time, resources, and capacity to engage meaningfully in climate-related initiatives.

Similarly, community leaders and some university staff reported that poverty among community members exacerbates vulnerability to the impacts of climate change. Ndejje as one of the marginalized communities lacks the resources, infrastructure, and social support networks needed to cope with extreme weather events, natural disasters, and environmental degradation. Addressing poverty concerns may therefore take precedence over engaging in proactive climate change mitigation or adaptation efforts. Some poverty-alleviation strategies, such as reliance on unsustainable natural resource extraction or land-intensive agricultural practices, may contribute to environmental degradation and exacerbate climate change. For example, community leaders revealed that local community members decry high prices for briquettes made by Ndejje University as an alternative source of energy. They noted that:

Because of the activities that were involved like charcoal making, we needed to buy materials, and the Germans brought just a little. Now, if they could give us like startup capital, and then we also continue from there, but most of the community members are poor, and now getting enough capital to start up with the little knowledge they have got from the engagement program becomes very hard. (NDJ, CL2, lines 10-14, Page 7)

So, if we are going to make artificial charcoal for example, this needs a lot of finances and our people are very poor. (NDJ, CL3, lines 19-20, Page 3)

Another challenge is that the university does not sell the brackets to the community, it sells the brackets outside the university, outside the community after all it is expensive. So, you find that the neighboring community continues to use charcoal and firewood and hence cutting the trees which affects the environment and maybe causing climate change. So, the issue is that these briquettes are expensive, and the local people, who are the major poor, cannot afford them. (NDJ, CL3, lines 20-26, Page 7)

Also, still about finance, most of our community members are poor; they are always too expectant and this makes mobilisation uneasy. When you tell them that there is a program from the university, they expect there is some money. So, when they find that there is nothing, they are demotivated to always go and attend such activities. So, the nature of livelihood for our community members also affects engagement efforts. This is because most don't go there because they can't forfeit their daily work for money to go and attend engagement programs. (NDJ, CL3, lines 4-9, Page 9)

Participants reveal that many households in Uganda rely on inefficient and polluting sources of energy, such as biomass or kerosene, for cooking and heating. This not only contributes to deforestation but also exacerbates indoor air pollution, which has adverse health effects and contributes to climate change. Participants argue that the poor living conditions of Ugandans restrict access to resources necessary for adapting to climate change. Poor communities may lack funds to invest in climate-resilient infrastructure, such climate friendly sources of energy or drought-resistant crops. As noted, poverty also limits access to education and information about climate change mitigation and adaptation strategies as community members focus on earning a living ignoring university invitations for sensitisation programs on climate change action. This

lack of knowledge may hinder communities' ability to adopt sustainable practices or take preventative measures against climate-related risks.

Notably, by 2030, the combination of climate change and poverty is estimated to affect between 35 million and 122 million people (Balasubramanian, 2018). Particularly, food, water, sanitation, and shelter are basic requirements for human survival, but all four are getting harder to access for low-income communities in developing countries, because of climate change and institutional failure to help to adapt to it. In Uganda, while working with poor communities in the highland areas of Mt. Elgon, Kabale and the savanna parklands of Teso and northern Uganda, Gwali, (2014) was cognizant of factors such as high population, poverty, and political displacement of persons. These were major causes of tree cutting, land fragmentation, and unsustainable farming methods which are among the key drivers of climate change.

Addressing poverty in Uganda requires comprehensive strategies that consider its interconnectedness with climate change (Turyahebwa, 2014). University-community engagement initiatives that promote economic growth, improve access to education, enhance agricultural resilience, and provide alternative energy sources can help mitigate the adverse effects of poverty on climate change vulnerability. Additionally, policies and programs should prioritize the inclusion of vulnerable communities in decision-making processes and ensure equitable access to resources and opportunities for adaptation and resilience building (Okello, 2019).

However, transitioning away from these livelihood strategies without viable alternatives in place can create economic uncertainty and resistance to change among affected communities. Underpinned by Ubuntu's values of interdependence and interconnectedness, partnerships between universities, governments, NGOs,

businesses, and community organizations to leverage complementary expertise, resources, and networks for addressing poverty and climate change in tandem. University collaborations with local stakeholders to co-design and implement contextually relevant and socially inclusive interventions are paramount for effective climate change action. Such collaborations can also foster community-led approaches to climate change adaptation and mitigation that prioritize local knowledge, needs, and priorities. Reciprocity can ensure support for grassroots organizations, community-based enterprises, and participatory governance structures that enable bottom-up decision-making and collective action.

4.4.3 Cross Case Analysis

This section presents a comparative analysis of the key findings that emerged regarding the challenges that implementing units face in carrying out university community engagement programs regarding climate change action across case universities. The common and divergent key findings in this respect are highlighted.

Common key findings regarding enemies of engagement programs on climate change action

Participants from both case universities similarly reported institutional constraints. Participants at both cases reported unreciprocated and unidirectional kind of engagements that rarely involve the community leadership in the planning stages. These challenges at both cases arise from the organisational structures that are unclear to most community members and bureaucratic procedures that deter fast access to different planning and implementation units of engagement programs. It was further reported from both cases that the two institutions have unbalanced attention and focus on the three missions of the university (teaching, research, and community engagement). Participants noted that both institutions have their largest share of focus

on the first two missions of teaching and research leaving the third mission with minimal attention. They revealed that this is evidenced in the budget allocations to engagement programs, infrastructures, resources, and incentives that are allocated to those involved in engagement programs.

Relatedly, another common finding across the case universities was the challenge of inadequate resource support by the institution and government towards community engagement programs implemented by the case universities. Participants from both cases reported that there is inadequate funding for climate-related engagement programs and insufficient expert human resources that can copiously implement engagement programs at the case universities.

It was interesting to find out from participants of both cases that COVID-19 has equally impacted the planning and coordination of engagement programs at the case universities. For instance, participants from Makerere University reported how the pandemic aggravated the already existing impacts of climate change by intensifying the poverty levels among community members which resultantly enhanced anthropogenic drivers of climate change. Congruently, participants from Ndejje University reported disruption of engagement programs as a result of COVID-19, the reappropriation of priorities by the university, and increased anthropogenic drivers of climate change in the communities.

Another similar finding to both cases relates to unawareness and misconstructions about climate change. Participants from both cases reported that some communities that they engage in have diverse fallacies on climate change which result in cultural resistance, negative attitudes and biases toward climate change engagement programs implemented by the case universities. Both participants attributed this to

inadequate climate change sensitisation from all key players and strong cultural attachments (that regard climate change as a global south challenge) that create resistance from some communities.

Divergent key findings regarding enemies of engagement programs on climate change action

Participants from Ndejje University reported local priorities and livelihood concerns, a finding that was not reported at Makerere University. Participants at Ndejje University reported that a high level of poverty among community members forces them to encroach on the environment for activities like charcoal burning, bricklaying, and mat weaving among others which destroy the environment and ultimately derail efforts made by the engagement programs by the case university. Participants further revealed that Ndejje community members either ignore some engagement programs to concentrate on ‘earning a living’ activities or ask for money to participate in the climate change engagement programs organised by the university.

It was also unique to Makerere University that participants decried policy gaps both in the national laws and institutional policy frameworks. Participants particularly decried the absence of clear policies that mandate community members to engage the universities in different climate change activities. While community leaders at Ndejje complained about the lack of local representation at university management, community leaders around Makerere University were predominantly displeased with the absence of clear and accurate policies that would streamline and actualise their intentions to engage the universities. The university staff and students further reported political interferences with their community activism and misplaced attention for policymakers despite the institution always coming up with different policy briefs that

would institute community engagement and strict environmental protection national wide. Lastly, it was unique to Makerere that participants raised gender equality concerns in the efforts to address climate change issues. This was also attributed to policy inadequacies since in most African communities, women are still looked at as inferior in efforts to transform communities and ensure social development.

It was a unique report from Ndejje University that they had faced the challenge of inadequate land to have demonstration farms as part of the engagement programs. Being located in a rural setup, it was a surprising finding compared to Makerere University which is at the heart of the capital city. It was however found out that Makerere University's financial basket and annual government funding enables it to procure land from different regions and communities for its climate change-related engagement programs. This could be why this finding was unique to Ndejje University.

4.4.4 Synthesis

Collectively, five themes for each case university that responded to the research question "*What are the major constraints in the university-community collaborations in the efforts to address climate change at the selected cases?*" point out institutional constraints, resource-related barriers, and COVID-19 and its impacts as major challenges that are common to both cases. Additionally, myths and misconstructions about climate change and policy gaps were unique to Makerere University while unawareness challenges and local priorities and livelihood concerns were themes unique to Ndejje University. Lack of enough funding was identified as a central phenomenon that cuts across most of the challenges alongside inadequate commitment to community engagement, unidirectional planning of engagement programs, and a regress of sustainable, mutually beneficial partnerships. These challenges not only

deteriorate the efforts to enhance community engagement at African universities but also give opportunity to anthropogenic activities to drive climate change and enhance African communities' vulnerability to climate change mitigation and adaptation

Building trust and ensuring that engagement efforts are responsive to the needs and aspirations of the community are key elements in successful university-community collaborations. Congruently, addressing these constraints requires a strategic approach that involves leadership buy-in, resource allocation, cultural change, bidirectional planning and implementation of engagement programs at the case universities, and adaptability to technological advancements. Successful engagement programs often involve a continuous effort to overcome these challenges and create a more inclusive and responsive organizational environment.

Addressing these institutional constraints requires a concerted effort to foster a supportive environment for community engagement and interdisciplinary collaboration within and without universities. This may involve reforms to funding mechanisms, changes to academic incentives and reward structures, enhanced institutional support for outreach activities, and efforts to cultivate a culture of innovation, risk-taking, and social responsibility within the academic community. The next sub-section adequately explores opportunities that participants in the two cases suggested to enhance university-community engagement programs and address climate change issues in African contexts.

4.5 University Community-Engagement Opportunities Towards Climate Change in African Context

Africa has been defined for us more than we have defined it.... we need African solutions for African problems (US2, MAK)

Findings from the last objective of this study reveal numerous opportunities that participants believed might be able to support policy making and enhance the third mission programs towards climate change issues at the case universities. In my interactions with them (university staff, students, and community leaders) different opinions were raised on different multidisciplinary openings that both the university and communities can tap into to foster interdisciplinary collaborations and impact society positively, particularly regarding climate change knowledge, mitigation, and adaptation. Participants gave various opinions on these during the semi-structured in-depth interviews and focus groups.

I first present findings from case one (Makerere University) and later on case two (Ndejje University). This presentation and analysis are preceded by a cross-case analysis that involves the in-depth exploration of similarities and differences across cases intending to support theoretical predictions. The findings from data analysis are presented in seven categories: institutionalization of CE towards climate change mitigation and adaptation; incorporation of indigenous knowledge about CC mitigation and adaptations in mainstream academic and collaboration programs; leveraging traditional conversation spaces (Barazas) for UCE and pathways for sensitization; Harnessing women's knowledge, experiences and contribution towards climate change mitigation and adaptation practices; Community empowerment and income diversification as a key to building climate resilient communities, synergetic approach for policy formulation and implementation and extensive capacity building. These

major themes are contextualized in different cases and indigenous communities where data was generated.

4.5.1 Opportunities from Case One; Makerere University

Speaking about what they think of the opportunities, the university staff, students, and community leaders from Makerere University noted the following opportunities for effective university community engagements and climate change action in the context of Africa. I present the results in the sequence in which I generated the data, to enable the reader to get a sense of the fieldwork.

Table 4.9: University-community engagement opportunities to contribute to climate change action at Makerere University

University-community engagement opportunities to contribute to climate change action	Institutional commitment to community engagement towards climate change mitigation and adaptation
	<ul style="list-style-type: none"> • Change in incentive regimes at the university • Review of institutional structures and policies • Explicit funding for UCE programs
	Leveraging traditional Conversation spaces (Barazas) for ECE and pathways for sensitization
	<ul style="list-style-type: none"> • Creating local spaces for climate change sensitization • Community spaces for the co-creation of climate change knowledge • Local training platforms for alternative sources of energy
	Incorporating CC Indigenous knowledge in Mainstream academic and engagement programs
	<ul style="list-style-type: none"> • Integration into academic program: teaching and research • Tapping into IK for the UCE program • Weaving academic and IK for CC action
	Harnessing women's knowledge, experiences, and contribution towards CC mitigation and adaptation practices
	<ul style="list-style-type: none"> • Recognise and leverage the role of women in UCE and CC action • Capacity building that is gender sensitive • Working with women for gender transformation
	Community empowerment and income diversification as key to building climate resilient communities
	<ul style="list-style-type: none"> • Leadership empowerment

-
- Sourcing funding for community projects
 - Income diversification community projects

Synergetic approach for policy formulation and implementation

- Create engaged platforms for UCE and CC policy formulation
- Strengthen and actualise policies regarding UCE
- Policy benchmarking for engagement programs

Extensive Capacity building

- Strengthening staff and students' expert knowledge and skills in UCE and CC
 - More funding for CC research and training
 - African umbrella of universities for CC action
-

4.5.1.1 Institutional commitment to CE towards climate change mitigation and adaptation

The participants viewed institutional commitment to community engagement programs as a core opportunity for any African university (like Makerere) to reach the indigenous communities about problems that they face. Participants felt that for effective university-community engagement and climate change action, there needs to be an explicit commitment from the university management and administration in terms of unending actualisation of community engagement policies, budget allocations, broad staff understanding of and support for CE, infrastructure, faculty roles and rewards, and integration of engagement activities into other aspects of institutional work and academics.

Despite the review of documents showing that Makerere University acknowledges CE as one of its core functions and with some aspects of CE integrated into its curriculum and policies, some of these CE programs remain largely unsupported and the contributions to CE are inadequately rewarded. The university staff, community leaders, and students in this study believe that for any effective community engagement

programs regarding climate change to be meaningful, the university management ought to establish a more explicit leadership structure for engagement, setting aside a specific budget for engagement programs on climate change action, regulate the sensitization/dissemination of climate change information to communities, review institutional policies to accommodate mandatory student engagement, change in the incentive regimes at African universities and set aside a specific budget for engagement programs on climate change action among others. These sentiments are expressed in;

I see that we have as a university, we have a lot of potential to make a difference with this through research. And so, as a university, enhancing our research profile and portfolio so that we integrate climate change in all the aspects of the research we do can help in addressing issues that now people are already aware that they are real through anticipatory engagements with community members (MAK, US1, lines 17-20, page 9).

As indicated, universities supporting and enhancing research activities, particularly on climate change action can be paramount in enabling engagement programs on climate change education, mitigation, and adaptation. This they suggested (with full support of the university) could be through participatory engagements like action-oriented research, inception workshops, and findings dissemination workshops. As the university staff pointed out, institutional support to engagement programs on climate change action could further enhance the understanding of the drivers, understanding what people are using to cope, so sort of indigenous knowledge, but also now coming into identify strategies that could be used to mitigate the challenges. Therefore, it is significant for the university to be consistent with its commitment to institutional support for research and participatory engagement anchored on a clear research and engagement agenda and comprehensive community engagement structures for efficiency and effectiveness.

Relatedly, Participants further views on how university research on climate change phenomena can be restructured to effectively benefit external communities. Interviewees believe that African universities need to sit and rethink how they can incorporate aspects of climate change in their research in all the different departments in the universities, whether they are from the humanities, social sciences, natural sciences, etc. A participant related this opportunity to the analogy of HIV when it had just hit Africa in the 1980s and how scholars and institutions committed to supporting research on the same “...because just as HIV was a big problem, and every department in every university picked up HIV because in our department, you know, (MAK, US5, lines 15-16, Page 11). Similar sentiments were expressed in;

the university needs to avoid this tendency of having research on Environment and Climate Change based areas just for the Institute of Environment. But the environment is not just on the College of Environment. But also, to the other colleges, it also applies to the College of Natural Sciences, it applies in veterinary studies, health sciences, and any other colleges like education. So, it shouldn't be open so that even the students in other colleges can do research that is climate change-based. (FGD MAK, PK, lines 13-17, Page 17)

the opportunity I see would be about tailored information for different disciplines in the university. At least every college or every college should get climate change information according to their discipline so that it's very beneficial when they start interactions with community members. Of course, when we leave Makerere, our destination is the community to serve people, we all need climate change knowledge despite the course one is doing (FGD MAK, PJ, lines 27-29, Page 15)

Climate change indeed cuts across all sectors and can be easily integrated in various courses and programs. Participants believe that the university management should actualize this interdisciplinary approach to research so that students are provided a more comprehensive education by exposing students to a diverse range of climate change knowledge. This approach provides a well-rounded education that covers a wide range of climate change topics while also encouraging students to follow their own

interests. This in the end can prove to be effective especially when students graduate and take on different employment responsibilities in different disciplines in different communities where they work.

Another form of restructuring was echoed by suggesting a separation of research from extension to ensure explicit funding and other forms of support for each of the entities. Participants observed that:

Research should be separated from extension because currently, we receive funding which is for both. But usually, whenever you're planning for both, as a researcher, the experience of getting, researchers do a lot of desktop work compared to community work. But if you have an established project, when you're funding such a project, I would say they would think of separating those two activities, the community engagement versus the desk work, such that the community engagement can have an established budget on its own, and in my opinion, that is more. (MAK, US4, lines 6-12, Page 10)

When it comes to things that require you to go out in the community and engage the community, you need money, the university may not be able to give you that money. So, there should be strict and specific funding for community engagement, I think that can improve things. (MAK, US5, lines 16-19, Page 7)

Undoubtedly, the participants believe that the university's commitment to have explicit funding and support for community engagement programs on climate change action could enhance a range of ways of engaging members of the public with the design, conduct, and dissemination of research - all with the goal of generating mutual benefit by enhancing the quality and socio-economic impact of research.

In another instance, participants reckoned improved remunerations for university staff members on community engagement programs. In this case, the university staff noted that from the policy paradigm, there is a need to see how incentive regimes can be balanced around those three mandates (Teaching, research, and community engagement). It was clear that a person who wants to advance their career

and be promoted, will not invest his time in something (community engagement) that is not going to add value to their ambitions. Some university staff seemed to believe that community engagement programs are not adequately rewarded and that could account for why their focus engagement is elsewhere (like writing papers for publication, teaching advancing their academic and professional qualifications) which weighs higher on the evaluation grid for promotions and other appointments. Thus, participants believe that incentive regimes in universities need to change in such a way that they incentivize community engagement. (MAK, US3, lines 28-29, Page 6). This is further expressed in;

in my experience and interest in community engagement, I think that one of the things that need to change is the incentives in universities, incentive regimes in universities need to change. Now, whereas universities are expected to do community outreach, in essence, the incentive regimes do not promote that. In universities, you hardly have any incentive, for example, promotion because you've been doing community engagement, at least for Makerere University. The incentive regimes are in such a way that someone in a university is going to be promoted because of how many publications have been written to fellow scientists, but it's not so significant about how much community impact they have. I don't see, I don't know where that is anywhere in the universities in Uganda. (MAK, US3, lines 17-25, Page 6)

Indeed, interviewees believe that there is minimal consideration of community engagement as an incentive for the career and professional development of staff, which participants think should be changed and given priority by the university policy to further enhance the third mission of the university. According to Makerere University policy on appointment and promotion of academic staff (as reviewed and approved by the university council in 2006), amended at the 112th meeting of the University Council held on 10th September 2009, all promotion tracks at the university, the ordinary track, and the fast track emphasize teaching and research related achievements more than community engagement programs (Makerere University, 2009). Table 4.9 for example,

shows the distribution of points under the ordinary track system as per the points-based faculty evaluation system at Makerere University.

Table 4.10: 1 Faculty evaluation system at Makerere University. Source: Data from MUK, 2009, pp. 17–18.

Defined Parameters	Maximum Points Allocated
Academic and professional qualifications	20
Publications	25
Teaching ability and experience	13
Research	8
Supervision of students' research	10
Other academic activities	8
Service to the university and the community	5
Membership of professional bodies	2
Conduct	5
Professional practice/outreach services	2
Innovation (e.g., patent)	2

Although the policy indicates that MUK values CE and rewards the contributions of its academic staff to external communities, participants feel that the appointment and promotion policy and practices at the university undervalue the involvement of the academic staff in community-related activities. Accordingly, the question is not whether the appointments and promotions policy of MUK recognizes and rewards the contributions of the academic staff to the external communities, but rather whether the rewards are appropriate and prioritized. Besides the inadequacy of the rewards, the university does not actually spell out what constitutes contributions to external communities; thus, the process of evaluating the contributions of the academic staff to external communities is unclear.

Lastly, local community leaders emphasized the need for the university to establish clearer and known engagement structures that can effectively enable climate change engagement programs. As earlier indicated, neighbouring communities are not

in the know of existing structures, the university's mandate around community engagement, and specific offices that handle engagement programs. One of the community leaders indicated that;

If these university management people were willing to put clear structures on engagement programs, a lot would be possible. This is very important because it will open space for engagement. They need to work hand in hand with us and bridge a gap that is between the local communities and the Makerere University at large. This will automatically give us a sense of belongingness that we feel that Makerere is part of us and we are part of it. And then we work together to draw a roadmap for engagement programs and activities that can encourage climate change, adaptation, and mitigation. (MAK, CL2, lines 21-27, Page 5)

Despite the existence of engagement offices at Makerere University (in addition to MUCCRI - Makerere University Centre for Climate Change Research and Innovation), the lack of this knowledge in the immediate community members signifies the gap in the relationship between the university and neighboring local communities especially on matters of climate change. The above suggestion by the community leader could help to bridge the seemingly existing gap and instill a bidirectional sense of ownership both on the side university and the local community. Actually, one community leader further proposed that local communities should be given a chance to be part of top management councils of the universities, at least one representative or two so that there is a direct linkage between local community challenges and university management. He noted that "The universities have enough resources, enough infrastructure, enough equipment to do research and find solutions to the communities, which communities might not manage. Makerere University community is at the centre of the city. So, it is diverse in terms of culture, in terms of tradition. So, all that would need a representative at least so that these environmental and climate change issues that are affecting so much of the community members can be addressed". (MAK, CL2, lines

22-29, Page 7)

It is however a fact that MUK involves external communities in its decision-making processes. For example, the membership of the University Council, the highest decision-making organ of the university, and the University Senate includes, among others, representatives of certain external communities, for example, the Ministry of Education and Sports. In fact, in 2006, Mugabi (2014) revealed that MUK bestowed honorary professorships on four people from the public and private sectors in recognition of their contributions to the country. The idea was that the honorary professors would mobilize resources for the university, enhance the involvement of the public and private sectors in the affairs of the university, and enable the university to make appropriate responses to the needs of society. However, this was long ago and did not continue in recent days. On the other hand, this kind of involvement could be too broad to accommodate the wishes of the neighbouring local communities to have a representative on any of the university's governing bodies.

The above sentiments from different participants denote that the university's extra commitment to engagement programs has the potential to necessitate the creation of university-wide agendas and support institutions in terms of policies, structures, and climate change practices within the communities. This can further guide and facilitate the involvement of the academic units, faculty, staff, students, and external communities in engagement programs that address mitigation and adaptation of climate change.

Notably, the general feeling among the interviewees was that CE is an important function because it enables the university to interact with and share knowledge with external communities. Therefore, the main issue is to enhance the involvement and

commitment of the academic staff and students by providing sufficient institutional support to enable smooth and meaningful climate change action within the communities. However, it is important to note that this kind of engagement (as postulated in the above opportunity) is unidirectional and does not adequately adhere to the values of *Ubuntu*, particularly reciprocity and interdependence. While the university staff calls for institutional support, they can equally establish avenues for communities to actively participate and benefit university programs for mutual benefits. This is especially due to the richness of African indigenous knowledge (which is adequately presented in a later theme) regarding climate change mitigation and adaptation. *Ubuntu* values clearly advocate for bidirectional engagement of communities, working hand in hand to address existing challenges.

Although the involvement of external communities in the academic, administrative, and other affairs of universities appears to serve a ceremonial role, Mugabi (2014) notes that, if effectively actualized, it also facilitates the exchange of knowledge between universities and external communities, enables universities to mobilize external funding and enriches the learning experiences of students. Accordingly, it is unsurprising that MAK recognizes the importance of the involvement of external communities in its academic activities and decision-making processes. The university needs to show vivid commitment and actualization of this recognition (of community engagement) through holding consultative conferences within communities (especially local) during which it shares information with, and involves, other external stakeholders in its decision-making processes.

4.5.1.2 Leveraging traditional conversation spaces (Barazas) for UCE and pathways for sensitization

The second category that emerged from the data relates to creating traditional conversational spaces commonly known (in African contexts) as Barazas not only to enhance university community engagement programs on climate change action but also to create an opportunity for shared awareness between the universities and communities. The Baraza is a semi-formal public gathering held in communities in African contexts at the behest of local administrators (Omanga, 2015). The aims of the baraza are to pass critical information, to deal with rising information in a locality, and to collect the views of the local community on certain issues. In this regard, participants indicated that this can give universities and communities a common ground and be able to position such institutions as being close and relevant to the communities, partners, and action-oriented to change the mindset and perceptions of communities about universities and engagement programs. In similar sentiments, participants opined that such African traditional spaces would be fertile for universities to express commitment with different external stakeholders like national policymakers, scientists, local knowledge holders, and local community members to deliberate on how to address climate change issues (knowledge, adaptation, and mitigation). Some of the participants noted that;

And we expect that since they have a lot of knowledge about a lot of things including climate change and protection of the environment, we can really, really have an opportunity to work together. Let them give the community and other stakeholders a chance to work together and then let us know what is supposed to be done in terms of protecting the environment and understanding what climate change is. Because what you're telling us is important, but we either don't know or know it in our own way. Let us know what the use is in engaging with the communities. Because for us, we don't know. Most of the people don't know the importance of university-community engagement (MAK, CL1, lines 12-19, Page 4).

So why can't the university give us an opportunity so that we sit together as leaders inform them of our problems, and then they come and give us knowledge because they are the creators of knowledge and the community should be the consumers of knowledge. So as leaders, both leaders of the university and the communities we should work together and look at the opportunities and avenues that can be utilized to sort out problems of the community. Because, that coordination, that collaboration is not there. (MAK, CL4, lines 13-19, Page 5)

These sentiments from the community leaders further cement the belief that barazas have the capacity to provide a platform for in-depth knowledge exchange and contribution to climate change mitigation and adaptation practices through different knowledge sets and worldviews from different policymakers, scientists, indigenous people, and local communities. So far, most of the community engagement programs on climate change implemented by Makerere University are part of research projects and therefore not well structured and on a large scale as expected (Ssekamatte, 2021). Advertently explored, this collaborative space for the university's third mission would involve local communities, local governments, academic institutions, and non-governmental organizations. This would reflect the envied commitment from both universities and communities to ensure a holistic understanding of climate change knowledge, and challenges and explore further opportunities. It was clear that universities should listen and give opportunity to diverse voices leaving no one behind and deconstruct the notion of tower and monopoly of knowledge. This would forefront a double sword to climate change problems with universities and communities addressing climate change issues from either side. This is further emphasized in;

That's what I called the co-production of these frameworks. So, for instance, when you look at a community like Karamoja, Buganda which is now so congested with different tribes, and other communities of this country like Northern Uganda, Eastern Uganda, Western Uganda, where we've had their cultural and local pieces of knowledge still existing and is still in play. You cannot sit here in Makerere and come up with a community engagement project before

reaching to those people because they understand the local context very well. You have to look at what has been happening in their area so that you can say, okay, if we need to change this, it shouldn't be in line with their local context such that people embrace it. (MAK, US4, lines 1-9, Page 11)

we need to have an open dialogue with these communities. How do they understand climate change? The truth is, yeah, some people have discovered that the rains are short-lived. When the heat comes, it is too much, like currently the heat is too much. What do people think about climate change? What do they think would be the drivers of climate change? What are the experiences, some people I've lived long enough to know that you know, they used to get rain at this time or they used to get this number of grasshoppers but they are no longer to get that. All these have knowledge related to climate change. So can we also not put ourselves in a position of wanting, to educate, engage, and disseminate but also to hear from these people the experiences of what they think the solution is, and we see if we can work with them and address these issues? (MAK, US5, lines 1-9, Page 10)

The participants' account touches on the core aspect of Ubuntu as an African way of communalism, interconnectedness, and reciprocity which are inherent in most of the African social and cultural structures and therefore are key drivers for what individuals, institutions, communities and nations should do for humanity and communities (Ssekamate, 2020). Notably, these spaces are therefore relevant for the co-creation of climate change knowledge, awareness, and sensitization among community members. This is emphasized in;

We can explore any local community spaces for conversations and sensitizations. For example, our local council meetings, local community meetings, etc. could create a platform where we can engage, share knowledge, and work together.... if there is this engagement opportunity, then we could be sharing with them the challenges that communities are facing, actually includes what students are facing, and the issues that we have with them especially to do with the environment. Thus, a common local platform is very, very, very necessary. (MAK, CL1, lines 20-28, Page 4)

Therefore, what is important is sensitization, it should be given a key priority, because people need to understand why they are keeping these trees and they shouldn't just be planted, but they should also grow. So, there needs to be some awareness creation, so people get to know the importance of environmental management. That will be very, very important for the community and also for the environment. So,

through this sensitization, the university can come up with some innovations that can really fight against some pollution like plastic pollution. (MAK, CL1, lines 4-9, Page 5)

It is clear that such traditional spaces can also provide another alternative room for awareness creation. To the belief of the participants, this opportunity can provide a dialogue apace among local communities, universities, and other relevant stakeholders to identify climate change themes, challenges, and policy questions to be addressed by relevant bodies like NEMA, NFA, and relevant government ministries among others. Participants noted that the preparation for these workshops should involve several integrated activities that boost trust among the engagement entities like local establishments, and the university planting a forest. Thus, during these workshops, the university can implement its third mission but also be an opportunity for community members and university members to learn from each other, and exchange knowledge, culture, and experiences through showcasing the application of local expertise in the use and management of climate change actions.

Another point raised was that traditional local leaders who actually have a lot of influence on the people in an African setup should collaborate with university administrators to organize, mobilize, and sensitize the community members. One of the participants noted that;

Here in Buganda, people are still so traditional and have a lot of respect for the Buganda Kingdom. So, it is very, very important for the university to tap into that, if they have programs, if they have knowledge that they want, they can use that platform of these leaders, once a cultural leader here does say something, it is highly believed easily, believed by their subjects. So, the university needs to connect to that immediately. The advantage they have more than us is that for us, it is seen as politics because we are local leaders under the local government. So, they will look at you in terms of your party. And if they don't agree with you, that is hard, but with Buganda kingdom, is one kingdom. So, there is a strong heart, belief, and loyalty to the kingdom. MAK, CL1, lines 3-12, Page 6)

While local government leaders might be seen and perceived through their affiliated political parties, traditional leaders in different communities are looked at differently as they unify larger scopes. Currently, political parties represent different ideologies and loyalties and it is very possible for a leader's opinion not to be heeded because of their political affiliations. On the centrally, cultures and traditional leaders have loyalty and respect that is beyond political affiliations which could prove critical owing to their authority and proximity to the people and their primary mandate to preserve customs and traditions. Traditional leaders can then cooperate with locally elected government officials and other stakeholders to ensure common knowledge of climate change and the effectiveness of related programs.

Lastly, together with the university, community leaders regarded these traditional spaces as avenues where different stakeholders can come up with innovative ways to deal with other sources of energy. The baraza could be a favourable space for training the locals about how to engage in other sources of energy that are climate-friendly. Oen community leaders argue that "You see people using charcoal are putting pressure on the environment and this is a suburb and most of the neighbouring communities are actually slums where people don't have enough money and at the end of the day, there is a lot of pressure on the environment in terms of cutting trees, in terms of poor sanitation thus, the environment is affected in very many ways. (MAK, CL2, line 8-12, Page 7). Another participant indicated that;

the universities should work very hard on innovations to help people with alternative sources of energy. Because for sure now electricity is very expensive. And this has been forcing people to go back to trees as the available alternative. But talking about recycling, and other innovations that can be made for tentative sources of energy could be very, very useful for the community members and strengthening the collaboration between the university and the community because. (MAK, CL1, lines 26-30, Page 6)

To create awareness and change the mindset and perceptions of the community members, the university should be in the community and vice versa. Indeed, some participants argued that some community members still believe climate change issues are for the learned to understand and handle which is a problem itself. A participant noted that that gap intensifies the climate change problem and impedes community engagement programs. He noted that

“The day that gap will be bridged, the better, even when you just release policy brief in the newspapers, the local people down there can take it serious. The only way I think that could be done is; we stop making people see it as Makerere or Ndejje or Bustema, a separate community from the local community. So, what I'm trying to mean is, besides us going to their communities there, can we establish programs and common avenues that are going to make that 50-year-old man who didn't go to school see Makerere as a normal place to go to. because if they don't understand what we do here, they will never understand what we are doing. (MAK, US4, lines 18-25, Page 11)

Broadly speaking, in Africa, and taking the example of Uganda, there is a need to promote bottom-up approaches and community action, whether it is in terms of research, whether it is in terms of learning, whether it is in terms of innovations. There is a need to develop leadership centered on communities that are impacted by climate change. I don't think that today's anyone is going to be more interested in knowledge, interested in bringing solutions than someone who is most impacted. I think the paradigm needs to shift from looking at communities as you know, just for as of events, or as people who know nothing but empowering them. (MAK, US3, lines 1-5, Page 8)

As indicated by participants, the *baraza* in the form of open-air meetings needs to be convened by a local leader in collaboration with institutional leadership for the purposes of addressing climate change issues and ensuring that the government agenda and policy reaches the grassroots (Omanga, 2015). This traditional formal gathering is used for the purpose of interaction among different stakeholders. Baraza (as emerged from the Swahili culture in the independence period) was viewed as a forum arranged by the public administration aimed at consensus rather than debate. Actually, currently,

all Kenyan chiefs are required by law to convene at least two *barazas* every month (Omanga, 2015). Makerere University can thus ensure a well-established relationship with local area Chiefs, their assistants, and village elders within communities in Uganda. This could be critical for disseminating or enforcing relevant information regarding climate change mitigation and adaptation and sensitization on climate change policies within their localities. The call to decolonise research processes and knowledge produced through them has spawned a powerful shift in working relationships between community researchers and members of local communities by leveraging traditional conversation spaces (Chubb et al, 2022).

Importantly, Collaboration among universities, local technical government departments, and community members ensures that project activities are more likely to be sustained over time. Information disseminated to communities should be simple, relevant, digestible, and applicable to ensure that climate change adaptation tools and techniques become part of broader community life. Phatshwane (2024) has indicated that indigenous communities share information orally, through traditions like conversations; documenting their histories, and sharing knowledge by word of mouth from one generation to the other. This is mostly through songs, discussions, folklore, proverbs, and storytelling among others. Such platforms have the potential to explore and co-create multiple indigenous climate change adaptation and mitigation measures for climate change.

4.5.1.3 Incorporating CC Indigenous Knowledge in mainstream academic and engagement programs.

“Let our knowledge be vivid in African University’s curriculum”

Indigenous knowledge or African knowledge (used interchangeably) is experiential knowledge based on a worldview and a culture. This knowledge is passed from generation to generation usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation and conservation, health care, education, and a wide range of other activities that sustain a society and its environment in many parts of Africa. It was clear from participants in this study suggested a bottom-up approach that values African Knowledge systems. It was clear that universities only seeing themselves as experts and sole knowledge creators create unfair and unbelievable engagement with communities. Thus, exploring indigenous knowledge as a missing link is part of the product picture of moving beyond the prevailing paradigm where universities are out there to extract information from communities but work with them as collaborators, including valuing their knowledge systems. Moreover, this experiential knowledge is highly believed and trusted by community members and could have the potential to address climate change is fully valued and acknowledged, incorporated in mainstream academic and engagement programs. Regarding valuing traditional knowledge regarding climate change action, some participants noted that;

I talked about experiences, and especially the context of climate change, valuing experiential knowledge, tacit knowledge, rather than focusing on explicit knowledge, so, it's part of that broader equation, that it's one of the missing links, where communities have capacities, they have capabilities that are never valued in knowledge creation, knowledge use and practice. (MAK, US3, lines 13-20, Page 7)

one thing we must know is that indigenous knowledge is highly trusted by people. I'll give you an example, there is a lot of traditional knowledge on rainmaking from the indigenous point of view. I would love to tap into that knowledge of how the common man believes that

he can be able to make rain, especially when the drought has been prolonged. Then, because we can talk about climate change without talking about the drivers of climate change. One of the major drivers of climate change is biodiversity loss, destruction of habitats, etc. And we used to have indigenous knowledge that used to ensure that people protect these habitats. Forests used to be revered because we were used within God's residing forests. Big trees used to be worshipped. Yes, we thought these were gods and inadvertently this ensured that these resources were not destroyed, touched on touch. (MAK, US5, lines 20-29, Page 10)

Indigenous knowledge is very important and is becoming very critical and popular because you cannot come up with innovations about climate change that are quite disoriented from traditional knowledge. We can start from there, what is it that people can contribute, and what is it that they already know, let us not assume that they do not know and avoid overdependence on the knowledge created at the university. once people begin with what they know, they can integrate with what they do not know that can be accommodated within their knowledge and resources. (MAK, US2, lines 1-7, Page 14)

Acknowledgment and valuing the indigenous knowledge system in the African context is core for meaningful and constructive engagement opportunities to address issues of climate change. Building on what people know, as the saying goes, ‘the best scientists are the practitioners’ because they know. It should never be assumed that practitioners do not have knowledge about a phenomenon they experience on a daily basis. This implies that what universities can do is to take what is already possibly in nature, or in people and put it in a scientific way. So, the existence of indigenous knowledge on climate change, mitigation, and climate change adaptation strategies is an opportunity, especially for cross-pollination, that some communities might be way ahead in how they are dealing with climate change issues. And that presents an opportunity for this information can be disseminated or can be even modelled to predict what is likely to be because of the dynamic nature of indigenous knowledge. Thus, in that way, universities can model and know how such is likely to change, maybe over the next 50 or 100 years, given the impacts of development on the community.

Besides renewed value and acknowledgment of indigenous knowledge, participants went ahead to suggest that African traditional knowledge should be weaved and integrated into university academic programs for students and staff to be aware and apply it in engagement programs. Regarding integrating indigenous knowledge in mainstream academic programs, participants suggested that such knowledge on climate change should be inculcated in study subjects, weave Western and traditional knowledge in teaching, and engage in folk taxonomy among others.

I would think of curriculum developers at the university considering local knowledge of climate change solutions on topics they teach. They should give a chance to our traditional knowledge, especially on the basis of being African universities. They should stop living in denial that there are African-based solutions that can also contribute to the existing Western education knowledge that students currently get at the university. So that combination of the two kinds of knowledge can be effective. There is a saying that two heads are better than one. So, if we have a scientific form of knowledge, we can also have a traditional indigenous form of knowledge that can be effective in addressing issues of climate change, because before Western education, we did not have a lot of these issues of climate change. Let our knowledge be vivid in African University's curriculum (MAK, CL2, lines 1-7, Page 8)

In this folk taxonomy, there are some trees whereby our old tradition, probably our ancestors used to say that if you cut me, bad omens will follow you, and actually those trees should be preserved at the botanical garden for study purposes. So, that folk taxonomy was used by those traditional people to preserve our climate and we can still disseminate such knowledge to communities and it might be of great help in climate change mitigation. (FGD MAK, PA, line 24-28, Page 18)

We can help by working together to protect the environment. We also actually have knowledge of protecting the environment, much as they might have scientific knowledge and reading books, a lot of them but we have our traditional knowledge on how we use to protect the environment before those books came. The environment was very good. But now with their science and whatever, imagine the environment is being destroyed. Why can't they come back to us and we contribute also to the little that we know traditionally that can protect the environment? (MAK, CL4, lines 27-31, Page 5)

In relation to the above suggestions, other participants further suggested in-depth research on different forms of knowledge systems that can inform decisions to integrate indigenous knowledge in academic programs. Participants argued that both the community and the university can collaborate to research such knowledge so that valid inferences are made and people get to know how such knowledge was vital in the protection of the environment and how relevant it is now. This is expressed in;

Enough research should be done on how the loss of indigenous knowledge has led to climate change and how we as the current generation are going to protect the indigenous knowledge because it plays really a major role in climate change. Another example is like our grandparents, they used to preserve some trees. They would tell us that if you cut this tree, this will happen, when you cut this tree, the rain might not come when you do this, we would get drought for this period of time. And for sure, think of knowledge is easily believable and conceivable by the community members more what we produce here in classes and laboratories. Let us also have research on our traditional knowledge, let there be comprehensive studies done like on traditional adaptation measures to climate change, (FGD MAK, PG, lines 12-19, Page 18)

Different communities have different climate-related problems given their socio-economic situation, cultural orientation, political situation, and geographical outlook. This is because climate change affects different locations and sectors variably though it cuts across sectors. These differences mean that communities experience climate change effects differently and, therefore, research must be carried out within the context of these differences across locations to generate multifaced pieces of knowledge regarding traditional mitigation and adaptation practices.

Lastly, as earlier alluded, participants recommended the integration of indigenous knowledge in engagement and outreach programs by the universities. In this case, universities can work closely with communities, and intermediary stakeholders to discuss, provide insights, and co-identify indigenous knowledge activities or practices

relevant to mitigating and adapting to climate change. A participant argued that it might not be fully productive to always underpin engagement programs and projects with laboratory and experimental activities which highly suggests a disregard for African Knowledge. Notably, participants indicated that indigenous knowledge-related activities on climate change are believable by community members and such knowledge could have a soft landing in terms of comprehension among the community members. This was expressed in;

we can blend indigenous and scientific adaptation and mitigation activities together, I think both can go hand in hand. But if you have only scientific knowledge related to programs for the communities, it cannot help because e.g., if I go like to my village and I take those weather forecasting instruments to the village, most people will not know those things. But if you incorporate knowledge like folk tales, indigenous species of trees for planting, indigenous livestock husbandry, and indigenous health care among others, that they have grown up seeing, it will be more believable to them. (FGD MAK, PE, lines 26-30, Page 19)

When you do maybe like a scientific evaluation, you'd see there is a problem that if they say like, let me go to agriculture, if a weed grows in some area, they are like that weed is attached to so infertility. As a scientist you doubt this, you didn't come and do soil samples and do over-testing, but it's true, at the end of the day, you will see that maybe there's something wrong with the pH, maybe water infiltration, and you didn't put it into consideration. So, I really think as Africans or Ugandans we should refer to our indigenous knowledge. (FGD MAK, PB, lines 14-19, Page 19)

In terms of research, there seems to be a lot of potential and space for indigenous mitigation and adaptation knowledge that can possibly make a difference it is thus paramount to enhance this kind of research profile, inform policy, and enhance the third mission of universities. Findings can further guide the integration of indigenous knowledge in the university curriculum, enhance knowledge demarginalisation, and translate the knowledge into practice.

In the education sector, it has been noted that each year, millions of learners lose access to school due to climate- and environment-related events like extreme weather events and air pollution. Higher climate risks mean greater risks to education, through increased likelihood of internal displacement, food insecurity, damage to education infrastructure, and negative impacts on children's health and wellbeing. But despite their severity, these issues have not been at the heart of either education or climate debates especially African indigenous climate change knowledge. Notably, their critical intersection is often overlooked. This leads to missed opportunities for knowledge-based action and comprehensive solutions.

This opportunity provides an intersection of diverse world views and knowledge to develop contextualized programs and activities and ultimately collaborate to create solutions for the natural environment. Representatives of different communities can be engaged and knowledge exchange occurs across and between local communities together with the university knowledge experts. It would also expand the knowledge base and broaden contextualized policy options for informed and locally appropriate decisions. Indeed, universities should consider indigenous and local communities, whose traditional knowledge could significantly enrich global efforts towards climate change action.

As one of the specific objectives under goal one (a research-led university) of the 2020-2030 university strategic plan, Makerere University encourages inquiry into African problems by leveraging African indigenous knowledge. To achieve this, the University leverages its premier position to create a critical mass of graduate enrolment to act as a base for knowledge generation. Transfer Partnerships at the university act as the vehicle through which ideas generated from basic and applied research within

traditional communities make meaningful contributions to the development and transfer of indigenous knowledge to communities to address environmental challenges like climate change.

Tweheyo et al, (2024) note that the most indigenous knowledge is key in addressing climate change issues in African contexts and local communities have been able to innovate some of the most amazing best practices e.g. through taboos and prohibitions. These may be particularly crucial to the implementation of adaptation and resilience interventions. This is supported by Gwali (2014) who argues that local communities in different African contexts have been able to exist for centuries because of their ability to understand nature through due regard of the taboos and customary practices regarding natural resources.

4.5.1.4 Harnessing women's knowledge, experiences and contribution

Despite the wide acknowledgment of women's role and enormous potential leadership for sustainable development, there were clear concerns from participants that such women's capacity is not effectively exploited especially in the African context where there are several constructions on the role of a woman in society. Thus, an opportunity to mainstream gender knowledge, experiences, and contribution towards climate change knowledge, mitigation, and adaptation. Participants suggested that universities need to work hand in hand with communities and appreciate potentially integrated approaches suited to gender contribution to climate change action, triggering new dynamic social spaces for women to engage for instance in policy formulation and decision-making.

all those constraints are what we can try to mitigate alongside climate change so that a man and a woman are able to work better for the wellbeing of the family in the face of climate change. So that even

the new interventions that are coming up target both, so that and primarily the woman, the woman, you know, because women are the ones who are always in the garden longer compared to the men, especially in northern Uganda, women are they like, they do a lot of work, they are the ones in the garden, men are just served food, they lie in the trading centres drinking (MAK, US2, lines 1-6, Page 6)

women's knowledge and experience must be used. they face a lot of disadvantages, as we might, we might also know in terms of underlying social-cultural construct, they don't own land, they don't own resources, in terms of income, rarely, they are harassed by the communities in terms of opportunity, the control of income, sometimes in the hands of a husband, if the woman makes the money. But in the African setup, largely, women interact with land and the environment at large, more than men, if both universities and communities can work together to mitigate these genders-based exclusion and then utilize the opportunity, we could move faster in stabilizing the climate (MAK, CL5, lines 20-26, Page 5)

And while we are working with women groups, husbands should be available too. Very gender transformative, as we think about women, we don't forget the men. And we know that they operate within households where husbands and brothers and sons also live. But we know the role of women in the household is very critical, especially if we are talking about climate-smart agriculture, if we're talking about food security, we're talking about issues of nutrition, it is a woman it is a mother, that plays a key role in determining the food that they have to for the family, the kind of food when is going to be cooked, how it is going to be served, and where it is even going to be grown. (MAK, US2, lines 19-26, Page 5)

In order to mitigate social cultural constraints that limit women's full participation in engagement programs towards climate change action, participants feel that there is a need to effectively utilize women's experiences with the environment, their knowledge of agriculture, and climate change to efficiently implement mitigation measures that are gender sensitive. This means that a feminist approach to climate change action not only addresses injustices and barriers that keep people from participating in sustainable change but encourages all people to work together toward climate-resilient and sustainable development. In an African setup where women have no say on environmental issues in most communities, land ownership, and decision-

making, universities, and community leaders ought to initiate engagement programs on climate change action that are explicitly geared towards inclusion.

It is true that in a community setup, all actors should exercise some form of visible or invisible responsibility in different situations to address social problems. Implementing a landscape approach to better help recognize power differences and create a space for marginalized actors to participate in decision-making and policy formulation. Thus, it is a responsibility not only for the university but also for its external stakeholders to build capacity that is gender sensitive.

so yes, I'm in class, but outside there we need to work with people who work with communities to do a better job and build capacity, giving skills, giving the tools. What are the agenda tools? What helped you talk to the women with you in mind? Even how do you access the household to be able to talk to both without causing tensions and using breed for men and women differently? No, you don't. But you might have to be very cognizant of them. For instance, women's constraints, if you're going to breed and produce climate-smart technologies that are going to burden women and girls, to drop out of school because they are going to weed the entire gardens, then you are doing harm than good. So those are the messages we want to show that yes, we can come up with these climate change and smart interventions but be gender sensitive. (MAK, US2, lines 17-26, Page 4)

and we want to work directly with the women, we develop interventions, use our indigenous knowledge, use the ICT method, randomised control trials where we have different options, and intervention suits, that might work better, we want to know what might work better for women, smallholder farmers to adapt better to climate change shocks in those agricultural communities. So, if we give gender transformative training, we give a revolving fund for women to purchase for instance seed that is more resilient to shocks and then give them business skills where three or four things will need to work best than for other communities, to me, that is a great opportunity to uplift women in climate change fight. (MAK, US2, lines 4-12, Page 5)

Universities and communities have to promote women and their contribution to sustainable development and mobilize to advance land rights for women and girls in the university, communities, and external stakeholders like NGOs and the entire civil society. These can lend their support by reaching out to local communities and

advocating the key role of gender equality in empowering women to also be at the forefront of climate change resilient efforts. This could be through; the promotion of laws, policies, and practices that end discrimination and secure women's rights to land and resources, prioritize women and girls in their investments and facilitate access to finances and technology, support women-led initiatives and raise awareness of the disproportionate impact of climate change on women and girls and the barriers they face in decision making on environment issues, as (in African context) they do not have access and control of land resources in most African communities.

As noted by the participants, gender justice is key to effective climate action, especially policy. In fact, if universities and communities effectively explore gender-equitable structures, it could prove to be a crucial factor in reducing Uganda's greenhouse gas emissions and building resilience among community members. Due to the widespread, gender-specific distribution of everyday tasks and care work in different African contexts, women have specific knowledge and skills as providers, educators, energy users, and land managers while they work in agriculture in most rural setups. Therefore, they have important knowledge to deal with the climate-related risks to water and food security. Relatedly, indigenous Peoples, especially indigenous women, are crucial knowledge carriers for biodiversity conservation and climate action. Their transformative potential can only unfold if their rights are respected and they are participating in political processes. Actually, the Paris Agreement declares gender equality as a principle in addressing climate change (Soergel et al, 2021). The implementation of the Paris Agreement and the 2030 Agenda requires a just transition in our societies. In the process, discriminatory structures must be removed and an empowering environment for women and disadvantaged groups must be created.

In consideration of movements like sustainable development and environmental justice, inclusive climate action addresses a growing problem of underrepresented or excluded social and gender groups, who often suffer the most as a result of climate change (Chu & Cannon, 2021). Therefore, universities and communities tapping into this opportunity means reducing both the effects of climate change on the most vulnerable and ensuring the benefits and burdens of climate action are equitably distributed. Climate action becomes inclusive and diverse by engaging a wide range of stakeholders, designing policies that are fair and accessible, and equitably distributing engagement programs. Gwali, (2014) recommends that in designing and implementing community adaptation and resilience interventions, great care and consideration should be taken of the gender relations, wealth, power relations, culture, and traditions existing in the local communities.

4.5.1.5 Community Empowerment and Income Diversification as a Key to Building climate resilient Communities

These are prospects that participants thought that both universities and communities can collaborate on to empower community leadership and resilience to the impact of climate change and at the same time strengthen their sources of livelihood to restrain them from tempering with the environment and other carbon sinks. Participants noted that building strong capabilities and capacities at local levels could be significant in sustaining climate change action and engagement efforts at the case universities and communities. A participant argued that there is a need to strictly change the current paradigm of thinking and acting up the university and then begin by building the institutional arrangements and capabilities at the local level, whereby people can be able to adjust their capabilities as changes happen, and also as they are foreseen to happen. It was further noted that a chance should be given to community-based research

arrangements through community-based information exchange to stimulate community-based adaptation and mitigation measures. To this, a participant noted that;

Empowerment of these communities, to take leadership in terms of what they can be able to do, of course in partnership with others could be very, very key. so, I think we need to embrace local-level leadership. So that in essence, you're able to build institutions at the local level, you're able to build the capabilities at the local level, you're able to build relevant and context-specific knowledge systems that assess sustainability in that context whereby it's embedded within the context within which they operate, rather than having copy and paste mindsets, abstract way of looking at things because climate change especially when it comes to responding to, it cannot be abstract. Yeah, because mitigation, maybe you can, you can copy and paste many things but not everything, of course. Community leadership should be empowered (MAK, US3, lines 5-13, Page 8)

It is clear from the above quotation that increasing community resilience requires collaborative support to community-based disaster management structures. These could prove to be effective platforms for community leadership organs to mainstream disaster risk reduction and climate change adaptation into local planning processes to reach every community member. Effectively empowered, universities can assist communities in designing community-based adaptation interventions and embed those opportunities for cross-learning between local stakeholders and across other similar contexts in numerous regions. Therefore, empowering community leadership and members indicates that supporting the establishment and strengthening of community-level committees and providing members with relevant technical expertise provides an effective platform for communities to mainstream disaster risk reduction and climate change adaptation into local development planning and budgeting processes. Committees can also play an integral role in government-level development, planning, and disaster response mechanisms.

Participants also suggested that universities together with community leaders can source funding for projects to promote alternative livelihoods, and sources of

energy and sustain basic needs as a measure to build climate resilience. Participants strongly expressed that Climate change adaptation interventions cannot achieve sustainable results without dealing with the fundamental root causes of poverty and vulnerability. Participants decried the sickening poverty that is within most communities in the country which actually for people to environmental destruction, a huge driver for climate change.

we need to ask ourselves what is driving the community members to destroy the environment. Our biggest huddle is poverty and hunger, that is why you have all this charcoal burning, swamp destruction, and other causes of climate change. Once we understand this, can we look for avenues to empower these community members? I believe if civil society, university management, and we community leaders combine our efforts, we can improve the livelihoods of these community members. (MAK, CL1, lines 4-9, page 7)

We need to get more funders or more people are interested in this. As I said like although we got triple GI also need to get now other organizations like the UNDP United Nations Development Program. We need to get other organizations that like Million Trees Uganda that can support, that can support climate financing. (MAK, US6, lines 10-13, Page 11)

I think there is also a need to have some arrangement that promotes local financing arrangements, so that in essence, you can have partnerships, partnerships across different communities that look at the universities as partners or potential partners. (MAK, US3, line 3-7, Page 7)

Participants clearly decry poverty as one of the drivers of climate change. They explicitly feel that universities can collaborate with communities to promote local financial initiatives. In an effort to effectively utilize the would-be available livelihood diversification opportunities, a participant noted that there needs to be well-organized and structured household models to ensure transparency and achieve the set targets. He noted that;

We should develop small group or neighbourhood models or household models where people come up with ideas of how they would want their neighbourhood to look like or what they would want to have or the policies they want or the things that they would want to follow

and how they would conserve and protect their environment. So, in those small groups, I can say about 10 homes, they will have a leader who effectively checks on the progress of these ideas they come up with to effectively involve the communities. (FGD MAK, PJ, lines 24-30, Page 20)

Continuing support for income diversification is required to ensure that effective capacity is maintained and strengthened. Universities engaging closely with a range of different community groups and associations in developing and implementing project activities can assist communities to more effectively build their capacity to provide ongoing support for local adaptation actions in a collaborative and holistic manner and reduce the destruction of the environment. It is a common story across many rural communities in African contexts where rising temperatures and unpredictable rains are upending food security and diminishing already low-structured household income.

As suggested by the participants, a collaboration of universities and communities can come up with a comprehensive plan for climate risks, take up or have training on climate resilient agribusiness practices to strengthen their livelihoods through diversification, knowledge about climate-resilient agricultural commodities like cowpeas, sunflower, and peanuts (Masson-Delmotte et al, 2022). Gwali (2014) acknowledges that in Uganda, poor communities, households, and individuals with the least resources have the least capacity to adapt to the impacts related to these hazards and are therefore the most vulnerable. Globally, the World Bank (2020) has indicated that the goal of ending extreme poverty by 2030, is at risk and could be beyond reach in the absence of swift, significant, and sustained action, and the objective of advancing shared prosperity.

4.5.1.6 Synergetic approach for policy formulation and implementation

Participants from case one suggested this synergetic approach for policy formulation and implementation as a strategy where universities and communities combine their efforts and resources to accomplish more collectively than they could individually. Participants hope that this can eventually result in increased productivity, efficacy, and performance when their combined implementation results in progress for climate change action could be greater than the sum of the individual impacts of each entity. Participants' views also touched on the questions of policy design in general, on how to avoid contradiction and foster synergies between interdependent policy views. As a crucial instrument for guiding action and decision-making on climate change action, university community engagement can enhance the incorporation of locally available policy components based on research by universities and indigenous knowledge systems. Participants further acknowledged that such synergies can be critical in resource mobilisation, promote collaborative investment in key climate change action areas, build consensus and also create a sense of ownership among the community members. Some of the participants pointed out that;

as the practitioners and the people whom the policies affect, we need to be involved in the processes of formulation. There should be consultative meetings. And maybe that opportunity can be brought by the university. Because it is the nearby biggest institution that can create space for us. We need to understand that process to do with the law so, they can come up with community laws, maybe sensitize us on different laws, listen to our concerns about some policies and laws, and also make sure that our ideas are incorporated in either formulation and creation of some policies, both within the university and also government level these people in my community, some of them don't know these policies. They don't know environmental policies, and they don't know policies about climate change, much as it might be a responsibility of the government, but the university is the closest that we have with us so it can take that initiative and be also a space that can be occupied with this engagement opportunity. (MAK, CL2, lines 22-30, Page 6)

maybe I can say we need to make more climate strikes, but also, we need to try to follow up our recommendations to make sure that these recommendations are put in place, especially by making sure that among the recommenders, one appears on the implementation board because we are the people with the ideas and so if we give you an idea that's part of the idea, you may sit with the idea. (MAK, US6, lines 14-18, Page 11)

The community members have challenges to do with understanding policies that govern the environment or even the mandate, I mean policies for university engagement. So, it's important that the university occupies that space of locally available platforms so that we can engage each other and be able to have discussions about better propositions for policy, understand climate change better, and even propose better adaptation strategies that can surely effectively address climate change. (MAK, CL2, lines 11-15, Page 6)

As suggested by the participants, the process of policy formulation should be cyclical, rather than linear or static, and formal. In the Ugandan context, the formulation of policies is often undertaken by the government including ministers, civil servants as well as other stakeholders. However, community leaders undoubtedly feel they do not contribute much to the formulation of such policies. Moreover, they indicate that they are uninvolved and unaware of the university's mandate and policies that govern community engagement. It is on this basis that they think of a collaborative approach to policy formulation that provides a more unified set of frameworks to guide stakeholder engagements and climate change actions. Relatedly, one local community leader proposed that local communities, especially near the universities should have representatives on university management boards. He noted that;

The communities should be given a chance to be part of the top management of the universities at least one representative or two, so that there is a direct linkage between community challenges and university management. The universities have enough resources, enough infrastructure, and enough equipment to do research and find solutions to the communities, which communities might not manage. Makerere University community is at the center of the city. So, it is diverse in terms of culture, in terms of tradition. So, all that would need a representative at least so that these environmental and climate

change issues that are affecting so many of the community members can be addressed. (MAK, CL2, lines 22-29, Page 7)

This engagement opportunity has the potential to promote a sense of shared responsibility in terms of formulation and implementation for achieving the goals and targets of universities and communities in their efforts to address climate change issues. In addition to synergetic policy formulation, another participant indicated that universities should be given more attention and space to contribute to national policies on climate change. The participant argued that universities have and train policy experts, conduct comprehensive research that can guide policy formulation, and are closer to communities than parliament and ministries that are mandated for national policies and laws.

To me to a certain point, I thought that policymaking to such sensitive matters could be left to institutions like Makerere. Because they will understand the purpose of having a given policy given the expertise at their disposal.If you leave policymaking to an institution, institutions like Makerere and other universities that understand what policymaking, and climate change really are, with all the research that is conducted, I think it would help, that these people will make a policy that has been researched best. (MAK, US4, line 1-9, Page 9)

Alternatively, the participant further suggested that the government give serious attention to policy briefs formulated by the institutions. He noted that;

If not, then the policies and the policy briefs that have been created by these different institutions should be taken seriously. We had an issue of urban flooding here in Kampala, but I landed on a framework and drainage structure that was created by one of the professors. I think he was one of the former heads of the Department of Geography here at Makerere. That framework and the journals that were included in that publication were not put into action. (MAK, US4, lines 10-14, Page 9)

Conversely, another participant felt that there should be a direct conduit with the national policymakers whereby any research that has come out of climate change-related issues is directly transmitted to the parliament. He noted that if there are any big

implications, those implications should be discussed. He argued that parliamentarians for instance are also community members and their platforms could be important for policy implementation and dissemination. He noted that;

So I think the biggest thing to do is to ensure that all these institutions, either research institutions or academic institutions, if they come up with substantial discoveries or dissemination, by the way, even if they are good products that can adapt to the climate change crisis, like let us say, maybe a hybrid of a plant or anything, or a water saving stove, they should be a way that the politicians should be used to disseminate this information because people tend to listen to them a bit more. So, one, led our discoveries to reach parliament, or reach the executive, for that matter, if the drivers to climate change are discovered, can we have a law that will put a brake on such drivers in case that law hasn't been existing. (MAK, US5, lines 23-30, Page 8)

Effective policy formulation is essential to addressing social and economic challenges and achieving positive outcomes for higher institutions and society as a whole. Thus, UCE can be explored to elevate and critique the effectiveness of existing policies at national, institutional, and local levels and identify areas for improvement as well as information gaps to be filled. For instance, engagement can also be used to identify areas of biodiversity that are most in need of attention and can provide decision-makers with a better understanding of the potential impacts of different policies on a variety of ecosystems like forests, freshwaters, wetlands, etc leading to policies that are more inclusive. To effectively achieve impactful climate change action by both universities and other external stakeholders, policies need to be ambitious, holistic, and integrated. This requires a shift in thinking towards a more transformative approach to policymaking that prioritises climate change action like biodiversity conservation and restoration as a core goal for sustainable communities. This ought to be a product of a multisectoral policy formulation process, through the systemic and participatory approaches that are inclusive in nature with different community spheres.

Congruently, some studies have reported considerable gaps in policy design and implementation, including the lack of proactive engagement of communities, limitations to access of timely and reliable climate information, inadequate structures and services and resources, including financial resources, to boost local response actions (Ampaire et al, 2017; Eakin et al, 2014). This results in a persistent lack of tailored adaptation actions, which leads to failure to address local needs. Therefore, proactive engagement of local communities in developing and implementing adaptive capacity-building strategies that translate the existing, as well as new, national policy and legal frameworks into practice is urgently needed. Indeed, COP28 has underscored the importance of public and private cooperation for scaling innovative climate change solutions and potential catalysts for unlocking resilience among community members facing diverse impacts of climate change. Emphasised by the Ubuntu values of collaborations, reciprocity and interdependency, university-community collaborations have the potential to demonstrate a win-win situation for both the universities and communities where both parties benefit from proactive and collaborative policy formulation, a prime example of mutualism.

Furthermore, as postulated in Ubuntu theory, the synergetic approach to policy formulation demonstrates the benefits that can be realized when people at all levels (elite and local communities) work together on a common goal. The participatory approach in which such community engagement and climate-smart action strategies are developed and the responsibility for action at all levels is a commendable opportunity for implementing inclusive public policies. A sustainable and resilient community is key to the attainment of Uganda's aspirations in the Vision 2040 and with this opportunity, Ugandan universities and communities are positioned to lead this transformation.

4.5.1.7 Extensive capacity building

The participants viewed Makerere University as an institution that produces much-needed knowledge and resources on climate change through research and training. Participants regarded capacity building in terms of developing and strengthening the skills, abilities, processes, and resources that organizations/institutions and communities need to survive, adapt, and thrive in a climate-changing world. Being a higher institution of learning, participants believed that universities like Makerere are centres with expertise to do research, train, and bring out the real status of what is happening because of climate change in the communities and ably work with the communities to address issues as a result of climate change. In order to achieve this, participants suggested that universities should prioritize research on climate change with some suggesting that there should be a specific budget for research and engagement programs on climate change. A participant argued that the university needs to rethink how to incorporate climate change research and training across all university study programs so as to have various climate change professionals. These sentiments are expressed in;

The other opportunity that I could possibly see is that we have a way we understand the trends that we are seeing and predictions that have been made, we are able to see that yes, we can see what was predicted and we can see the impact of that. So that knowledge for me, helps us in preparing ourselves, to create capacity, it's no longer guesswork. Some people always say that climate change is a myth. The trends we have now, and what we have seen, definitely tell us what is coming. And for me, that's a very key strength, and some people even deep down in the village, will tell you that climate change is a real thing. So, if we use the knowledge we have, they will be more receptive, if you tell them that this is what we need to do because it has impacted them, they know it is real. So, I see that for me as an opportunity (MAK, US1, lines 7-16, page 9).

one of them, which is very important to me is building enough knowledge, skills, and capabilities, especially for young people. Yeah. They have a limited capacity in terms of understanding some of the critical issues. So, broadly, we need to train, and educate the masses,

that is what we may really want to do. but also making more collaboration government, with other partners, it's key, because it gives us an opportunity to learn from others and enhance our understanding. (MAK, CL3, lines 11-15, Page 6)

for example in sustainable agriculture, yes, where we can have pieces of training on farming techniques that protect the environment. E.g., the use of organic fertilizers. Those who want to use fertilizers, don't use inorganic, please prefer organic, like that... (MAK, US6, lines 6-10, Page 5)

The capacity that participants talk about is grounded in two-way conversations between universities and community members. Universities in this case have avenues for research and provision of skills and on the other hand, communities know best the context of their work and what types of support are likely to make the biggest difference. Thus, higher institutions of learning ought to seek out these insights and engage community members in the design of capacity-building approaches clearly considering their needs. That can in the end build a strong foundation for successful capacity-building partnerships. Elaborately, one university lecturer emphasised changing the current paradigm of thinking and acting up there by building the institutional arrangements and capabilities at that level, whereby people can be able to adjust those institutions, their capabilities as changes happen, and also as they are foreseen to happen. He elaborated, *“I think it's about building strong capabilities and capacities at the local level. And that includes also community-based research arrangements through community-based information exchange and many other things like that”*. (MAK, US3, lines 13-19, Page 8).

Dealing with climate change requires a lot of knowledge through research in areas like meteorology, geography, sustainable development, environmental science, disaster and risk management, policy analysis, and sociology among others. To this, participants noted that research should be given distinct priority in terms of quality and

funding to make it meaningful with the ability to innovate and sociological solutions to climate change. This can further be in terms of (as earlier alluded to) comprehensive incorporation of climate change in all university research. Participants noted that;

I think universities, all the different departments in the universities, whether they are from the humanities, social sciences, natural sciences, etc. They need to sit and rethink how they can incorporate aspects of climate change in their research, because just as HIV was a big problem, and every department in every university picked up HIV, all the attention and capacity created, made significant impacts, we can do the same with climate change (MAK, US5, lines 12-16, Page 11)

as Africa, we must invest in research, because the research helps us to generate solutions to climate change, and to have the capacity for environmental solutions. Without any solutions, then you will not fix any problem. We may need to trigger our minds to think aloud, and we may need to think of solutions but those solutions must be implemented. (MAK, CL3, lines 1-5, Page 7)

When it comes to things that require you to go out in the community and engage the community, you need money, the university may not be able to give you that money. So, unless there is strict funding for community engagement, I think that can improve things. (MAK, US5, line 16-19, Page 7)

We need to get more funders or more partners interested in this. As I said just like we have triple GI, we also need to get now other organizations like the United Nations development program. We need to get other organizations like 'Million Trees Uganda' that can support climate financing. (MAK, US6, lines 10-13, Page 11)

Capacity can also be enforced strengthened and fully funded research in order to have a more robust structure, skills, and empirical knowledge not only to be adaptive to changes but also to mitigate the changes in climate. Capacity building is therefore understood not only as human resource development but also as organizational and institutional development. It is clear from the participants' responses that there is increasing recognition of the need for a coordinated multi-strategy approach to building research capacity that is interdisciplinary. This can potentially lead to producing graduates with a pool of knowledgeable and competent human resources on climate

change and can have a positive impact on society. Particularly, the graduates would then support mitigation and adaptation efforts. They can also support policy formulation and design localized solutions to problems associated with climate change effects in the areas they work in.

Finally, in order to have sustainable abilities and skills enabling individuals and organizations to perform high-quality research, participants thought that there should be an umbrella of universities that brings together all the universities in the African Context. They believed that if there are organizations or movements that are advocating for climate change, adaptation, and mitigation, or something related to that, then institutions have to come together under one roof, share their information, and approach the phenomenon with collective capacities. It was noted that “They will have their voice, it can be on the level of a country or Africa as a continent. I believe that as Africa we have unique ways and approaches to this global problem. We may not apply what other continents have applied”. (MAK, US6, line 7-10, Page 12). Relatedly, another participant expressed that;

for me, universities have to work jointly focusing on societal needs, which is very critical. The fact that, especially in Africa, the predictions are that communities or landscapes in Africa are going to be more affected by climate change extremes puts universities in Africa in the spotlight, how do we conduct research that is going to meet the needs of the societies that are very vulnerable? It's good to think about, you know, artificial intelligence and technology, it's good to think about them. But if we are not examining the basic needs of the people, in relation to climate change, to me, we are losing the relevance of the university. If for instance, we are able to come up with strategies for people who are affected by floods, how do they cope? Or how can we predict landslides? How can we predict flooding events? If we can provide that kind of knowledge to support communities, then we are relevant. But if we go into nanotechnology and artificial intelligence, and people are dying of floods and whatever, we are missing the relevance of the university, not that they are not important. cutting-edge science is important. But there is science that we need at the foundation to support our communities.

United, we can ably handle the climate change issue (MAK, US1, lines 11-23, page 10).

The participants argue that being a continental problem, universities should work together to produce unified capacities that are widespread and benefit the common people. Despite powerful and overwhelming scientific evidence and a comprehensive toolkit of policy instruments, (as suggested by the participants) a core component of ubuntu, communalism/collectivism/solidarity is fundamental for African universities to serve as the basis for supportiveness, cooperation, collaboration, and solidarity. Communities in Africa are often characterized by a high degree of internal diversity and steep gradients of vulnerability and adaptive capacity, thus, universities have an opportunity to unify collaborative efforts to address climate change on the ground, particularly in settings with a lack of formal adaptation strategies such as in many marginalized African community contexts.

As put by the participants, Universities can offer training and capacity-building programs for local communities on climate change adaptation and mitigation strategies. This can include workshops on sustainable farming practices, renewable energy technologies, and climate-smart business approaches. Ssekamate (2021) acknowledges several other roles of the university including generating knowledge on climate change, training and capacity building on climate change, advancing innovations and technological solutions to effects of climate change, conducting sensitization and taking the lead in local adaption and mitigation initiatives at community level. If these roles are effectively utilized, they can facilitate and enable effective capacity building for the staff, students and external stakeholders and ultimately, enhance university community engagement efforts towards climate change action.

4.5.2 Opportunities from Case Two; Ndejje University

Findings in this sub-section proceed with the findings presented from case one (Makerere University). The presentation of the results is the sequence in which I generated the data, to enable the reader to get a sense of the fieldwork. This presentation and analysis are proceeded by a cross-case analysis that involves the in-depth exploration of similarities and differences across cases with a view to support theoretical predictions. The findings from data analysis are presented in six categories: institutionalization of CE towards climate change mitigation and adaptation; incorporation of indigenous knowledge about climate change mitigation and adaptations in mainstream academic and collaboration programs; leveraging traditional conversation spaces (Barazas) for UCE and pathways for sensitization; Community empowerment and income diversification as a key to building climate resilient communities, synergetic approach for policy formulation and implementation and extensive capacity building. These major themes are contextualized in different indigenous communities where data was generated.

Table 4.11: Opportunities to enhance the university's third mission to contribute to climate change mitigation and adaptation at Ndejje University

Opportunities to enhance the university third mission to contribute to climate change mitigation and adaptation	<p>Institutionalization of CE towards climate change action</p> <ul style="list-style-type: none"> • Establishment of a well-laid-out engagement structure • Bidirectional engagement planning and implementation of CC programs • Incorporation of engagement programs in all academic programs • Explicit funding for engagement programs <p>Adopting a community engagement Baraza as an alleyway for sensitization</p> <ul style="list-style-type: none"> • Collaborate with community leaders for local engagement platforms • Traditional platforms as avenues for information dissemination <p>Community empowerment and income diversification strategies</p> <ul style="list-style-type: none"> • Financial literacy and empowerment to community members • Establish collaborations with communities to source for funding • Initiating and supporting climate-smart business opportunities <p>Incorporation of CC Indigenous knowledge in mainstream academic and engagement programs</p> <ul style="list-style-type: none"> • Recognising and tapping into community experiential knowledge • Intensify research in indigenous knowledge • Blend indigenous knowledge in academic programs <p>Collaborative approach to planning and implementation of engagement programs</p> <ul style="list-style-type: none"> • Community representation at university management • Bidirectional engagement • Clear communication channels between the university and communities <p>Extensive capacity building</p> <ul style="list-style-type: none"> • Community training on environmental conservation • Adopt African based crosscutting curriculum • Source for alternative funding for CC engagement programs
--	---

4.5.2.1 Institutionalization of CE towards climate change action

This category pertains to ways and strategies that participants suggested to enable the instillation of a collective mindset and structures at higher education

institutions, particularly Ndejje University which values community engagement. Participants suggested that institutionalization of community engagement towards climate change action should be a straightforward process in the context of organisational priorities, structure, resources, and culture, and it requires changing routines and ways of thinking toward numerous engagement programs that directly deal with climate change knowledge, mitigation, and adaption. They firmly believed that this can be achieved through numerous strategies like the establishment of a well-laid-out engagement structure, institutional support to adaptation innovations, involvement of community leaders in engagement planning, university administrators picking keen interest in climate change action, and consistency in engagement programs among others.

While commitment to meaningful community engagement is infused at Ndejje University's mission statement participants argued that a lot still needs to be done in terms of increasing access to leadership; restructuring organizational networks and funding mechanisms; expanding and supporting opportunities for student involvement; and effectively supporting service-learning in the curriculum among others. To this, participants were quoted saying;

Let there be formal structures, let it be very, very clear to us in planning and they involve in environmental protection much, much more. We believe they have all the knowledge; they have all the equipment to conduct the research. So, let them come back to us and tell us what we are supposed to do, and let them be consistent. (NDJ, CL2, line 12-15, Page 10)

I want to encourage the creation of formal structures. We talked about agreements so that it is not by word of mouth. Let there be well-known strategies and structures that we can go through to reach the university. At least for them, they can come and find us at specific offices. For, we don't even know where their offices are. We don't know which office handles the community. (NDJ, CL3, line 9-13, Page 10)

With the establishment of an explicit structure for community engagement at the university, participants suggested that this should be given a clear leadership with full university administration support to enable effective implementation of the third mission mandate at the university. participants further emphasised that these structures should work closely with external stakeholders especially community leaders for easy mobilisation and smooth running of engagement programs and Increase community resilience by supporting community-based disaster management structures. They noted that;

we really have to engage the university administration, because, for us in agriculture, the administrators are not really agricultural. So, we have to bring them into our programs so that they appreciate what we are doing in the community. Then maybe they can give more support, give more support, financially and morally. (NDJ, US3, lines 4-7, Page 6) ... more so, this goes back to the university administration, the management, African universities should get interested so much in climate change. We are in a different context and if we give climate change a lot of focus, and address it using African approaches and frameworks, I think we can be safer. Africans have a spirit of togetherness, working together, brotherhood, and sisterhood, this kind of collaboration should be at the core of every African university mandate. It shouldn't be just a course outline in agriculture, in the Faculty of Agriculture, but it should be the face of the university, taken up by administrators, the managers so that together with the faculties, we can come up with something effective on the ground, not just small papers written. (NDJ, US3, lines 14-21, Page 7)

So, if they were involved in some strategic planning, especially for the university and we see specific activities for the communities when the time comes, we can go back and remind them in case. We can go and remind them and plan on how better to execute those problems. But when you don't have a program or when you're not aware of the university mandate, you will just sit here and wait. (NDJ, CL2, lines 16-20, Page 3)

the university must involve us in the structures that run the university in the structures that attempt to engage with us as a nearby community. We, like I told you, requested that we have a member of the Council of the university, but our wish was not granted. So, I still see that that could be an opportunity to get to know issues that affect their university. We don't only want to see them the way you're coming to only collect the information for research. They come we help them

with information, but they don't want to involve us in matters that run the university. (NDJ, CL2, lines 13-18, Page 9)

It is clear from the participants' views that they long for a well-known structure that plans and implements engagement programs. Considering that fostering engagement and partnership with the community is under the office of the vice-chancellor at Ndejje University, it appears that there is no defined autonomy, stringent mandate and policies, specific budget for engagement programs, and explicit organizational structure which makes the entity appear unstructured, especially the community members. The community members evidently yearn for involvement in the formulated structure and planning of the engagement programs with the community members. They believe that it enables them to put their voices and let the university know what is happening in the communities. This could fill the communication gap that participants indicated earlier between the university and grassroot communities. Indeed, as per Ndejje University's strategic plan for 2017-2027, the university indicates its commitment to facilitating and enhancing the spirit of cooperation within the community and the outside world and also promoting partnerships with the community. This commitment could be actualized if well-laid explicit structures for engagement are in place working closely with the community leaders.

The participants also talked about the incorporation of engagement programs in all other university academic programs to foster a transdisciplinary approach to climate change action. This will enable a wider population of the university especially students to gain knowledge on climate change action and subsequently apply the knowledge to the communities. Student participants particularly called on the university management to involve them more in engagement programs and support their initiatives that foster engagement programs on climate change action. Participants noted that;

We also need campaigns, also tailored information about programs or colleges, because our colleges and our studies vary. if you have somebody in business, let them study climate change related to business, if somebody is in veterinary science, let them study climate change related to veterinary, if someone is in social sciences, let them have climate change knowledge related to social sciences so that everyone will go to the university will get climate change knowledge. (NDJ, US5, lines 8-13, Page 2)

I think it is a deep involvement of the students when they're taking on some of the projects. We've had cases where students say we were not consulted and thus projects will fail because they feel that their representation under that guild is important. Let us consult them, and let them know why some of these things are coming up. And also let them be part of that decision. (NDJ, CL1, lines 9-12, Page 4)

The participants observed that every discipline or subject should have nodes for climate change. Whether it is social sciences, health science, business administration, science and computing, there are clear aspects of climate change education. This could be a key factor that could push the climate change agenda and engagement programs on climate change action to higher levels within the university and communities.

The other interrelated prospects highlighted by the participants include consistency in the management of the structured engagement programs, and continued assessments to enable sustainability of the engagement programs initiated to address climate change and enhance university-community interdependence. Some participants observed that;

Consistency is also an issue. Like I said earlier, they come like once a year, it's better the engagement programs happen more often. Let them be consistent with the programs that they bring to us as communities. (NDJ, CL2, lines 16-18, Page 10)

Like if you start a project, let there be a continuance of that project, that in case of any problem, these people always go back to this pilot project, and either maybe get new breeds or they could get more information. So, if we start a project, I believe we could have to leave a branch project behind to keep sustaining the existing numerous general community projects. (FGD NDJ, PG, line 2-7, Page 15)

I think we need to do a needs assessment in different communities, I think on this one, you'll find out the progress of implemented activities and also involve the community to decide on what should be done which can be very key to strengthening our engagement programs. You find out that what is done in one community might not be favorable in another community. (NDJ, US1, lines 25-28, Page 5)

Fostering university administration interests in community engagement programs on climate change resilience through leadership support transdisciplinarity education interventions, and community representation in engagement planning is believed to have enhanced the sustainability and effectiveness of university-community engagement. As indicated by the participants, community engagement programs at the university should come up with tailor-made approaches that work to support the most vulnerable people to gain a greater understanding of disaster and climate risks (Murrah-Hanson et al, 2021). Such approaches can entail a redefinition of the university culture, include curricular change, involve and empower faculty and staff, and necessitate new institutional infrastructure and policies regulating community engagement. This could further be through supporting the staff, students, and possibly community leaders with the tools to develop locally appropriate adaptation plans and actions.

Furthermore, university and community leaders can ensure that these approaches are reflective of the unique needs of different communities (considering the diversity of African societies) and also guarantee that outcomes can be scaled up to support higher education institutional planning and policies and reach a far wider population. This could be through Exposing community members to diverse ideas through knowledge-sharing hubs that can help them to better understand the interconnected nature of climate change and the range of potential adaptation responses.

4.5.2.2 *Adapting a community engagement Baraza as an alleyway for sensitisation*

Another opportunity that emerged from the analysed data is adapting a traditional conversations space for university-community engagement dialogues and pathways for awareness creation. Baraza is a Kiswahili word, common in East African contexts, meaning a public meeting(s) that is used as a platform for creating awareness, responding to issues affecting a given community, sharing vital information, providing community members with the opportunity to identify and propose solutions to concerns. It is also an avenue for information dissemination to the community as well as a quick means of getting feedback on the critical issues affecting that community. Given the resource constraints, participants proposed that university management can collaborate with community leaders to establish platforms within communities for effective engagements. Participants believed that this could enable the university to reach out to the final consumers of its knowledge (community members) and also learn from them about climate change action through this cost-effective and potentially with huge benefits. They highlighted that;

I think for effective engagement and addressing climate change, spaces should be created by both the universities and communities for needs assessment, sensitisation and awareness creation. These strategies we are talking about, we cannot just take them to the communities, we can engage traditional or community leaders to organise traditional meetings and invite community members for a discussion about climate change. I think that is something that is not happening now. For these community members to provide and implement the solutions to the climate change problem, first of all, they must be sensitised. (NDJ, US2, lines 1-7, Page 9)

the challenge with community members is that they do not even know what climate change is, they just hear climate change, when they see floods, droughts, changing seasons, and famine, they do not know it's all about climate change. My idea here is that universities try, universities should utilize local community spaces, associations, and community-based organizations to do mass sensitization, let us explain to that person who did not go to school what climate change is, in simpler terms. I am sure they always have local spaces like

women's associations, traditional courts, and cultural gatherings, all these could be used and create awareness. (FGD NDJ, PF, lines 23-29, Page 16)

as a community, we also need to be very organized. I think we need to create associations. So that, when there is a mobilization, there is where they reach immediately. For example, we can have environmental associations that can receive training and also train other community members and ensure that the programs that are brought into the community are fully implemented. So, such associations can enable the sustainability of the engagement programs which the university does not do. (NDJ, CL3, lines 16-21, Page 10)

Locally established platforms are very key for connecting the university and community members in contextualised spaces of indigenous communities. This could be valuable in increasing the believability of the knowledge shared by both the university and community leaders to community members. Participants feel that the university management should ‘move’ the university to the communities to enable constructive dialogues on climate change knowledge, mitigation and adaptation which is currently unavailable. These meetings are conducted in public places like market areas, community halls/centres, places of worship, and open arenas. It is important to note that while a student participant F (PF) noted that community members do not know what climate change is, this appears not to be the case since they have their own indigenous understanding of the phenomena as indicated earlier.

Participants clearly indicated that these African traditional spaces could prove to be key avenues for information dissemination to the community on climate change action as well as a quick means of getting feedback on critical issues like climate change that are currently affecting numerous communities. This can enhance sensitization and awareness creation. One local community leader was articulate when he noted that;

the university is a source of knowledge, we all know that, so, if the university can meet us and educate the community members, about bad practices of agriculture like overgrazing, like deforestation, and

burning bushes. so, in so doing, this will help them. If the community has this training, has this education and they know the negative impacts of such practices, that are dangerous to the community. (NDJ, CL3, lines 4-8, Page 2)

The university has professors and many doctors who have experience in research, and there is a Faculty of Agriculture and Forestry. What I am saying is that they have enough knowledge of what is needed to come to communities and lead climate change action in addition to what the students do. (NDJ, CL3, lines 12-15, Page 5) Ndejje University can come in to encourage the community, to sensitize the community and ask them to plant such crops that need to support over trees and also sensitize the community about the importance of not cutting trees. Thus, the community can be able to see another value over trees (NDJ, CL3, lines 5-8, Page 12)

we need to educate the people. This is particularly on what should be done to save the environment, what it means to climate change, and what are the impacts of climate change. For some of our people, they will not see the rainfall and they will just say it is God. Yes, God has the powers of course, but some of the effects are coming from the activities of man. I have told you brickmaking, Charcoal, all of these activities are destroying the environment. (NDJ, CL3, lines 24-29, Page 10)

According to the above excerpts, barazas should mainly be utilized to educate the masses about climate change actions and also support established community associations in terms of knowledge sharing. A community engagement baraza should target all community members who live in social units or communities larger than a household and share common values and challenges. This targeting is intended to reach out to the people who more often than not get information ‘second hand’ and participate through representation. Therefore, the aim is to give such people an opportunity to personally participate and directly voice their perspectives in a dialogue on climate change issues in their respective communities. The baraza is also a platform for empowering community members with information and knowledge that can enhance their ability to participate in the adaptation and mitigation measures for climate change.

In 2009, the Government of Uganda initiated community advocacy forums, also known as barazas, to involve the public in holding the government accountable for its

performance in relation to the resources spent and to finally improve public service delivery (Van Campenhout et al, 2021). The baraza program, initiated by the president of Uganda and implemented by the Office of the Prime Minister (OPM) provides a platform for creating awareness, responding to issues affecting a given community, sharing vital information, providing citizens with the opportunity to identify and propose solutions to concerns (Chubb et al, 2022). It is also an avenue for information dissemination to the community as well as a quick means of getting feedback on the critical issues affecting that community. Therefore, African universities should endeavour to organize and explore community barazas where community members receive information regarding climate change knowledge, adaptation, and mitigation and get the opportunity to directly engage with them for knowledge co-creation and sharing.

4.5.2.3 Community empowerment and income diversification strategies

The participants revealed that universities and communities should exploit community empowerment and income diversification as key approaches to building climate-resilient communities. Participants noted that such approaches could be significant not only to uplift and boost community members in terms of their participation/involvement, social capital, capacity, human capability, competence, and cohesiveness but also to support procedures by which communities construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standards of living. While poverty and poor livelihoods have been identified as key drivers of climate change, participants believed that universities can work closely with communities to source for funding, initiate financial literacy programs, enhance support from other stakeholders like civil society, establish collaborations that ensure food security and initiate climate-smart investment among others. This could possibly

curb poverty and discourage community members from encroaching on and destroying biodiversity. To this, they noted that;

we need to interrogate further together with the communities how we can empower the local communities to improve their livelihood. Poverty is a key driver of climate change and I believe it could be a good collaborative opportunity may be through writing fundable proposals, initiating home-based projects, bringing some innovations to the communities, etc. Such empowerment initiatives could be key to bringing community members closer to our engagement programs and fully participate. (NDJ, US1, lines 1-6, Page 7)

the university may be, can come up with financial empowerment programs for the communities because what is forcing these people to go to the environment and destroy it is poor livelihoods and at the end of the day becomes an issue of climate change. So, we believe that universities are highly connected and they can source for financial training programs that can improve the livelihoods of people. We encourage them to get more financial programs that can enhance engagement with these communities. Once livelihoods improve, I believe that will reduce pressure on the environment. (NDJ, CL2, lines 1-5, Page 10)

Universities should think more of empowerment. They need to empower communities; African communities are still poor. And that is the major reason that takes them to the environment and destroys it. So, empowerment is very key in terms of finances, and in terms of capacity building, and also sensitization knowledge provision. We look at the university as a source of knowledge. Africans' traditions should be respected. (NDJ, CL3, line 13-18, Page 12)

The above assertions indicate a dire need for diversification of community members' livelihoods in an attempt to curb financial illiteracy and ultimately reduce poverty levels. According to them, this is key in empowering community members to make informed decisions about their finances and create knowledge about possible sources of livelihoods that are climate-smart, hence enabling them to make better-informed decisions. Participants view universities as better placed and connected to both international and national programs, government funding, and other sources of funding. On this basis, some participants suggested that universities should put in extra efforts to lobby for empowerment funds, work with other external stakeholders, link

communities with the government and write fundable proposals in collaboration with community leaders and other available community members. They expressed that;

We believe the university has better connections with the government or other organisations, they are connected to the government, and they can seek for us funding from organizations and other sources of funding. Since we are ignorant about seeking funding and also getting money from different organizations, the university can help us connect with funders so that these engagement programs can move properly because for sure, once you don't have enough funding then engagement activities become difficult to conduct. (NDJ, CL2, lines 14-20, Page 7)

might be one thing I can speak about, these could be maybe non-government organizations or the government to add on to support universities and research, maybe running some of the projects. Like for example, a government can help the university to research on how we can use swamps to be more useful than they are, like using them but at the same time conserving them. So, I think if the government or this non-government organization comes up with some funding and research to see that the university as a body can come up find possible ways or solution of how to handle or use this, for example, this water bodies like swamps, (FGD NDJ, PA, lines 11-16, Page 15)

we can look at a government-university interaction on climate change, and in this case, the government has to be involved in dialogues in relation to climate change. (FGD NDJ, PD, lines 27-28, Page 13) the government can go through the university, to understand and know which activities to partake in, in this case, of course, that is to the government University intervention, there were many universities, and the government could use them as, as tools. (FGD NDJ, PD, lines 7-10, Page 14)

I think may be the universities and other partners need to write some proposals., finances are not enough. It constrains our efforts to engage the community often. (NDJ, US1, lines 17-18, Page 6)

Financial empowerment has the potential to lead to the financial well-being of community members. They can possibly have the knowledge, skills, and confidence to make money choices that help them reach their personal and financial goals. As suggested by the participants, this could be achieved through a unified effort of universities, government, civil society, and community members through initiating, supporting, and strengthening community livelihood programs, fostering private sector-

driven workforce development, including job and life skills training, creating expanded access to financial services and supporting local community leadership in creating business-enabling opportunities. One of the examples of business enabling opportunity that the participant mentioned is the briquettes making that is owned by Ndejje University, an initiative that, if considerably managed well, could financially benefit the community members. To this, one of the community leaders suggested comprehensive collaborations on briquette making as an alternative source of energy and income and scaling the involvement of community members in briquette making. He highlighted that;

If you have visited the school of Agriculture and Forestry, I think, they have a very big store and even a machine that is used to change the collected maize cobs into Brickettes and then sell to the community. It's a very good way of protecting the environment. But also, I think the community must directly be brought on board, and be trained in this innovation, and at the end of the day, they are able to make these briquettes for themselves and earn a living. (NDJ, CL3, lines 26-30, Page 1)

So, for effective reduction of the impacts, or causes of climate change, the university can collaborate with the community with that innovation, where the communities bring their maize cobs, the university can buy them. And then, the university with its technology, funding, and knowledge, can change or transform the maize cobs and cassava flowers into briquettes that can be able to support energy and also be a collaborative opportunity that can fight against climate change. So, you will find that the community is helping the university and the university is helping the community. (NDJ, CL3, lines 18-24, Page 1)

I'm dissatisfied with the Briquettes program, it is not at a cheaper price to our local communities. They contribute maize cobs. As much as the university buys it for its briquettes factory, community members should certainly have a discount so that briquettes are affordable. This will push our people away from the trees and burning charcoal. It is the university's role to look for funding from organizations so that these briquettes can even be given for free or even people are trained on how to make and make from home so that they have an alternative source of energy. (NDJ, CL3, lines 4-9, Page 11)

An important characteristic of the livelihood diversification approach is its way

of solving issues not by introducing foreign systems and technologies, but by skilfully using the limited resources available to improve people's lives. It is paramount that the university has initiated briquette-making opportunities and this could be an alternative source of skills and income to build climate-resilient communities in Uganda. Despite the innovation, participant explicitly decry the management of the industry by the university management which could deter their participation in that engagement program. Thus, a participant argues that the university should source an external investment into the briquettes industry to enable community members to sell briquettes raw materials at higher prices and also buy the products at cheaper prices. This and other ranges and combinations of other activities and choices that community members make are critical in achieving their livelihood goals.

Congruently, Bedeke (2023) denotes that efforts should intentionally aim at promoting meaningful local community-level leadership and participation in strategies and actions for achieving vulnerability reduction and strengthening resilience. Failure to bridge the gap between global and national climate change response efforts and local level needs of communities could exacerbate the already existing challenges, including increased environmental degradation, food insecurity, increased vulnerability to extreme weather events, and poverty, hence compromising the well-being and livelihoods community members and efforts to address climate change.

4.5.2.4 Incorporation of CC Indigenous knowledge in mainstream academic and engagement programs.

In this category, participants expressed their views on the existence of African indigenous knowledge systems and the urgent opportunity for its integration by the university into mainstream academic and community engagement programs. They

highlighted that the experimental knowledge based on African culture can significantly contribute to the achievement of Sustainable Development Goal 13 on climate action by observing changing climates, adapting to impacts, and contributing to mitigation efforts. Participants looked back to an African journey marked by vast climate change indigenous knowledge and mitigation practices that could still be relevant and applicable in different African contexts but have since been neglected.

Further taking me down memory lane, some participants recollected different indigenous practices that were instrumental in the old days that could not only be instrumental for university academic programs but also for practice as engagement activities. Participants argued that African indigenous knowledge should not be perceived by universities as alternative knowledge but as one domain of knowledge among others. They encourage the education system to openly recognise Indigenous and traditional knowledge to have a contribution towards environmental management. It was noted that as times have moved, there could be some knowledge that is still applicable and relevant in current times. This has the potential of widening the knowledge base and increasing options to increase awareness about climate change, and mitigate or even adapt to the existing challenges of climate change.

Because for sure, even before what we now call scientific knowledge, before Western education, the traditional people had their science of environmental management and how they managed to control the climate. I am sure there could be some indigenous knowledge on how people use it to protect the environment. Or maybe there could be some specific ethnic, specific cultural norms. (NDJ, US3, lines 20-24, Page 6)

in fact, there is so much of that knowledge, but maybe we've been disregarding it as something for the uneducated, but we should, we should focus on them. And there are many. People used to guard their soil. And those measures are still there. But we are we are no longer engaging them. There are some trees that we shouldn't cut, there are some trees that should be planted with other trees. You know, which

trees you plant among bananas, and there are those which you don't. So, I think we should find out more about the indigenous knowledge. (NDJ, US3, lines 24-29, Page 6)

You know, our forefathers and ancestors respected the environment and certain aspects of the environment, So those people were scientists in their own way. However, now, current people do not respect their wisdom and knowledge, but they are scientists in their own way. There is a way they managed their society and these issues of climate change were not there. But we are not adequately using the knowledge that they had in those days. Those people who are doing research can visit them and they get to know. For example, these trees, our forefathers, used them to grow yams on them. (NDJ, CL3, lines 19-25, Page 11)

local knowledge, they have very many indicators. And we should tap into these indicators. Like in agriculture, you have weeds that exist in places that have turned infertile. so, when you keep on testing, testing, until when you select that is and no more, yet there is some rare nutrient lacking and the farmers have noticed that because of their continuous work experience and indigenous knowledge. So, we should tap into this local knowledge, which is really important. (NDJ, US5, lines 17-21, Page 7)

Beyond recognition, valuing, and acknowledgment of indigenous knowledge and its role in climate change action, participants were cautious that enough research should be done and imperative decisions be made on incorporating it in different university academic programs and engagement activities. This is to potentially blend an understanding of the local Knowledge in terms of know-how, skills, and practices that can further be developed, sustained and passed on from generation to generation within a community. This could supplement and complement the university's knowledge to effectively contribute to the current fight against climate change in Africa. To this, they noted that;

Indigenous knowledge should be exploited and more research carried on to establish its usefulness in environmental protection. The convention environmental protection scientists, when we take it to the community, we tend to think that these people don't know. Yes, they know! for instance, in central Uganda, you get a name according to your totem. Yes. And your totem, you can never kill it, you can never cut it, you can never eat it, it is something highly feared and respected. And remember, most of the totems are animals and plants. That is

local environmental protection or biodiversity protection. So, we should actually exploit local knowledge as far as climate change and environmental protection are concerned. (NDJ, US4, lines 15-22, Page 5)

I believe we shall work together because the community for sure has enough knowledge and actually something that is forgotten is most of these community members are elders, so they have traditional knowledge that the university can use. Also, it is not that we are going to be only learning from them, but in this collaboration, they can learn from us and we've also learned from them. (NDJ, CL2, lines 21-25, Page 10)

These universities depend so much on Western knowledge and leave behind African knowledge. Before the Western world came, we had our own ways of solving problems. So, let there be respect for traditional knowledge and be picked up and also applied in addressing social problems. (NDJ, CL3, lines 18-21, Page 12) ... This is something that some people have moved away from. People who are doing research are not tapping, or using this knowledge to teach the community how they can protect the environment through such a means, so it was a taboo. We were even threatened that it could cause death by cutting such a tree. So, people had fears of tampering with the trees. (NDJ, CL3, lines 1-4, Page 12)

It is distinct from the participants' responses that they commend the remarkable value of indigenous knowledge in Africa for climate change adaptation and its value for supplementing climate services. This is particularly true in most African communities where there is limited or completely no access to modern climate and weather forecasts. A collaboration of universities and communities explores and encourages local communities to develop a sense of ownership and blend the university and indigenous knowledge to actively contribute to the sustainability of their communities. Findings from such participatory studies can provide another basis for local-level decision-making for African communities regarding climate change action. For instance, Tweheyo et al, (2024) opine that integrating indigenous knowledge into broader climate change mitigation strategies is imperative for fostering resilience and sustainability in the face of ongoing environmental challenges. Congruently, a combination of knowledge management and systems thinking can amalgamate into

practical approaches for both building new approaches to sustainable development and fostering pertinent projects and programs (Roland et al, 2018). This involves creating a highly involved, engaged, and active community in order to gather and store all the wisdom on how biodiversity has hitherto been conserved and handled.

Integration of indigenous knowledge and academic knowledge could provide potential benefits such as: cutting back soil erosion, increasing the availability of water, improving the seeding process, enhancing cultivation and harvesting, and improving the reciprocity and mutual relationships between the university and community as postulated by the Ubuntu tenets. Therefore, “Learning about biodiversity, about how traditional and indigenous holders of biodiversity-related knowledge cope with biodiversity, how this knowledge is used to effectively manage biodiversity and to maintain ecosystem services at various scales, as well as which are the most appropriate approaches to promote education and raise further awareness on these issues – all of this has been part and parcel of African university missions” (Roland et al, 2018, p13).

4.5.2.5 Collaborative approach to planning and implementation of engagement programs

Study participants categorically propose university-stakeholder engagement regarding the formulation of engagement programs which includes identifying, analysing, planning, and implementing policies on university-community engagement. They noted that it is important to identify, engage with, and understand the requirements and issues affecting the various stakeholders in the communities and how they can be catered for the policies to be formulated. Local community leaders alluded to their long-term desire to have a community leader representative on the university management councils to represent community members and their views. It was not that these

synergies could be very important for effective communication between the university and community members regarding the planning and execution of different engagement programs, especially regarding climate change. In their own words, participants revealed that;

Thus, different approaches can be used to come up with good and core relevant policies that can guide effective community engagement. You actually find that generalisation is not good. In other words, the university management, together with the community leaders and other external stakeholders need to create local and community-based platforms that are inclusive to engage the community members in matters that affect them and in this case climate change mitigation and adaption. (NDJ, US1, lines 1-5, Page 6) ... any project to start, let it have the policy, legal backing, design the visibility, do environmental assessments and social impact assessments with community members. Look at cost benefits and if there is no balance, such projects should not be implemented. (NDJ, CL1, lines 1-4, Page 4)

Then also maybe like a general university policy that really says that the university is obligated for community engagement. I'm not sure whether the university has a policy that obligates to fund work on climate change. If it's there, then it is just on paper. Otherwise, in consultations with community members, such policies can be formulated and they must favour the community, students, and the university at large. (NDJ, US5, lines 1-4, Page 7)

let there be specific policies that govern this kind of engagement. Thus, communities should be aware of any government policy that guides this engagement with the university or the university to engage with the community. We respect policies but once there is no policy, it becomes very hard to be implemented or convince people into these engagement activities, especially to protect our environment. (NDJ, CL3, lines 1-5, Page 13)

as the chairperson local council, and one of the leaders of this area, I would appeal to the university to give us an opportunity, at least one slot on the management or whatever council that they have and will be part of the planning, contribute on policies that affects us and they also get to know, issues that affect us. (NDJ, CL2, lines 23-27, Page 9)

The participants agree that it is important to map the community members and other stakeholders through different engagement events to collaboratively reach a consensus on policy formulation and implementation. Whether the creation of a new

policy or the revision of an existing one is a regular event or a one-off project initiative, all team members (university, community members, and civil society among others) should be able to reach a point of commonality within the context of engagement programs on climate change action. Knowing the ‘who, what, why, where, and when,’ is a fundamental requirement for effective collaborative policy formulation. This is why community leaders feel that they should be in positions on some management structures of the university to contribute to these fundamental requirements.

Mfitumukiza et al, (2024) agree with the participants' views that in different institutions in African contexts, policies are developed out-of-sync with local realities, leading to a lack of congruence with the local needs of communities; therefore, very difficult to mainstream such policies into local communities' contexts. Eriksen et al (2019) support this postulation by arguing that there is the continued use of top-down approaches to policy formulation and implementation, which promote elite monopoly of custodianship of information and the associated marginalization and vulnerability of communities. Such approaches have been criticized for perpetuating historical power imbalances, brought about by centralised and exclusive decision-making (Kahsay & Bulte, 2021). It also hinders ownership and implementation of policy at the local level, because of the disconnect with the needs and priorities at the local community level (McDougall & Ojha, 2021).

Effective collaboration requires that the individual perspectives of each entity arrive at a common priority that can ably enhance the university's third mission and also advance the efforts towards climate change mitigation and adaptation. Gwali, (2014) agrees that adaptation measures can be more successful when the local population participates in both planning and implementation in government,

institutions, and organisations. Therefore, community participation is critical for successful interventions aimed at promoting adaptation and enhancing resilience to climate change at all levels. There should always be involvement of local political, community, and opinion leaders in the introduction of adaptation interventions. This helps to foster the acceptability of the interventions in most African communities where there are many misconceptions and fallacies about the role of the university and the concept of climate change.

4.5.2.6 Extensive capacity building

Participants reported the need to enhance and strengthen both the institutional and external stakeholders' skills, abilities, and resources to enable smooth and effective implementation of engagement programs within different communities. Particularly, university staff and some community leaders suggested that both universities and communities should enhance community training on environmental conservation, adopt an African-based crosscutting curriculum, enhance research and training, lobby funding and teach community members about sustainable climate-smart agricultural practices among others. By doing this, participants envisioned skilled graduates, financial capacity, skilled and knowledgeable university staff members, and skilled local farmers that are able to support policy formulation and design localized solutions to problems associated with climate change effects in the communities where they live. In their words, they noted that;

Our people need to be sensitized, trained, educated, and given knowledge, especially from the university where they do a lot of research. This will enable community members to be aware that what they're doing against the environment is actually against the law, and against their sources of income. So, most of our people don't know. (NDJ, CL3, lines 1-3, Page 11)

also need campaigns, also tailored information about programs or colleges, because our colleges and our studies vary. if you have somebody in business, let them study climate change related to business, if somebody is in veterinary science, let them study climate change related to veterinary, if someone is in social sciences, let them have climate change knowledge related to social sciences so that everyone will go to the university will get climate change knowledge. (NDJ, US5, lines 8-13, Page 2)

the university is a source of knowledge, we all know that, so, if the university can educate the community members, about bad practices of agriculture like overgrazing, like deforestation, and burning bushes, so, in so doing, this will help them. If the community has this training, has this education and they know the negative impacts of such practices, that are dangerous to the community. (NDJ, CL3, lines 4-8, Page 2)

Relatedly, university staff proposed the need to have alternative funding as they wait for the government to come in. One university staff encouraged writing proposals and looking for other external stakeholders that can support their engagement programs on climate change action. To this, they noted that:

I think we can come up with a project for funding and find other realistic ways of how to raise funds to capacitate sufficient engagement programs on climate change action. I am sure that our learned scholars have the knowledge ad connection to get funding (FGD NDJ, PF, lines 19-21, Page 15)

The committees in Parliament that should get interested in climate change and the environment, the line ministries, agriculture, and the environment ministry should also set aside enough budgets for higher education institutions so that they get to know what we are doing out here. Maybe they can also come in and help me because Ndejje University is a private institution, I think you know that we depend on student tuition, so, we need the funding. (NDJ, US3, lines 8-12, Page 6)

As expressed in the excerpt, participants strongly believe that African universities need to develop a curriculum based on African contexts, direct to community problems and needs. This calls for crosscutting courses about climate change in all programs that students are undertaking in every faculty. This can adequately prepare learners and the university staff to be equipped with the required knowledge and skills about climate change mitigation and adaptation. Capacity

building helps individuals, communities, and institutions to better understand the complexities of climate change, including its causes, impacts, and potential mitigation and adaptation strategies. This understanding is crucial for informed decision-making at all levels in the development and coordination of engagement programs at African universities. Addressing climate change requires collaboration across sectors, disciplines, and geographic boundaries.

Capacity building can foster this collaboration by bringing together diverse stakeholders, including policymakers, scientists, practitioners, and community members, to share knowledge, expertise, and resources towards climate change action (Berman, 2014; Berman et al 2015). Moreover, Ssekamatte, (2018) has recommended that African universities could engage in training and capacity building on climate change mitigation and adaptation by offering short courses, academic and research programs, and working with communities and policymakers through outreach interventions. Therefore, African universities have a responsibility to shape knowledge, skills, and attitudes through training and conducting scientific research on aspects of climate change and environmental sustainability. One most relevant way can be through reviewing their colonial curriculum and transforming the higher education systems in order to remain relevant and become competitive and responsive to the contemporary challenges and needs of the current African society.

4.5.3 Cross Case Analysis

The study also established similarities and differences in perspectives and multiple realities of participants at both case universities, regarding the opportunities that universities can engage in with communities to address issues of climate change in

the African context. The study revealed different common and divergent perspectives within and among the different themes presented below.

Common key findings with respect to opportunities to enhance community engagement to address climate change

One of the strong common findings that emerged from the case universities was leveraging traditional conversation spaces as alleyways for sensitization, knowledge co-creation, training platforms for alternative sources of energy, and awareness creation between the university and community members. Participants from both universities agreed that the traditional conversation spaces (known as Barazas in African contexts) could be very significant in providing platforms for community mobilization, co-creation of climate change knowledge, and responding to climate change issues affecting the community. There was congruency in the participants' responses that this avenue can be of a paramount effect in creating space for information dissemination between the university and communities and ultimately bringing the university closer to the community and likewise the community closer to the university hence completing the African interconnectedness and reciprocity values as postulated in the Ubuntu theoretical framework.

Another common finding from the cases was the incorporation of climate change indigenous knowledge in Mainstream academic and engagement programs at the case universities. Participants from both cases urged African universities to recognize and tap into the vast African indigenous knowledge on climate change mitigation and adaptation, intensify research in the indigenous knowledge, and weave academic/scientific and indigenous knowledge to build African contextualized capacities to university staff, students, and communities for climate change action. These participants both believe that

this knowledge has the capacity to bring the community closer to the widely perceived ‘towers of knowledge, enhance engagement programs, and enhance the believability of knowledge created at universities by community members.

The other common finding from across the cases was Community empowerment and income diversification as key to building climate-resilient communities to climate change drivers like poverty and anthropogenic factors. Participants from Makerere University noted that community leadership ought to be empowered through financial literacy programs and be capacitated to generate income diversification community projects that can not only be able to improve the livelihoods of the community members but also attract funding for their progress and sustainability. Consistently, participants from Ndejje University recommended financial literacy empowerment programs to communities, the establishment of university-community collaborations to source funding for community-based projects, and initiating and supporting climate-smart businesses that can too enhance livelihood for community members and act as shocks to poverty as a driver of climate change. Such initiatives are paramount to absorbing climate change drivers like poverty and environmental degradation.

The last common finding in the cases was extensive capacity building for the university staff, students, and community members who participate in community engagement programs with respect to climate change action. Despite the existence of capacity building in the two cases, participants believed that it is lacking especially in African contexts where climate change is still a new phenomenon in many African communities and a lot of focus at most African universities is on teaching and learning with minimal focus on community engagement. Participants from both cases recommended community training on environmental conservation, adapting an

African-based crosscutting curriculum to strengthen staff and students' expert knowledge on climate change mitigation and adaptation, and exhausting efforts to source funding. Overall, participants in both cases were in tandem that capacity building on climate change is essential for building a more sustainable, resilient, and equitable future for all. They agreed that it empowers individuals and communities to take meaningful action, fosters collaboration and innovation, and helps to ensure that climate responses are effective, inclusive, and grounded in sound science, expertise, and African-based indigenous knowledge systems.

Divergent key findings with respect to opportunities to enhance community engagement to address climate change

At Makerere University, participants reported a key opportunity of Harnessing women's knowledge, experiences, and contributions towards climate change mitigation and adaptation practices. Some of the university staff at Makerere University strongly recommended the recognition and leveraging of the role of women in university-community engagement and climate change action. They firmly noted that there ought to be capacity building that is gender-sensitive, especially in African communities where most women are marginalised and never considered despite being key recipients of climate change impacts. They urged the universities to leverage women's knowledge and experiences with climate change-related activities like agriculture to forge practical strategies to address climate change and achieve gender transformation in African communities.

Another key finding that was unique to Makerere University was the synergetic approach to policy formulation and implementation in African communities. Having identified that they are always not given adequate consideration, some community

leaders from the Makerere community proposed the creation of engaged platforms for community engagement and climate policy formulation at African universities and national legislatures. They further recommended actualisation of existing policies regarding community engagement in climate change action, environmental protection, and further policy benchmarking for strong and effective policy formulation.

While Makerere University recognizes community engagement as one of its core functions and has organizational structures and personnel to organize and provide community-related activities and services. Having reported about community-related activities remaining largely unsupported and the contributions of the faculty to community engagement being insufficiently rewarded, university staff and students urged African universities to give equal attention to the three missions of the university and sustain the commitment especially the third mission of community engagement. As a means of achieving this, participants further recommended change of incentive regimes at African universities by sufficiently rewarding community engagement, reviewing institutional policies and structures to efficiently accommodate and support community engagement programs, and expediting explicit funding budgets for engagement programs. These three key findings were unique to Makerere University.

On the other hand, at Ndejje University, participants reported a collaborative approach to the planning and implementation of community engagement programs. Having decried the absence of local representation in engagement planning structures at the university, participants suggested that engagement planning and coordination should be bidirectional where a local community leader should always be part and parcel of developing engagement programs for communities. Relatedly, participants suggested explicit communication channels between the university and the community to ensure smooth mobilization and timely access to community members.

While at Makerere University participants reported about institutional commitment to engagement programs, Participants at Ndejje University reported of institutionalization of community engagement at the university. Participants reported that community engagement should be a straightforward consideration in the institution's priorities, structures, resources, infrastructure, and culture. They reported that the institution ought to have a strong will to instill a collective mindset in all structures of the institution, develop or transform rules and procedures that influence and community engagement programs. Particularly this should involve developing university-wide agendas and policies, structures, and practices to guide and facilitate the involvement of academic units, staff, students, and external communities in engagement. These two key findings were unique to this case university.

4.5.4 Synthesis

Collectively, eight themes from Makerere University and six themes from Ndejje University answered the research question "*What are the opportunities that might enhance the third mission programs towards climate change issues at the case universities?*" institutionalisation and institutional commitment to community engagement programs towards climate change mitigation and adaption, leveraging African Barazas, incorporation of climate change African indigenous knowledge in mainstream academic and engagement programs, community empowerment and income diversification, and extensive capacity building were common findings at the two cases. On the other hand, harnessing women's knowledge, experiences, and contribution to climate change mitigation and adaptation and a synergetic approach to policy formulation were unique themes at Makerere University. Relatedly, the collaborative approach to planning and implementation of engagement programs was also unique to Ndejje University.

All around, while higher education has contributed to community transformation, it has often been deficient in adjusting its curricula and management to respond to the changes affecting the communities in Africa. The focus has mainly been on providing education and services geared to the professional development of those responsible for agriculture and rural development. There is thus a clear need to tap into the suggested opportunities to raise capacity for effective climate change-related planning and management in African communities including focusing on women, youth, and local and marginalized communities, improve education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning. Successful adaptation depends on knowledge transfer, capacity building, integrating science and local knowledge, and raising awareness about climate change impacts and the benefits and potential of sound environment management.

As suggested by the participant, indigenous knowledge, traditions, and lifestyles are integral to all the SDGs, and indigenous peoples and local communities have emerged as a beacon of hope amidst intensifying planetary crises. These remarkable custodians of the Earth's most essential ecosystems, which are home to a staggering 80 percent of the world's biodiversity and immense stocks of carbon, hold the key to keeping our planet within safe planetary boundaries. A plan that safeguards the rights of indigenous peoples and recognizes their contributions as stewards of nature. While we don't have planet B, the opportunities provide plan B." as stressed in all the tenets of Ubuntu theory, the opportunities can be explored through a consultative and participatory approach and provide a transversal framework for mainstreaming climate response in all our services. It provides shared ambition and responsibility for taking action at all

levels as well as giving both the university and communities the opportunity to take the lead in a bidirectional and reciprocated collaboration.

4.6 Chapter Summary

This chapter analysed the context for the university community engagement situation at the case universities of Makerere and Ndejje. It presented key findings organised into four objectives. Objective one, on the other hand, explored the various academic, research, and community engagement programs on climate change being implemented at the case universities. Objective two explored the development and coordination of engagement programs at Makerere and Ndejje Universities. Objective three presented the challenges faced by the case universities in implementing engagement programs on climate change, while Objective four discussed the key opportunities that enhance university community engagement programs in climate change action in African universities.

The next chapter offers a summary of key findings, conclusions, and key recommendations of this multiple case study.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this study, I explored participants' perspectives on university-community engagement opportunities to address climate change in the African context. Guided by the concepts of interdependency, collectivism/solidarity and reciprocity, I generated data using an in-depth, face-to-face semi-structured interview and focus group discussion with a purposive sample of 42 participants. The themes that were generated through thematic analysis provide answers regarding the four research questions: *What are the community engagement activities implemented by the case universities on climate change? How do the case universities develop and coordinate community engagement programs on climate change action? What are the major constraints in the university-community collaborations in the efforts to address climate change in selected cases? and what are the opportunities that might be able to enhance the third mission programs towards climate change issues at the case universities?*

The study took place in the context of two African universities, namely Makerere and Ndejje Universities in Uganda. A qualitative approach was used located in an interpretive paradigm. Using Braun and Clark's (2006) five stages of thematic analysis, themes were generated for the four research questions. In this chapter, therefore, I summarise the findings of this study, draw conclusions from the themes, and propose recommendations. More so, I provide suggestions for further research.

5.2 Summary of Findings

This section provides a summary of all the themes generated through thematic analysis. The themes answered the four research questions. Thus, the summary of the

study findings is presented based on the objectives and research questions of the study as below.

5.2.1 Community engagement programs implemented by the case universities on climate change

The study revealed different engagement programs implemented by Makerere and Ndejje Universities regarding climate change action. These programs have been presented and discussed in two categories: university-initiated and implemented engagement programs and student-initiated and implemented engagement programs. Notably, the study established that the university renders institutional support to staff and students' engagement programs like recess and internship programs to communities, community digital programs for smart agriculture, and other collaborations with external stakeholders.

The study further established that there is the generation of climate change knowledge and climate-smart initiatives through the currently available climate change-related courses and inventiveness that are currently offered at Makerere and Ndejje Universities. This is especially true in the College of Agricultural and Environmental Science (Makerere University) and the Faculty of Environment and Agricultural Science (Ndejje University). However, the engagement programs regarding climate change are not limited to only these academic units. It was also revealed that the university conducts capacity building that enables climate education and awareness creation in both cases. this includes training stakeholders, and providing consultancy services on the environment and climate-related knowledge which are all essential for conducting sensitisation programs with both internal and external stakeholders of universities.

From the analysis, it was also revealed that students initiate and lead different engagement programs regarding climate change action with community members. These include conducting climate education and awareness creation activities where students are actively involved in advocacy and sensitisation programs, conducting public lectures and climate change-related events like tree planting, and disseminating and actualising research findings with community members. These findings were common in the two university cases.

On the other hand, there were some unique findings in particular cases. It was revealed that climate entrepreneurship programs for climate change mitigation and adaptation were a unique finding at Ndejje University. Here, it was reported that the university has collaborations with local community members in the production and selling of briquettes not only as an agriculture smart enterprise but also as an alternative source of energy that contributes to environmental protection. Relatedly, partnerships with NGOs and other external government entities were a unique finding revealed at Makerere University. Particularly, it was reported that students at Makerere initiate and source for partnerships with external civil society organisation. These partnerships result in training and funding student-initiated activities and events aimed at climate change action. By combining these engagement programs on climate change action, it has been indicated that universities contribute significantly to climate change mitigation and adaptation efforts, preparing the different generations of leaders, professionals, and experts to address the challenges posed by climate change within different African communities.

While these university and students' initiated engagement programs have made strides towards climate change knowledge, mitigation and adaptation, the process of

initiation and implementation is unidirectional with either minimal or complete absence of community involvement. This defies the idea that "I am because we are," that highlights the collective identity and reciprocated nature of planning and addressing communal problems in African contexts. These findings make it glaringly clear that some African universities continue to give African philosophies like Ubuntu a lip service without clear and serious consideration in their mandates and engagement programs towards climate change action. Densu has clearly indicated that "African-centred ecophilosophy, political ecology and traditional ecological knowledge can play a significant role in restoring forest systems, water systems, agricultural lands, degraded wetlands, and bioremediation of electronic and industrial waste, nonsensically imported from Western countries by African elites to gain access to foreign currency"'. (Densu, 2018: 47).

Therefore, the African ontology and values can be a source of an Indigenous knowledge system that can inform climate change action, especially in this decade in which the value of Indigenous Knowledge Systems has been emphasized within the Social Development Agenda 2020–2030. This underscores the value of reciprocity and interdependency which emphasizes the idea that individuals and organisations within a community rely on each other for support and collaboration. This mutual support fosters a sense of unity and shared responsibility towards common goals and challenges like climate change (Kyei-Nuamah & Peng, 2024). Overall, the value of interdependence in Ubuntu underscores the idea that human beings are inherently connected and that our actions and choices impact others. It promotes a holistic approach to community life, where individuals are encouraged to contribute positively, collaborate effectively, and uphold the well-being of the entire community

5.2.2 Development and coordination of community engagement programs on climate change action at the case universities

From the thematic analysis, participants revealed how engagement programs regarding climate change were developed and coordinated at the two cases of Ndejje and Makerere Universities. These programs have been presented through two major themes; development of engagement programs on climate change action and coordination of engagement programs regarding climate change action. It has been indicated that the case studies make efforts to promote UCE by providing systematic capacity building to staff and students in the areas of community engagement. In this, participants revealed that the university ensures that climate change-related knowledge is relatively integrated into some courses at the universities. This enables the formation of a consortium of experts who possess the ability to initiate engagement programs related to climate change action.

Systemic capacity building allows the university staff, under the guidance of existing strategic plans, structures, and policies, to ably plan and develop a wide range of engagement programs with external communities to mitigate and adapt to climate change impacts. Particularly, the staff members and students establish funding opportunities for the intended engagement programs, seek and granting of engagement permits, and formal and due signing of memorandum of understanding among others. Under this major category, it was unique to Makerere University that the university has established a climate change centre for research and innovations that is instrumental for developing climate change knowledge based on research and innovations which is one of the critical ways of developing engagement programs on climate change action. It was also unique to Makerere that the development of engagement programs is through the establishment and registration of students' associations (for example Makerere University Climate Change Association, MUCCA) which sources for partnerships, initiates innovations, plan

and develop environmental-related events and establishes climate change advocacy campaigns among others.

The university staff, management, students, and external community partners play an important role in the coordination of the developed engagement programs on climate change action in the two cases. Likewise, the coordination of engagement programs in the two cases is done under the guidance of university strategic and action plans in partnership with internal and external stakeholders. This coordination allows the university and community workforce to work towards a common goal especially when enough capacity and enough planning are utilised. Ultimately, this can possibly allow more beneficial and efficient allocation of resources to climate change engagement programs in higher education institutions, which can reduce conflicts and redundancies between university staff, students, or faculties.

While the development and coordination of engagement programs on climate change action in African communities is still largely done by the universities (with trifling inclusion of community members), Ubuntu offers valuable tenets of collectivism and communalism reflecting the emphasis on communal welfare, shared responsibility, and mutual support among community members and institutions towards community challenges like climate change (Kyei-Nuamah & Peng, 2024). The authors have emphasized that ideologies of Ubuntu should be integrated with other ethical principles in African communities and institutions aimed at providing a solid base for adapting to the problem of climate change. Thus, collectivism values the input and perspectives of all members, ensuring that decisions reflect the interests and concerns of the entire community. Ultimately, this nurtures a supportive environment where community

members feel valued and connected, reducing feelings of isolation and promoting a sense of collective responsibility for the well-being of others.

5.2.3 Major constraints in the university-community collaborations in the efforts to address climate change in the selected cases

With regard to major challenges to university-community engagement efforts to address climate change, the data analysis revealed numerous constraints. The study findings revealed that the study participants across the cases pointed out institutional constraints that relate to unidirectional engagements and the absence of community representation at university decision-making bodies, bureaucratic procedures in engagement program development and coordination, and unbalanced focus on the three traditional university missions of teaching, research and community engagement. Participants further revealed resource-related barriers including inadequate funding, insufficient expert human resources and time constraints. It was common across the cases that COVID-19 and its impacts are still affecting engagement programs at the case universities. Particularly, participants noted that the pandemic impacted university funding and budgeting with some engagement programs facing limited funding and prioritisation.

Additionally, myths and misconstructions about climate change and policy gaps were unique to Makerere University. Participants noted that there are diverse fallacies on climate change that several community members hold which breed negative attitudes and biases toward university community engagement programs on climate change. This is coupled with ignorance of engagement strategies initiated by the universities which resultantly lead to some resistance from some local community members. Additionally, it was unique to Makerere University that there are some policy gaps both within the

institutions and government. Participants noted that there were political interferences on community activism, minimal attention by policymakers on community engagement and climate control measures, and an absence of clear policy on inclusion in climate change mitigation and adaptation strategies.

On the other hand, participants at Ndejje University exceptionally identified unawareness challenges and local priorities and livelihood concerns. They noted that some of the community members are not aware of university engagement mandates and have inadequate knowledge about climate change mitigation and adaptation. Some participants attributed this to limited sensitisation which breeds resistance and rigidity by the community members in terms of adaptation measures. Correspondingly, analysed data revealed local community members prioritise income-generating activities over participating in engagement programs.

Relatedly, due to livelihood concerns, analysed data revealed that many community members in the rural Ndejje community encroach on the environment for income-generating activities like charcoal burning, bricklaying, and firewood selling which all are anthropogenic factors and drivers of climate change. These are a regress of sustainable, mutually beneficial partnerships between the local communities and higher education institutions. These challenges not only deteriorate the efforts to enhance community engagement at African universities but also give opportunity to anthropogenic activities to drive climate change and enhance African communities' vulnerability to climate change mitigation and adaptation.

Underscored by African deeply held values of reciprocity, interdependence and collectivism, African universities have the potential to overcome these challenges. For instance, through synergetic approach to policy formulation, engagement programs

planning, and co-creation of climate change knowledge among others, would encourage mutual aid, where community members support each other in times of need, whether it's through sharing resources, offering assistance, or providing emotional support (Nnodim, & Okigbo, 2024; Kyei-Nuamah & Peng, 2024).

5.2.4 Opportunities that might be able to enhance the third mission programs towards climate change issues at the case universities

Lastly, the final research question was; what are the opportunities that might enhance the third mission programs towards climate change issues at the case universities? The thematic analysis revealed numerous opportunities that participants across the cases believed that might enhance university community engagement programs toward climate change action. These included leveraging African traditional conversational spaces commonly known as Barazas in most African communities. These Barazas provide local platforms for climate change education and sensitisation, create spaces for the co-creation of climate change knowledge, and local training platforms for alternative sources of energy. In a broader sense, Barazas is a key opportunity that ensures the bidirectional approach to university-community engagement and provides a double sword to climate change problems.

Findings from across the cases also indicated that African universities ought to incorporate the climate of climate change African indigenous knowledge in mainstream academic and engagement programs. This would ensure a bottom-up approach that not only values African knowledge systems but also enhances the inclusion of community members in the co-creation of climate change knowledge and expunging the long-held accusations of universities of being elitist ivory towers and individual disciplines functioning as siloes. Community empowerment income diversification, and extensive

capacity building were other key common findings across the cases. Analysed data showed that universities in African contexts need to work hand in hand with communities to empower community leaders and members and strengthen their sources of livelihood to significantly reduce entheogenic activities.

On the other hand, harnessing women's knowledge, experiences, and contribution to climate change mitigation and adaptation and a synergetic approach to policy formulation were unique themes at Makerere University. Analysed data show that there is enormous potential in African women due to their knowledge and experience with climate-related activities like agriculture and the environment. Participants' revelations indicate that exploring the role of women in the climate change fight not only addresses exclusion and barriers that keep them from participating in sustainable change but also ensures collectivism and solidarity induced by Ubuntu values of collectivism and communalism where there is equitable treatment and inclusive pursuit of sustainable development within the community. Analysed data also revealed that communities and universities as well as the government should ensure a collaborative approach towards policy formulation and implementation (Ikeke & Ukutsemuya, 2024; Mabele et al, 2022). This is for both university-community engagement policy frameworks and climate change policy formulations and implementation. Moreover, such synergies can be vital in resource mobilisation, building consensus, and also create a sense of inclusion among community members.

At Ndejje University, a collaborative approach to planning and implementation of engagement programs was also unique in the analysed data. Data showed that African universities ought to engage local community leadership in the formulation of engagement programs. Local community leaders in rural Ndejje alluded to the long-

term desire to have community representatives on the university management regarding planning and execution of different engagement programs especially on climate change action.

It is important to note that African universities should always anchor community engagement programs on core African Ubuntu values to effectively address issues of climate change. African HEIs ought to be always aware that Ubuntu influence various aspects of social interaction, decision-making, and community cohesion in African societies. They contribute to a holistic understanding of human existence and relationships, emphasizing the interconnectedness of all individuals and their responsibilities towards one another and the community as a whole. Furthermore, to effectively collaborate and collectively address the issues of climate change, African universities can acknowledge the importance of cooperation, solidarity, and shared responsibility within communities. This promotes a holistic approach to community well-being, where individuals contribute to and benefit from collective efforts towards prosperity, harmony, and mutual respect

5.3 Thesis Contribution

The findings of this study contribute to the science, theory, and practice in university-community engagement and climate change action at universities in the African context. Findings unpack the dominant notion of African universities as “developmental” and indicate workable opportunities for enhancing engagement programs towards climate change knowledge, adaptation, and mitigation. The resultant conflictual role of African universities, caught between the demands of academic excellence, on the one hand, and local demands of development and regional and communal impact, on the other, is resolved under core Ubuntu values of reciprocity,

interconnectedness, and solidarity. Conceptually and organisationally, university community engagement activities serve as mechanisms to bridge the divide between the traditional academy and the needs and expectations of societal stakeholders located outside of formal higher education structures.

5.3.1 Empirical contribution of the study

The findings of this study add to the existing empirical evidence on the university's third mission (community engagement) and climate change action at universities within the context of Africa. The study explored university community engagement programs implemented by the case universities and challenges for higher education institutions (particularly universities) in Africa in addressing climate change issues and explore ways to enhance the engagement programs and climate change knowledge, mitigation, and adaptation at these universities. Specifically, the study sought to analyse the current engagement programs and activities on climate change implemented by the case universities; identify the key challenges faced by the implementing units in carrying out community engagement programs in selected cases; examine the development and coordination of engagement programs on climate change at the case universities and establish the practical opportunities that would enhance universities to adequately engage communities on a wide range of challenges (like climate change)

The study findings provide scholarship on existing community engagement programs and activities on climate change action at Makerere and Ndejje Universities. It enriches the scientific community with empirical evidence of the challenges that both universities face in implementing climate change. Higher education institutions will utilise findings from this study on the development and coordination of engagement

programs on climate change action in African contexts. The research community will also benefit from empirical evidence on key opportunities for engaging African communities on climate change action at these case universities and how these are unique to the African context. All this empirical knowledge was missing in the literature on university-community engagement opportunities in the climate change action field and therefore it is expected that this gap has now been filled.

Finally, I have suggested areas for further research (see section 5.6) in relation to climate change and other SGDs at universities within the African context, which is expected to stimulate other researchers to add to empirical evidence on these areas using African indigenous epistemologies. This may widen the empirical base on climate change education in universities within the African context. The findings of this study can form an adaptable basis for future community engagement projects and for possible future research projects about such activities related to climate change in African higher education institutions. This will ultimately contribute to the larger aims of identifying long-term synergies and collaboration potential and the development of conceptual models that are scalable.

5.3.2 Contribution to policy and practice

The study findings may provide valuable information and evidence for decisions and policymakers at the case universities on the current situation, challenges, and ways they can adopt to improve their programs in their traditional three missions of teaching, research, and community engagement. The findings on existing engagement programs and activities are likely to raise awareness of the existing and successfully implemented programs on climate change mitigation and adaptation. The decision-makers may use the information to boost their engagement programs and also

increase support for their bidirectional development and implementation reciprocally. For African universities that have not yet started, the findings will be a good starting point to think about how best to begin engagement programs on climate change including approaching the case universities for benchmarking.

The findings on the development and coordination of engagement programs may be of paramount effect to other higher education institutions to benchmark how community engagement programs are planned, managed, and implemented amidst existing contextualised challenges. These findings have the potential to guide the creation, development, and crafting of policies both at institutional and government levels with a clear understanding of engagement programs at higher education institutions are developed at coordinated.

The study findings on challenges faced may be very useful for university management, stakeholders, and other policymakers in finding practical and relevant solutions to these challenges leading to effective delivery of community engagement programs and climate change mitigation and adaptation programs. Findings on opportunities and suggestions for community engagement enhancement are expected to support decision-makers and implementers on how best to take advantage of African contextualised strategies to address issues of climate change. I have made various recommendations that can be very useful to the university management and other stakeholders in strengthening and improving universities' third mission and climate change education, mitigation, and adaptation programs.

5.3.3 Theoretical Contribution

In foregrounding the experiences and voices of HE engagement practitioners, especially those who operate in African institutional and geopolitical contexts, this

study contributes to both the democratising and decolonising knowledge production agenda of Africanising higher education engagement. Referring back to the research questions, the analysis provided insights into the theoretical-conceptual notion of bidirectional engagement towards climate change action which is underscored by the African social and cultural systems or *Ubuntu* philosophy that motivates and drives those involved to work for each other. This is one of the key drivers of various societal interventions in Africa, especially Sub-Saharan Africa embedded in the individual, community, and national values of many of these societies. Notably, national development and achieving SDGs in the twenty-first century is dependent on a particular understanding of higher education, which cannot simply be aggregated to a dearth of appropriate ontology, epistemology, expertise, African value-laden social responsibility and catching up numerically with the rest of the world. The Ubuntu values like collectivity, reciprocity, interdependence, and solidarity are held across these societies in various aspects of life.

Based on this, therefore, African universities can invest in climate change initiatives and interventions based on the *Ubuntu* philosophy. Values of solidarity, working towards achieving the “common good” for their societies, serving African humanity, and being “concerned about the welfare” of African people can be key drivers for climate change engagement programs. Providing climate change education should be looked at as a way of promoting this African ethic and social justice as well as social responsibility and caring for others.

Findings from this study suggest that African universities can be driven by the existing African indigenous knowledge systems in their pursuit to contribute to climate change mitigation and adaptation. The multiple realities of participants in this study

identified that blending of existing African indigenous knowledge systems and academic knowledge systems in developing and implementing community engagement programs on climate change by African universities can enhance the relevance of universities to African realities and promote scholarship on African indigenous knowledge and its relevance to sustainable development. Strategies to enhance university community engagement programs on climate change action and adaptive capacity must, therefore, be context-specific, to avoid the likely failures associated with generalisations, including ineffective uses of resources.

The fact, for example, that higher education research in Africa mainly emanates from policy demands and is made relevant to policy in the context of development concerns seems to grant a place for the values and interests of dominant constituencies (often non-Africans), in that development is a concept conjuring up normative expectations (of those constituencies) concerning the right way to do things. The challenge for higher education as an emerging field of research in Africa is that the conceptual and analytical categories (often imported from a non-African context) through which we seek to make sense of higher education reality direct our attention to the data imparting substance to them when the issue, in fact, is to critically engage with the conceptual and analytical categories themselves. Engaging critically with the conceptual and analytical categories used to make sense of African higher education therefore requires that we uncover the normative grounds of the concepts, theories, and methodologies used to study Africa. Part of the challenge of doing higher education research in Africa, therefore, should be a commitment to uncovering the normative order underlying research, not to dispose of the values, but to harness them to probe them even more.

Therefore, based on a thematic analysis of multiple realities for participants at Makerere University and Ndejje University, I have attempted to theorise the linkage between university community engagement and climate change action within the context of African universities as illustrated in the model below.

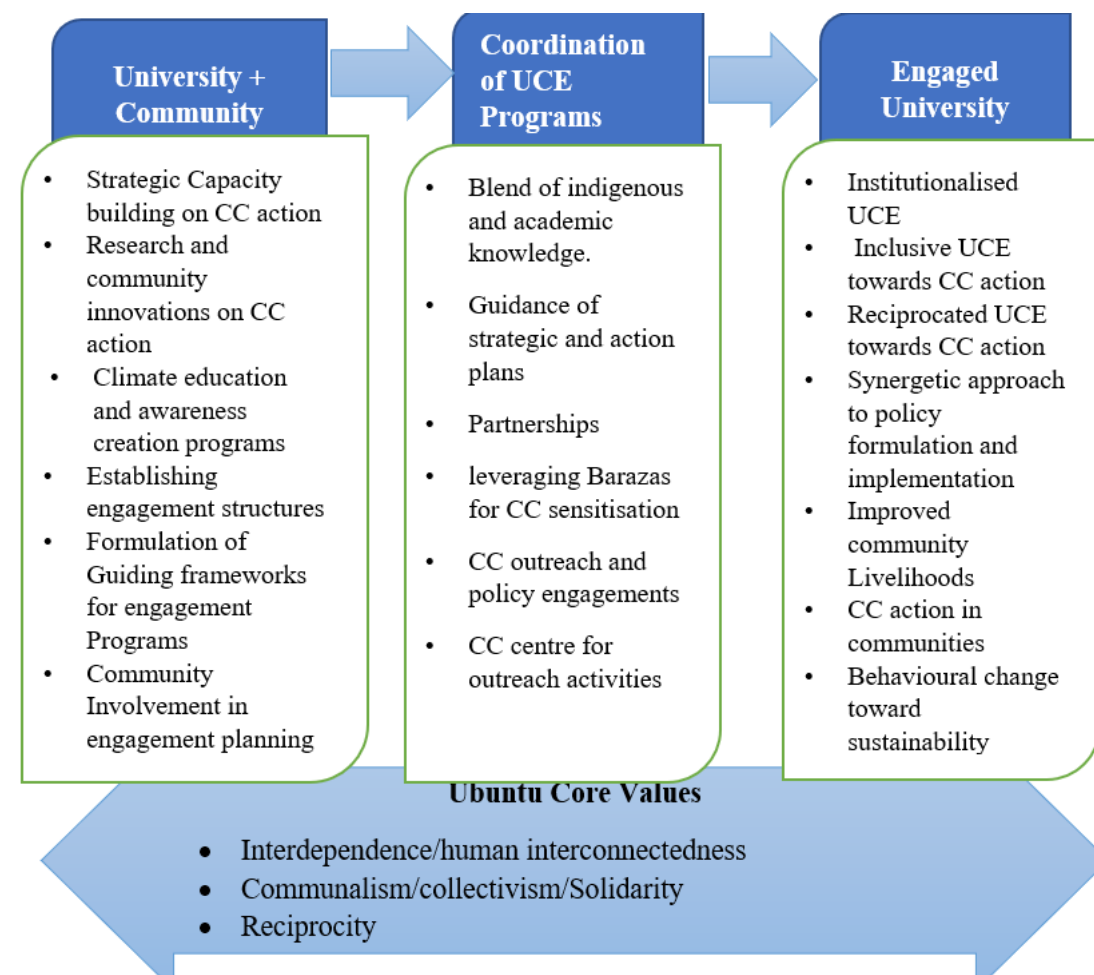


Figure 5.1 Theoretical Model: Linking University community engagement to Climate Change action in the African Context

It is evident that effective community engagement opportunities can enhance climate change action, as well as sustainability. Underpinned by the deeply held African Ubuntu values of interdependence, collectivism/communalism and reciprocity, findings show that institutionalisation and institutional support to engagement programs on climate change action, a blend of African indigenous knowledge and

academic knowledge into the mainstream academic and engagement programs can enhance a university's third mission, inform policy and enhance action toward climate change knowledge, mitigation, and adaptation. This is underscored in the deeply African held value of interdependence. The emphasis on the idea that "I am because we are," highlights the collective identity and shared destiny of the community.

African universities and communities ought to welcome and accommodate each other and co-create a blend of dependable knowledge to address climate change. The other significant categories emerging from the analysis refer to leveraging African traditional conversational spaces where university staff, students and community members can engage on a wide range number of climate-related programs including climate change knowledge co-creation and dissemination, co-formulation of engagement activities on climate change mitigation and adaptation. These communities' contextualised spaces provide platforms for a synergetic approach to policy formulation and implementation as a strategy where universities and communities combine their efforts and resources to accomplish more collectively than they could individually.

The findings in my study clearly suggest that global efforts toward combating climate change issues (especially in African contexts) cannot stand in isolation without African women's knowledge, experiences and contributions. Thus, African universities need to work hand in hand with communities and appreciate potentially integrated approaches suited to gender contribution to climate change action, triggering new dynamic social spaces for women to engage for instance in policy formulation and inclusive decision-making. This is in line with Ubuntu's values of collectivism and human interconnectedness that defines an African engaged university toward climate change action and sustainability.

The Ubuntu community ought to strive to be inclusive and welcoming to all forms of people from all backgrounds. It encourages participation and contributions from individuals around all communities to contribute to a common cause or community problem. It is important to note that Ubuntu promotes principles of fairness and justice in resolving conflicts and addressing societal issues. It values equitable treatment and the pursuit of harmony within the community. This ought to be one of the strongest pillars of an engaged African university that strives to address community challenges and achieving SDGs.

5.4 Conclusion

The thrust of this research was to explore university community engagement opportunities to address climate change in African contexts. The analysis of the content from the interviews, FGDs, and some documents served to provide rich insights into current engagement programs and their development and coordination on climate change action. I further explored challenges encountered and possible opportunities to enhance the third mission of universities towards climate change action. Given the foregoing findings, I have emerged from the experience in my roles as both participant and researcher and several conclusions are presented below in the order of the objectives of the study.

In line with the first objective, it was clear from the participants' perspectives that University-Community engagement programs towards climate change action remains marginally institutionalized at the case universities compared to the other two missions of teaching and research. This form of engagement is not yet fully integrated into their budgets, community engagement programs towards climate change action and research activities. Their faculty hiring and promotion practices appear to

insufficiently recognize and actualise individual or faculty contributions to the external communities. Makerere University appears to be ahead of Ndejje University in terms of implementing the third mission of universities (regarding climate change action) given the direct government funding, available favourable infrastructure, strong external partnerships and rich academic and research history which gives a strong background to engagement programs. An explicit example of this is a well-established MUCCRI particularly dealing with climate change issues. Despite this noteworthy development at one case, in both cases, there are marginal and implicit engagement entities intended to develop and strengthen existing engagement programs through the development of mutually beneficial corporations with external communities that are consistent with climate change mitigation and adaptation strategies.

In relation to the development and coordination of engagement programs on climate change, it can be concluded that it is effective collaborations with external partners like funders, local community members, civil society, and government, that enable successful university community engagement activities. To enable this, dedicated people and resources as well as institutional support for development and coordination of engagement programs on climate change are crucial. Institutional support, including the benchmarking and integration of community engagement in the frameworks of higher education institutions, is essential to achieving sustainable development goals and holding African universities as socially responsive institutions. This can be through securing and maintaining financial resources, and measures to secure these must form part of long-term visionary institutional planning strategies.

It also emerged that there are several institutional, resource-related, community centred and COVID-19 impact challenges that these case universities face in

implementing their engagement programs regarding climate change. Inadequate resources like funds, climate change experts, and time greatly diminish the current minimal efforts exerted by the case universities towards climate change action. The challenges face both the institution and community members thus hampering the effective participation of university staff, students, and community members in programs that foster climate change knowledge, adaptation, and mitigation. These challenges being specific and distinct to African contexts, university managements ought to tap into African contextualised opportunities anchored on African philosophies as their core foundations.

From the last objective, deep, rapid, and sustained African contextualised engagement programs on mitigation and accelerated implementation of adaptation actions would reduce projected losses and damages for humans and ecosystems and deliver many co-benefits, especially for universities and communities. The UCE opportunities towards climate change action itself can be the game changer: its holistic view makes adaptation everyone's (The university and the community) responsibility and shows that the two entities must infuse engagement programs with climate considerations to successfully adapt. At their core, these engagement opportunities are about biodiversity and about protecting the most vulnerable. Effective climate action is enabled by political commitment, leveraging traditional conversational Barazas, institutional frameworks, laws, policies, and strategies, and enhanced access to finance by both African universities and communities. Climate resilient development benefits from drawing on diverse knowledge and values including cultural values, indigenous knowledge, local knowledge, and scientific knowledge anchored on African Ubuntu's values.

With a rapidly closing window of opportunity to secure a liveable and sustainable future for all, university community engagement offers African contextualised opportunities that are necessary and can accelerate climate action as per the analysed data. The choices and actions implemented might be able to support policy making and enhance the third mission programs towards climate change issues and sustainability at African universities and communities. University community engagement that involves all partners is the glue that can create trust, generate new lines of work, funding, inclusion, income diversification and keep shared goals as well as expectations visible to both universities and communities. The actual core work of the community engagement is building the reciprocated relationship between communities and universities that endures beyond individual projects or grants to programs that enhance climate action and scales the impact to the entire communities. In this way, engagement opportunities can build sustained relationships that respect the needs and interests of all partners, and assessment as a constant tool for reflecting on our contributions and benefits should often be used – thus building deeper and more authentic reciprocity.

Ultimately, careful actualisation of these contextualised opportunities can potentially advance impacts of climate change caused by human activities to stop intensifying. Findings suggest that observed widespread and substantial impacts and related losses and damages attributed to climate change can decelerate through synergies between universities and communities. To effectively utilize these opportunities, CE at African universities requires each university to pay attention to its institutional context like history, disciplinary focus, location, ownership, mission, culture, values, indigenous knowledge and priorities, and national policy agendas. The conceptualization, implementation and sustainability of CE programs in African

contextualized Higher Education Institutions (especially universities) should reflect indigenous epistemologies induced by African philosophies as its core foundations. This can be possible through synergies for policy development and target-setting at university and community levels, particularly in relation to climate change knowledge, mitigation, and adaptation as well as enhanced transparency of engagement programs on climate action and support.

Tapping into available engagement opportunities (Revealed by this study) can play a crucial role in enabling and accelerating shifts in development pathways towards sustainability and climate-resilient development in African communities. Climate resilient development is enabled when universities, local communities, governments, civil society, and the private sector make inclusive climate change action choices that prioritize risk reduction, equity and justice, and when decision-making processes, finance and actions are integrated across engagement programs, sectors, and timeframes. Therefore, the engagement opportunities suggested in this study can enhance African universities' third mission and generally address a broad range of climate change impacts, including water shortage, floods, storms, soil erosion, and ecosystem productivity and resilience. It is important for both the communities and universities in African contexts to make deliberate efforts to understand and appreciate issues such as gender relations, wealth, power relations, culture, and traditions which are critical in African setup. These will not only influence the adoption of these adaptation and resilience strategies but also enhance the extent to which people can adapt to climate change in general.

5.5 Recommendations

In light of the findings on the university community engagement opportunities to address climate change in African contexts, the following are key recommendations that are made to inform policy and practice in higher education institutions, as well as university external partners, governments in African contexts, and community members.

Universities in African contexts should ensure that institutionalizing UCE ought to pertain to the formal and informal factors embedded in this specific mission. These encompass supportive policies and measures, resource mobilisation, strategic plans, formal and informal/cultural recognition, the integration of community engagement in the core knowledge activities and services of HEIs, administrative support, and academic staff. In the case of flagship and research-intensive universities, UCE can be considered a peripheral mission concerning the core tasks of teaching and research, although, in more regionally embedded and vocational universities, engagement is often cultivated due to its links within the localities

The university management and administration ought to prioritize inclusive, transparent and equitable decision-making, and improves access to finance and technology by the community members. To actualise such opportunities, universities and community leaders should ensure that all voices are involved in planning and decision-making and that communication channels remain open from both sides. Universities should emphasize the need for intentional processes that ensure all have a voice in planning, problem-solving, and management of the engagement programs. Shared control can also help keep the entire partnership alert to the need to bring in community members on board as engagement programs evolve.

Universities and their external partners like NGOs and local government should embark on a re-imagining process to understand the intellectual, scholarly, and demonstrable work needed to support the University's transformative engagement agenda towards climate change issues. The process of this re-imagination can involve developing an understanding *of*, and continual support *for*, engagement programs, as well as providing strategic direction to the hybrid engagement praxes across the University through well-laid university community engagement structures and entities.

African universities need to develop a community of practice to guide the Africanisation and Decolonisation of engagement programs on climate change action to foster a diverse, inclusive, and representative engagement rooted in knowledge democracy. HEIs should endeavour to look for feedback and interaction from communities in order to investigate and co-create a set of parameters that will guide engagement programs. The local traditional platforms should be consistently utilised as a collaborative multi-stakeholder space of exploration for the positioning and re-positioning of the engagement and transformation interface of African universities. It is both a feasible and doable option for reimagining the engagement programs as a university in service to society.

Government, civil society, and other university and community partners ought to create and avail funding opportunities to both the universities and community-based organisations and associations that aim to achieve income diversification. This can for instance be through availing fairly competitive grants for universities, wealth creation programs for community members that can ably enhance university community engagement activities and also scale up community resilience toward drivers of climate change like poverty and food insecurity.

Universities and communities' leaders need to create enabling structures and systems in which women's knowledge and experiences are harnessed. This could be through exploiting women's experiential knowledge to contribute to sustainability, and land management and mobilise support to advance land rights for women and girls around communities. Universities need to lend their support by reaching out to local communities and advocating the key role of gender equality in empowering women to be at the forefront of African climate change resilient efforts. This can be through the promotion of laws, policies, and practices that end inequality and secure women's rights to land and resources. Relatedly, universities can partner with communities to create awareness of the disproportionate impact of climate change on women and the barriers they face in decision-making on land issues in African contexts as in most communities they do not have access to and control of land resources.

5.6 Recommendations for Further Research

While this study looked at university community engagement opportunities in only one of the seventeen SDGs, another study could explore university community engagement opportunities in the rest of the sixteen SDGs. This is to underscore the role of the university as a socially responsible institution towards achieving SDGs.

Participants noted that "it goes both ways, not just a giving out of the knowledge [by the university]". Further exploration of this bidirectionality is needed in future studies, as it seems that there may be a disconnect between intent and practice, as little evidence emerged from these interviews of more than one-directional investment from the side of universities.

In relation to a statement by one participant "Africa should be defined by African epistemes and her knowledge", I recommend that a study be conducted to

explore the understanding of climate change and the related indigenous knowledge praxis that is African contextualised.

This study focused on two universities in central Uganda. I, therefore, recommend that this study be replaced in other regions of Uganda as well as other entities of HEIs like institutes, technical colleges, and vocational institutions among others to get a wider understanding of university-community engagement opportunities to address SDGs in a broader context.

5.7 Chapter Summary

In this chapter, a summary and discussion of key findings for each research question has also been given, highlighting the convergence and divergence of key findings and scholarly literature on the topic. The chapter also provided the conclusions that I made based on the findings as well as the thesis contribution to empirical and policy as well as theory. The chapter highlighted the areas for further research on community engagement and climate change in the African context. Lastly, it has provided practical recommendations that case universities and other relevant bodies need to seriously consider to improve the implementation of community engagement programs and activities on climate change action in African institutions.

REFERENCES

- Adhikari, U., Nejadhashemi, A. P., & Woznicki, S. A. (2015). Climate change and eastern Africa: a review of impact on major crops. *Food and Energy Security*, 4(2), 110-132.
- African Union (2023). The African Leaders Nairobi Declaration on Climate Change and Call to Action, African climate summit. URL: <https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://au.int/sites/default/files/documents/43682-doc>
- Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 2, 100051.
- Akyıldız, S. T., & Ahmed, K. H. (2021). An overview of qualitative research and focus group discussion. *International Journal of Academic Research in Education*, 7(1), 1-15.
- Alcántara-Rubio, L., Valderrama-Hernández, R., Solís-Espallargas, C., & Ruiz-Morales, J. (2022). The implementation of the SDGs in universities: a systematic review. *Environmental Education Research*, 28(11), 1585-1615.
- Allan, G. (2020). Qualitative research. In *Handbook for research students in the social sciences* (pp. 177-189). Routledge.
- Altbach, P. G. (2008). *The complex roles of universities in the period of globalization. Higher education in the World*, 1–14.
- Altheide, D. L. (2000). Tracking discourse and qualitative document analysis. *Poetics*, 27(4), 287-299.
- Ampaire, E. L., Jassogne, L., Providence, H., Acosta, M., Twyman, J., Winowiecki, L., & Van Asten, P. (2017). Institutional challenges to climate change adaptation: A case study on policy action gaps in Uganda. *Environmental Science & Policy*, 75, 81-90.
- Andama, E., & Suubi, U. M. (2015). Mainstreaming Education For Sustainable Development In Teacher Education At Busitema University, Uganda. *Stories! of! Change!*, 127.
- Andrade, C. (2021). The inconvenient truth about convenience and purposive samples. *Indian journal of psychological medicine*, 43(1), 86-88.
- Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of emerging trends in educational research and policy studies*, 5(2), 272-281.

- Antonelli, C., Coromaldi, M., Dasgupta, S., Emmerling, J., & Shayegh, S. (2021). Climate impacts on nutrition and labor supply disentangled—an analysis for rural areas of Uganda. *Environment and Development Economics*, 26(5-6), 512-537.
- Arbo, P., Benneworth, P. (2007) 'Understanding the regional contribution of higher education institutions: a literature review', *OECD education working paper*, No. 9, OECD: Paris.
- Asdal, K., & Reinertsen, H. (2021). *Doing Document Analysis: A Practice-Oriented Method*. Sage.
- Atube, F., Malinga, G. M., Nyeko, M., Okello, D. M., Alarakol, S. P., & Okello-Uma, I. (2021). Determinants of smallholder farmers' adaptation strategies to the effects of climate change: Evidence from northern Uganda. *Agriculture & Food Security*, 10(1), 1-14.
- Axon, S. (2010) 'Addressing climate change and the role of social solutions', *Human Geographies: Journal of Studies and Research in Human Geography*, Vol. 4, No. 1, pp.43–52.
- Axon, S. (2015) *Addressing Climate Change at the Community Level: Opportunities for, and Challenges to, Mainstreaming Sustainable Development*, Published PhD thesis, University of Liverpool.
- Axon, S. (2016) 'Sustaining public engagement with addressing climate change and the role of social solutions', *Int. J. Sustainable Society*, Vol. 8, No. 3, pp.185–205.
- Ayayia, G. (2022). The Concept of 'ubuntu' in African Environmental Ethics Vis-a-Vis the Problem of Climate Change.
- Baker, L., Burton, J., Godinho, C., & Trollip, H. (2015). The political economy of decarbonisation: Exploring the dynamics of South Africa's electricity sector. Energy Research Centre, University of Cape Town.
- Balasubramanian, M. (2018). Climate change, famine, and low-income communities challenge Sustainable Development Goals. *The lancet planetary health*, 2(10), e421-e422.
- Balaji, M. S., Roy, S. K., & Sadeque, S. (2016). Antecedents and consequences of university brand identification. *Journal of Business Research*, 69(8), 3023-3032.
- Bandy, J. (2011). Challenges and Opportunities of Community Engaged Teaching. Vanderbilt University Center for Teaching. <https://cft.vanderbilt.edu/guides-sub-pages/challenges-and-opportunities-of-community-engaged-teaching/>.

- Barrett, D., & Twycross, A. (2018). Data collection in qualitative research. *Evidence-Based Nursing*, 21(3), 63-64.
- Barouki, R., Kogevinas, M., Audouze, K., Belesova, K., Bergman, A., Birnbaum, L., ... & Hera-Covid-19 Working Group. (2021). The COVID-19 pandemic and global environmental change: Emerging research needs. *Environment international*, 146, 106272.
- Battle M (2009) *Reconciliation: The Ubuntu theology of Desmond Tutu: Revised and Updated*, Cleveland, OH: The Pilgrim Press.
- Baxter, P. &. (2008). *Qualitative case study methodology: Study design and implementation for novice researchers*. The Qualitative Report
- Bedoya-Dorado, C., Murillo-Vargas, G., & Gonzalez-Campo, C. H. (2021). Sustainability in the mission and vision statements of Colombian Universities. *International Journal of Sustainability in Higher Education*.
- Bedeke, S. B. (2023). Climate change vulnerability and adaptation of crop producers in sub-Saharan Africa: a review on concepts, approaches and methods. *Environment, Development and Sustainability*, 25(2), 1017-1051.
- Berman, R. J. (2014). *Developing climate change coping capacity into adaptive capacity in Uganda* (Doctoral dissertation, University of Leeds).
- Berman, R. J., Quinn, C. H., & Paavola, J. (2015). Identifying drivers of household coping strategies to multiple climatic hazards in Western Uganda: implications for adapting to future climate change. *Climate and development*, 7(1), 71-84.
- Berghaeuser, H., & Hoelscher, M. (2020). Reinventing the third mission of higher education in Germany: political frameworks and universities' reactions. *Tertiary Education and Management*, 26(1), 57-76.
- Bhagwan, R. (2017). Towards a conceptual understanding of community engagement in higher education in South Africa. *Perspectives in Education*, 35(1), 171–185.
- Bhardwaj, P. (2019). Types of sampling in research. *Journal of the Practice of Cardiovascular Sciences*, 5(3), 157.
- Biagini, B., Bierbaum, R., Stults, M., Dobardzic, S., & McNeeley, S. M. (2014). A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility. *Global environmental change*, 25, 97-108.

- Bokhari, A. A. (2017). Universities' social responsibility (USR) and sustainable development: A conceptual framework. *International Journal of Economics and Management Studies*, 4(12), 8-16.
- Bolden, R. (2014). Ubuntu. *Encyclopedia of action research*, 21, 800-802.
- Boudreault, M., Cossette, H. and Marceau, E. (2014) 'Risk models with dependence between claim occurrences and severities for Atlantic Hurricanes', *Insurance: Mathematics and Economics*, Vol. 54, pp.123–132.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, 9(2), 27.
- Bowers, A. M. (2017). University-community partnership models: Employing organizational management theories of paradox and strategic contradiction. *Journal of Higher Education Outreach and Engagement*, 21(2), 37-64.
- Bozic, C. and Dunlap, D. 2013. The role of innovation education in student learning, economic development, and university engagement. *Journal of Technology Studies* 39 (2): 102-111.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
- Braun, V., & Clarke, V. (2012). *Thematic analysis*. American Psychological Association.
- Braun, V., & Clarke, V. (2014). What can “thematic analysis” offer health and wellbeing researchers?. *International journal of qualitative studies on health and well-being*, 9(1), 26152.
- Braun, V., Clarke, V., & Weate, P. (2016). Using thematic analysis in sport and exercise research. In *Routledge handbook of qualitative research in sport and exercise* (pp. 213-227). Routledge.
- Braun V and Clarke V (2019) Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health* 11(4), 589–597
- Broeckx, J., Maertens, M., Isabirye, M., Vanmaercke, M., Namazzi, B., Deckers, J., ... & Poesen, J. (2019). Landslide susceptibility and mobilization rates in the Mount Elgon region, Uganda. *Landslides*, 16, 571-584.
- Butcher, J., Bezzina, M., & Moran, W. (2011). Transformational partnerships: A new agenda for higher education. *Innovative Higher Education*, 36, 29-40.

- Burke, S. (2016). Rethinking 'validity' and 'trustworthiness' in qualitative inquiry: How might we judge the quality of qualitative research in sport and exercise sciences?. In *Routledge handbook of qualitative research in sport and exercise* (pp. 352-362). Routledge.
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and practice*, 2(1), 1-10.
- Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & quantity*, 56(3), 1391-1412.
- Capano, G., & Pritoni, A. (2019). Varieties of hybrid systemic governance in European Higher Education. *Higher Education Quarterly*, 73(1), 10-28.
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in pharmacy teaching and learning*, 10(6), 807-815.
- Chigangaidze, R. K. (2023). Environmental social work through the African philosophy of Ubuntu: A conceptual analysis. *International Social Work*, 66(6), 1845-1856.
- Chu, E. K., & Cannon, C. E. (2021). Equity, inclusion, and justice as criteria for decision-making on climate adaptation in cities. *Current Opinion in Environmental Sustainability*, 51, 85-94.
- Chubb, L. A., Fouché, C. B., & Sadeh Kengah, K. (2022). Baraza as method: Adapting a traditional conversational space for data collection and pathways for change. *Qualitative Social Work*, 21(5), 914-931.
- Ciais, P., Sabine, C., Govindasamy, B., Bopp, L., Brovkin, V., Canadell, J., Chhabra, A., DeFries, R., Galloway, J., Heimann, M., Jones, C., Le Quéré, C., Myneni, R., Piao, S. and Thornton, P. (2013) 'Carbon and other biogeochemical cycles', in Stocker, T., Qin, D. and Plattner, G-K. (Eds). *Climate Change 2013: The Physical Basis*, Cambridge University Press, Cambridge.
- Clarke, V., Braun, V., & Hayfield, N. (2015). Thematic analysis. *Qualitative psychology: A practical guide to research methods*, 222(2015), 248.
- Compagnucci, L., & Spigarelli, F. (2020). The Third Mission of the university: A systematic literature review on potentials and constraints. *Technological Forecasting and Social Change*, 161, 120284.
- Connelly, L. M. (2016). Trustworthiness in qualitative research. *Medsurg Nursing*, 25(6), 435.

- Connolly-Boutin, L., & Smit, B. (2016). Climate change, food security, and livelihoods in sub-Saharan Africa. *Regional Environmental Change*, 16(2), 385-399.
- Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative and Mixed Method Approaches* (3rd Ed.). Los Angeles: SAGE Publications.
- Creswell, J. W. (2014). *Qualitative Inquiry & Research Design: Choosing among Five Approaches* (4th Ed.). Thousand Oaks, CA: SAGE.
- Creswell, J. W., & Clark, V. L. P. (2018). *Designing and conducting mixed methods research*. Sage publications.
- Cristofolletti, E. C., & Pinheiro, R. (2023). Taking stock: The impacts of the COVID-19 pandemic on University–Community engagement. *Industry and Higher Education*, 37(2), 251-264.
- Crow, M. M. (2010). Organizing teaching and research to address the grand challenges of sustainable development. *BioScience*, 60(7), 488-489.
- Cox, D. N. (2000). Developing a framework for understanding university-community partnerships. *Cityscape*, 9-26.
- Cunningham, H. R., & Smith, P. (2020). Community engagement plans: A tool for institutionalizing community engagement. *Journal of Higher Education Outreach and Engagement*, 24(2), 53-68.
- Dabić, M., Kovač, I., Labaš, D., Novak, I., & Bošnjak, M. (2018, August). Third mission goings-on and academic entrepreneurs in Europe. In *2018 Portland International Conference on Management of Engineering and Technology (PICMET)* (pp. 1-11). IEEE.
- Dasgupta, S., Emmerling, J., & Shayegh, S. (2023). Inequality and growth impacts of climate change—insights from South Africa. *Environmental Research Letters*, 18(12), 124005.
- David, S. (2020). Towards a theoretical model linking university education to climate change interventions in the African context. *Journal of African Studies and Development*, 12(1), 17-24.
- Degl’Innocenti, M., Matousek, R., & Tzeremes, N. G. (2019). The interconnections of academic research and universities’“third mission”: Evidence from the UK. *Research Policy*, 48(9), 103793.

- Denzin, N. K., & Lincoln, Y. S. (2005). Introduction: The Discipline and Practice of Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.). *The SAGE Handbook of Qualitative Research* (3rd Ed.), pp. 1–32. Thousand Oaks, CA: SAGE.
- Dlugokencky, E., & Tans, P. (2014) *Trends in Atmospheric Carbon Dioxide* [online] <http://www.esrl.noaa.gov/gmd/ccgg/trends/>.
- Dumenu, W. K., & Obeng, E. A. (2016). Climate change and rural communities in Ghana: Social vulnerability, impacts, adaptations and policy implications. *Environmental Science & Policy*, 55, 208-217.
- Du Plooy, B., & Von Moellendorff, M. (2024). “Our Theatre is Society”: Perceptions and Practices of University-Based African Centres of Excellence Regarding Community Engagement and the Third Mission of Higher Education. *South African Journal of Higher Education*, 38(2), 99-119.
- Eriksen, S. H., Cramer, L. K., Vetthus, I., & Thornton, P. (2019). Can climate interventions open up space for transformation? Examining the case of climate-smart agriculture (CSA) in Uganda. *Frontiers in Sustainable Food Systems*, 3, 111.
- Eakin, H. C., Lemos, M. C., & Nelson, D. R. (2014). Differentiating capacities as a means to sustainable climate change adaptation. *Global environmental change*, 27, 1-8.
- Etikan, I., Alkassim, R., & Abubakar, S. (2016). Comparision of snowball sampling and sequential sampling technique. *Biometrics and Biostatistics International Journal*, 3(1), 55.
- Faillie, J. L. (2019). Case–non-case studies: principle, methods, bias and interpretation. *Therapies*, 74(2), 225-232.
- Fitzgerald, H. E., Bruns, K., Sonka, S. T., Furco, A., & Swanson, L. (2019). The centrality of engagement in higher education. *Building the Field of Higher Education Engagement: Foundational Ideas and Future Directions*.
- Fitzgerald, H. E., Karen, B., Sonka, S. T., Furco, A., & Swanson, L. (2020). The centrality of engagement in higher education. In *Building the field of higher education engagement* (pp. 201-219). Routledge.
- Friedman, D., Perry, D., & Menendez, C. (2013). The Foundational Role of Universities as Anchor Institutions in Urban Development. *Washington, DC., USA: Coalition of Urban Serving Universities*.

- Frondizi, R., Fantauzzi, C., Colasanti, N., & Fiorani, G. (2019). The evaluation of universities' third mission and intellectual capital: Theoretical analysis and application to Italy. *Sustainability*, 11(12), 3455.
- Galanis, P. (2018). Methods of data collection in qualitative research. *Archives of Hellenic Medicine*, 25(2), 268-277.
- Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, 13(1), 117.
- Gannon, K. E., Crick, F., Atela, J., & Conway, D. (2021). What role for multi-stakeholder partnerships in adaptation to climate change? Experiences from private sector adaptation in Kenya. *Climate Risk Management*, 32, 100319.
- Gaston, K. J., Gardner, A. S., & Cox, D. T. (2023). Anthropogenic changes to the nighttime environment. *BioScience*, 73(4), 280-290.
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British dental journal*, 204(6), 291.
- Goodrick, D. (2020). *Comparative case studies*. SAGE Publications Limited.
- Goodwin, D., Mays, N., & Pope, C. (2020). Ethical issues in qualitative research. *Qualitative research in health care*, 27-41.
- GoU, Uganda National Climate Change Policy: Transformation Through Climate Change Mitigation and Adaptation (2015)
- Graham, C. (2020). Managing Climate Change: The Role of Multi-Stakeholder Partnerships in Building Climate Resilience in Sub-Saharan Africa. *Interdisciplinary Journal of Partnership Studies*, 7(2), 4-4.
- Groulx, M., Nowak, N., Levy, K., & Booth, A. (2021). Community needs and interests in university–community partnerships for sustainable development. *International Journal of Sustainability in Higher Education*, 22(2), 274-290.
- Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic Contraversies, Contradictions and Emerging Confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage Handbook of Qualitative Research* (3rd ed., pp. 191-216). Thousand Oaks, California: Sage Publications Inc.
- Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PloS one*, 15(5), e0232076.

- Gundumogula, M. (2020). Importance of focus groups in qualitative research. *International Journal of Humanities and Social Science (IJHSS)*, 8(11), 299-302.
- Gwali, S. (2014). Building community-based adaptation and resilience to climate change in Uganda.
- Hadi, M. A., & José Closs, S. (2016). Ensuring rigour and trustworthiness of qualitative research in clinical pharmacy. *International journal of clinical pharmacy*, 38(3), 641-646.
- Hadidi, H. E., & Kirby, D. A. (2016). Universities and innovation in a factor-driven economy: the performance of universities in Egypt. *Industry and Higher Education*, 30(2), 140-148.
- Halcomb, E. J., Gholizadeh, L, DiGiacomo, L., Phillips, J. & Davidson, P. M. (2007). Literature review: considerations in undertaking focus group research with culturally and linguistically diverse groups. *Journal of Clinical Nursing*. Blackwell Publishing Ltd.
- Hancock, B., Ockleford, E., & Windridge, K. (2001). *An introduction to qualitative research: Trent focus group*.
- Hansen, A.J. and Phillips, L.B. (2015) ‘Which tree species and biome types are most vulnerable to climate change in the US Northern Rocky Mountains?’, *Forest Ecology and Management*, Vol. 338, pp.68–83.
- Harkavy, I. (2016). Engaging urban universities as anchor institutions for health equity. *American Journal of Public Health*, 106(12), 2155–2157.
- Hlalele, D., Manicom, D., Preece, J., & Tsotetsi, C. T. (2015). Strategies and outcomes of involving university students in community engagement: An adaptive leadership perspective. *Journal of Higher Education in Africa/Revue de l'enseignement supérieur en Afrique*, 13(1-2), 169-192.
- Houghton, J. (2009) *Global Warming*, Cambridge University Press, Cambridge
- Hudson, R. (2001). *Producing places*. New York: The Guilford Press.
- Hügel, S., & Davies, A. R. (2020). Public participation, engagement, and climate change adaptation: A review of the research literature. *Wiley Interdisciplinary Reviews: Climate Change*, 11(4), e645.
- IMF (2020a) World economic outlook update, June 2020: Chapter 1. Washington, DC. <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEO>

- Ikeke, M. O., & Ukutsemuya, J. I. (2024). The Afrocentric imperative in tackling African environmental challenges: Afroecosolidarity perspectives. *East African Journal of Environment and Natural Resources*, 7(1), 17-27.
- Janis, I. (2022). Strategies for establishing dependability between two qualitative intrinsic case studies: A reflexive thematic analysis. *Field Methods*, 34(3), 240-255.
- Jadhav, J. U., & Suhalka, V. (2016). University community engagement: Insights from field work practices. *Indian Journal of Sustainable Development*, 2(1), 22–28.
- Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A review of the quality indicators of rigor in qualitative research. *American journal of pharmaceutical education*, 84(1).
- Joos, F. and Spahni, R. (2008) ‘Rates of change in natural and radiative forcing over the past 20,000 years’, *Proceedings of the National Academy of Sciences*, Vol. 105, No. 5, pp.1425–1430.
- Lazarus, J., Erasmus, M., Hendricks, D., Nduna, J., & Slamat, J. (2008). Embedding community engagement in South African higher education. *Education, citizenship and social justice*, 3(1), 57-83.
- Kahsay, G. A., & Bulte, E. (2021). Internal versus top-down monitoring in community resource management: Experimental evidence from Ethiopia. *Journal of Economic Behavior & Organization*, 189, 111-131.
- Kalule, S. W., Odongo, W., Kule, K.E., Ndyomugenyi, E.K., Omara, P. and Ongeng, D. 2016. Conceptualizing the Student-Centered Outreach Model for experiential learning and community transformation. *African Journal of Rural Development* 1 (3): 219-227.
- Kamkeng, A. D., Wang, M., Hu, J., Du, W., & Qian, F. (2021). Transformation technologies for CO₂ utilisation: Current status, challenges and future prospects. *Chemical Engineering Journal*, 409, 128138.
- Kamwangamalu, N.M. (1999). Ubuntu in South Africa: A sociolinguistic perspective to a pan-African concept. *Critical Arts* 13(2): 24–41.
- Kaplan, R. S., & Norton, D. P. (2006). *Alignment: Using the balanced scorecard to create corporate synergies*. Harvard Business Press.
- Kapp, J. A., & Rauch, C. F. (2017). Systems thinking for higher education leaders. *Change: The Magazine of Higher Learning*, 49(4), 23–31

- Kareem, B., Lwasa, S., Tugume, D., Mukwaya, P., Walubwa, J., Owuor, S., ... & Byarugaba, D. (2020). Pathways for resilience to climate change in African cities. *Environmental Research Letters*, 15(7), 073002.
- KCCA (2015) Kampala Climate Change Action. Kampala Capital City Authority (KCCA), Kampala, Uganda
- KCCA (2017) Energy and Climate Profile. Kampala Capital City Authority (KCCA), Kampala, Uganda
- Kennish, M. J. (2023). Anthropogenic Drivers of Estuarine Change. In *Climate Change and Estuaries* (pp. 75-98). CRC Press.
- Kezar, A. (2018). A new vision for the professoriate. *Change: The magazine of higher learning*, 50(3-4), 84-87.
- Kimball, M. J., & Thomas, D. F. (2012). Place-Building Theory: A Framework for Assessing and Advancing Community Engagement in Higher Education. *Michigan Journal of Community Service Learning*, 18(2), 19-28.
- Kitagawa, F., Sánchez Barrioluengo, M., & Uyarra, E. (2016). Third mission as institutional strategies: Between isomorphic forces and heterogeneous pathways. *Science and Public Policy*, 43(6), 736-750.
- Kitinoja, L., Saran, S., Roy, S. K., & Kader, A. A. (2011). Postharvest technology for developing countries: challenges and opportunities in research, outreach and advocacy. *Journal of the Science of Food and Agriculture*, 91(4), 597-603.
- Klenert, D., Funke, F., Mattauch, L., & O'Callaghan, B. (2020). Five lessons from COVID-19 for advancing climate change mitigation. *Environmental and Resource Economics*, 76, 751-778.
- Klentzin, J. C., & Wierzbowski-Kwiatkowaki, A. (2013). Service-learning program institutionalization, success, and possible alternative futures: A scholarly perspective. *Journal of Community Engagement & Scholarship*, 6(2).
- Knudsen, M. P., Frederiksen, M. H., & Goduscheit, R. C. (2019). New forms of engagement in third mission activities: A multi-level university-centric approach. *Innovation- Organization & Management*, 23(2), 209-240.
- Kompas, T., Pham, V. H., & Che, T. N. (2018). The effects of climate change on GDP by country and the global economic gains from complying with the Paris climate accord. *Earth's Future*, 6(8), 1153-1173.
- Koryakina, T., Sarrico, C. S., & Teixeira, P. N. (2015). Third mission activities: university managers' perceptions on existing barriers. *European Journal of Higher Education*, 5(3), 316-330.

- Kostere, S., & Kostere, K. (2021). *The generic qualitative approach to a dissertation in the social sciences: A step by step guide*. Routledge.
- Kroese, K., Porter, K., Surridge, H., & Tembo, D. (2021). Challenges and solutions: surveying researchers on what type of community engagement and involvement activities are feasible in low- and middle-income countries during the COVID-19 pandemic. *BMJ open*, 11(10), e052135.
- Kuckartz, U., & Rädiker, S. (2019). *Analyzing qualitative data with MAXQDA* (pp. 1-290). Basel, Switzerland:: Springer International Publishing.
- Kyei-Nuamah, D., & Peng, Z. (2024). Ubuntu philosophy for ecological education and environmental policy formulation. *Journal of Philosophy of Education*, qhae034.
- Kyngäs, H., Kääriäinen, M., & Elo, S. (2020). The trustworthiness of content analysis. In *The application of content analysis in nursing science research* (pp. 41-48). Springer, Cham.
- Lebeau, Y., & Cochrane, A. (2015). Rethinking the “third mission”: UK universities and regional engagement in challenging times. *European Journal of Higher Education*, 5(3), 250–263.
- Lehtonen, A., Salonen, A. O., & Cantell, H. (2019). Climate change education: A new approach for a world of wicked problems. In *Sustainability, human well-being, and the future of education* (pp. 339-374). Palgrave Macmillan, Cham.
- Lester, J. N., Cho, Y., & Lochmiller, C. R. (2020). Learning to do qualitative data analysis: A starting point. *Human Resource Development Review*, 19(1), 94-106.
- Mabovula, N. N. (2011). The erosion of African communal values: A reappraisal of the African Ubuntu philosophy. *Inkanyiso: Journal of Humanities and Social Sciences*, 3(1), 38-47.
- Machingura, F., & Museka, G. (2022). Coping with Climate Change-linked Environmental Tragedies: The Role of Shona Beliefs and Practices as Indigenous Knowledge Systems. *Re-imagining Indigenous Knowledge and Practices in 21st Century Africa: Debunking Myths and Misconceptions for Conviviality a*, 149.
- Mabele, M. B., Krauss, J. E., & Kiwango, W. (2022). Going Back to the Roots: Ubuntu: and Just Conservation in Southern Africa. *Conservation and Society*, 20(2), 92-102.

- Matthews, J.B. Robin; Möller, Vincent; van Diemen, Renée; Fuglestedt, Jan S.; Masson-Delmotte, Valérie; Méndez, Carlos; Semenov, Sergey; Reisinger, Andy (2021). "Annex VII. Glossary: IPCC – Intergovernmental Panel on Climate Change"
- Marinoni, G., Van't Land, H., & Jensen, T. (2020). IAU global survey report. *France: International Association of Universities*.
- Masson-Delmotte, V., Zhai, P., Pörtner, H. O., Roberts, D., Skea, J., & Shukla, P. R. (2022). *Global Warming of 1.5 C: IPCC special report on impacts of global warming of 1.5 C above pre-industrial levels in context of strengthening response to climate change, sustainable development, and efforts to eradicate poverty*. Cambridge University Press.
- Mayer, I. (2015). Qualitative research with a focus on qualitative data analysis. *International Journal of Sales, Retailing & Marketing*, 4(9), 53-67.
- Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities' community engagement and prospect for sustainable community development. *The Journal of Environmental Education*, 50(1), 11-22.
- McDougall, C., & Ojha, H. (2021). How does adaptive collaborative management leverage changes in power. *Krister Andersson, Professor of Political Science and Director, The Center for the Governance of Natural Resources, University of Colorado at Boulder, USA*, 186.
- Mero, T. (2011). Town and gown unite. *Sustainability: The Journal of Record*, 4(4), 169-173.
- Metz, T. (2016). Recent philosophical approaches to social protection: From capability to Ubuntu. *Global Social Policy*, 16(2), 132-150.
- Mihas, P. (2019). Qualitative data analysis. In *Oxford research encyclopedia of education*.
- Milugo, T. K., Mosha, M. V., Wampande, E., Philemon, R., Lwanga, I. N., Seeley, J., & Sewankambo, N. K. (2023). Public engagement by early career researchers during the COVID-19 pandemic: case studies from East Africa. *Open Research Africa*, 6(4), 4.
- Mkabela, Q. N. (2015). Ubuntu as a foundation for researching African indigenous psychology. *Indilinga African Journal of Indigenous Knowledge Systems*, 14(2), 284-291.
- McNair, T. B., & Ramaley, J. A. (2018). Equity and inclusion: Expanding the urban ecosystem. *Metropolitan Universities*, 29(1), 3–10

- M'Gonigle, M., & Starke, J. (2006). Planet U Sustaining the world, reinventing the university. Gabriola Island. *British Columbia. New Society*.
- Mfinanga, F. A., Mrosso, R. M., & Bishibura, S. (2019). Comparing case study and grounded theory as qualitative research approaches. *Focus*, 2(05), 51-56.
- Mfitumukiza, D., Mwesigwa, G. Y., Kayendeke, E. J., & Muwanika, V. B. (2024). Local Context Capacity Building Needs for Climate Change Adaptation among Smallholder Farmers in Uganda: Policy and Practice Implications. *Climate*, 12(1), 10.
- Molas-Gallart, J. (2004). Measuring and funding the “Third Mission”: The UK policy debate. In: R. Wink (Ed.), *Academia–Business links. Anglo-German Foundation for the Study of Industrial Society* (pp. 74–89).
- Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1), 23-48.
- Molnar, C., Ritz, T., Heller, B., & Solecki, W. (2010). Using higher education-community partnerships to promote urban sustainability. *Environment*, 53(1), 18-28.
- Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2019). Identifying effective climate change education strategies: A systematic review of the research. *Environmental Education Research*, 25(6), 791-812.
- Montonen, T., Eriksson, P., & Peura, K. (2021). The Third Mission of universities: a boundary object with interpretative flexibility. In *New Movements in Academic Entrepreneurship* (pp. 68-82). Edward Elgar Publishing.
- Morgan, H. (2022). Conducting a Qualitative Document Analysis. *Qualitative Report*, 27(1).
- Mtawa, N. N., Fongwa, S. N., & Wangenge-Ouma, G. (2016). The scholarship of university-community engagement: Interrogating Boyer's model. *International Journal of Educational Development*, 49, 126-133.
- Mugabi, H. (2014). *Institutionalisation of the “third mission” of the university: The case of Makerere University*. Tampere University Press.
- Mugabi, H. (2015). Institutional commitment to community engagement: A case study of Makerere University. *International Journal of Higher Education*, 4(1), 187-199.

- Mugumbate, J., & Nyanguru, A. (2013). Exploring African philosophy: The value of ubuntu in social work. *African Journal of Social Work*, 3(1), 82-100.
- Mupedziswa, R., Rankopo, M., & Mwansa, L. (2019). Ubuntu as a pan-African philosophical framework for social work in Africa. *Social work practice in Africa: Indigenous and innovative approaches*, 21-38.
- Murrah-Hanson, A. L., & Sandmann, L. R. (2021). Exploration of a pathway from leadership development to institutionalization of community engagement. *Journal of Higher Education Outreach and Engagement*, 25(4).
- Myers, N., Kent, J. (2008) *The citizen is willing, but society won't deliver: The problem of institutional roadblocks*. International Institute for Sustainable Development: Winnipeg.
- Nabaho, L., Turyasingura, W., Twinomuhwezi, I., & Nabukenya, M. (2022). The Third Mission of Universities on the African Continent: Conceptualisation and Operationalisation. *Higher Learning Research Communications*, 12(1), 4.
- Naidoo, R., & Jamieson, I. (2005). "Knowledge in the Marketplace. The Global Commodification of Teaching and Learning in Higher Education." *In Internationalizing Higher Education: Critical Explorations of Pedagogy and Policy*, edited by P. Ninnes and M. Hellsten, 37–51. Hong Kong: Springer.
- Nassaji, H. (2020). Good qualitative research. *Language Teaching Research*, 24(4), 427-431.
- Niang, A., Becker, M., Ewert, F., Dieng, I., Gaiser, T., Tanaka, A., ... & Saito, K. (2017). Variability and determinants of yields in rice production systems of West Africa. *Field Crops Research*, 207, 1-12.
- Nicotra, M., Del Giudice, M., & Romano, M. (2021). Fulfilling University third mission: towards an ecosystemic strategy of entrepreneurship education. *Studies in Higher Education*, 46(5), 1000-1010.
- Nicolaides, A., & Austin, A. C. (2022). Community Engagement as an Ubuntu Transformative Undertaking for Higher Education Institutions.
- Nixon, R. (2013). *Slow violence and the environmentalism of the poor* (1. Harvard Univ.Press paperback ed.).
- Nkosi, B., & Daniels, P. (2007). Family strengths: South Africa. *Marriage & Family Review*, 41(1-2), 11-26.
- Nnodim, P., & Okigbo, A. (2024). Ubuntu: Opportunities And Challenges For Africa And The World. *Ubuntu: A Comparative Study of an African Concept of Justice*, 229

- Nuwagira, U., & Yasin, I. (2022). Review of the Past, Current, and the Future Trend of the Climate Change and its Impact in Uganda. *East African Journal of Environment and Natural Resources*, 5(1), 115-126.
- Nyerere, J. K. (1968). Education for self-reliance. *CrossCurrents*, 18(4), 415-434.
- Nyimbili, F., & Nyimbili, L. (2024). Types of Purposive Sampling Techniques with Their Examples and Application in Qualitative Research Studies. *British Journal of Multidisciplinary and Advanced Studies*, 5(1), 90-99.
- Nyumba, T., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and evolution*, 9(1), 20-32. Cambridge, MA: Harvard University Press.
- Obilor, E. I. (2023). Convenience and purposive sampling techniques: Are they the same. *International Journal of Innovative Social & Science Education Research*, 11(1), 1-7.
- O'carroll, C., Harmon, C., & Farrell, L. (2006). *The economic and social impact of higher education*. Irish Universities Association.
- Ogunsanya, O., & Govender, I. (2019). University-Community Engagement: Current Tensions and Future Trends. *International Journal of African Higher Education*, 6(1), 51-76.
- Okello, J. (2019). Policy implications of social protection initiatives in addressing poverty in Uganda.
- Okoliko, D. A., & David, J. O. (2021). Ubuntu and climate change governance: Moving beyond conceptual conundrum. *Journal of Public Affairs*, 21(3), e2232.
- Omer, A.M. (2008b) 'Energy, environment and sustainable development', *Renewable and Sustainable Energy Reviews*, Vol. 12, No. 9, pp.2265–2300.
- Owen, G. T. (2014). "Qualitative methods in higher education policy analysis: Using interviews and document analysis." *The qualitative report* 19, no. 26 (2014): 1.
- Pacala, S., & Socolow, R. (2004) 'Stabilization wedges: solving the climate problem for the next 50 years with current technologies', *Science*, Vol. 305, No. 5686, pp.968–972.
- Parker, C., Scott, S., & Geddes, A. (2019). Snowball sampling. *SAGE research methods foundations*.

- Partey, S. T., Zougmore, R. B., Ouédraogo, M., & Campbell, B. M. (2018). Developing climate-smart agriculture to face climate variability in West Africa: Challenges and lessons learnt. *Journal of cleaner Production*, 187, 285-295.
- Papadimitriou, A. (2020). Beyond rhetoric: Reinventing the public mission of higher education. *Tertiary Education and Management*, 26(1), 1-4.
- Pauleit, S., Coly, A., Fohlmeister, S., Gasparini, P., Jorgensen, G., Kabisch, S., & Yeshitela, K. (2015). Urban vulnerability and climate change in Africa. *Futur City*, 4.
- Perry, D. C., & Wiewel, W. (2005). The University as Urban Developer: Case Studies and Analysis. edition 1. *Publisher Routledge*.
- Pinheiro, R., Langa, P. V., & Pausits, A. (2015). One and two equals three? The third mission of higher education institutions. *European journal of higher education*, 5(3), 233-249.
- Phatshwane, K. (2024). The art of talks and conversations in Indigenous research: decolonising interview methods. In *Handbook of Research Methods and Applications for Social Movements* (pp. 214-229). Edward Elgar Publishing.
- Preece, J. (2011). Higher education and community service: Developing the National University of Lesotho's third mission. *Journal of Adult and Continuing Education*, 17(1), 81-97.
- Pundt, H., & Heilmann, A. (2020). Building collaborative partnerships: an example of a 3rd mission activity in the field of local climate change adaptation. In *Universities as Living Labs for Sustainable Development* (pp. 621-636). Springer, Cham.
- Raditloaneng, W. N. (2013). Impact of “Implementing the Third Mission of Universities in Africa (ITMUA) collaborative research project, 2010-2011”. *International Journal of Peace*, 4(5), 90-99.
- Rajib, M. S. U., & Mou, N. Z. (2019). Ethical issues of qualitative research. In *Scholarly Ethics and Publishing: Breakthroughs in Research and Practice* (pp. 683-696). IGI Global.
- Räthzel, N., Cock, J., & Uzzell, D. (2018). Beyond the nature–labour divide: trade union responses to climate change in South Africa. *Globalizations*, 15(4), 504-519.
- Reed, M. S., Vella, S., Challies, E., De Vente, J., Frewer, L., Hohenwallner-Ries, D.,... & Van Delden, H. (2018). A theory of participation: what makes stakeholder and public engagement in environmental management work? *Restoration ecology*, 26, S7-S17.

- Reimann, L., Vafeidis, A. T., & Honsel, L. E. (2023). Population development as a driver of coastal risk: Current trends and future pathways. *Cambridge Prisms: Coastal Futures*, 1, e14.
- Ridder, H. G. (2014). *Book Review: Qualitative data analysis. A methods sourcebook* (Vol. 28, No. 4, pp. 485-487). Sage UK: London, England: Sage publications.
- Rising, J. A., Taylor, C., Ives, M. C., & Ward, R. E. (2022). Challenges and innovations in the economic evaluation of the risks of climate change. *Ecological Economics*, 197, 107437.
- Rodman, M. C. (1992). Empowering place: Multilocality and multivocality. *American Anthropologist*, 94(3), 640- 656.
- Rubens, A., Spigarelli, F., Cavicchi, A., & Rinaldi, C. (2017). Universities' third mission and the entrepreneurial university and the challenges they bring to higher education institutions. *Journal of Enterprising Communities: People and Places in the Global Economy*.
- Rubin, V. (2000). Evaluating university–community partnerships: An examination of the evolution of questions and approaches. *Cityscape: A Journal of Policy Development and Research*, 5(1), 219–230.
- Rocque, R. J., Beaudoin, C., Ndjaboue, R., Cameron, L., Poirier-Bergeron, L., Poulin-Rheault, R. A., ... & Witteman, H. O. (2021). Health effects of climate change: an overview of systematic reviews. *BMJ open*, 11(6), e046333.
- Roland, B., Rubens, A., & Azupogo, H. A. (2018). Combining indigenous wisdom and academic knowledge to build sustainable future: An example from rural Africa. *Journal of African Studies and Development*, 10(2), 8-18.
- Rousell, D., & Cutter-Mackenzie-Knowles, A. (2020). A systematic review of climate change education: Giving children and young people a 'voice' and a 'hand' in redressing climate change. *Children's Geographies*, 18(2), 191-208.
- Salmi, J., & D'Addio, A. (2021). Policies for achieving inclusion in higher education. *Policy Reviews in Higher Education*, 5(1), 47-72.
- Sathorar, H., & Geduld, D. (2021). A Critical Approach to University-Community Partnerships: Reflecting on the Diverse Realities. *Educational Research for Social Change*, 10(2), 88-104.
- Serwajja, E., Kisira, Y., & Bamutaze, Y. (2024). 'Better to die of landslides than hunger': Socio-economic and cultural intricacies of resettlement due to climate-induced hazards in Uganda. *International Journal of Disaster Risk Reduction*, 101, 104242.

- Shiel, C., Leal Filho, W., do Paço, A., & Brandli, L. (2016). Evaluating the engagement of universities in capacity building for sustainable development in local communities. *Evaluation and program planning*, 54, 123-134.
- Schneider, B., Brief, A.P., & Guzzo, R.A. (1996). Creating a climate and culture for sustainable organizational change. *Organizational Dynamics*, Spring, 7- 18.
- Schnurbus, V., & Edvardsson, I. R. (2022). The Third Mission among Nordic universities: A systematic literature review. *Scandinavian Journal of Educational Research*, 66(2), 238-260.
- Silva, L. A. G. P. D., & Mercês, N. N. A. D. (2018). Multiple case study applied in nursing research: a case report. *Revista Brasileira de Enfermagem*, 71, 1194-1197.
- Sim, M. S. C., Galloway, J. E., Ramos, H. M., & Mustafa, M. J. (2023). University's support for entrepreneurship and entrepreneurial intention: the mediating role of entrepreneurial climate. *Journal of Entrepreneurship in Emerging Economies*, 15(2), 360-378.
- Ssekamate, D. (2021). Participants' Perspectives Regarding the Role of University Governance in Promoting Climate Change and Sustainability Interventions at University of Dar es Salaam in Tanzania. *Developments in Administration*, 3.
- Ssekamate, D., Speck, K., & Siebenhüner, B. (2021). The Challenges and Opportunities for Climate Change Education at Makerere University in Kampala Uganda. *Sustainable Development in Africa: Fostering Sustainability in one of the World's Most Promising Continents*, 201-219.
- Ssekamate, D. (2018). *The Opportunities and Challenges for Climate Change Education at Universities in the African Context: A Comparative Case Study of Makerere University (Uganda) and University of Dar es Salaam (Tanzania)* (Doctoral dissertation, Universität Oldenburg).
- Ssekamate, D. (2020). Towards a theoretical model linking university education to climate change interventions in the African context. *Journal of African Studies and Development*, 12(1), 17-24.
- Ssekamate, D. (2022). The role of the university and institutional support for climate change education interventions at two African universities. *Higher Education*, 1-15.
- Staeheli, L.A. (2007) Place. In J. Akenew, K. Mitchell, & G. Toal (Eds.), *A companion to Political Geography* (pp. 157-169). New York: Blackwell Publishing.

- Stahl, N. A., & King, J. R. (2020). Expanding approaches for research: Understanding and using trustworthiness in qualitative research. *Journal of Developmental Education*, 44(1), 26-28.
- Susskind, L., & Kim, A. (2022). Building local capacity to adapt to climate change. *Climate Policy*, 22(5), 593-606.
- Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., ... & Reinhardt, J. (2017). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. *Regional Environmental Change*, 17(6), 1585-1600.
- Siedlecki, S. L. (2022). Conducting Interviews for Qualitative Research Studies. *Clinical Nurse Specialist*, 36(2), 78-80.
- Sin, C., Tavares, O., & Cardoso, S. (2019). Assessing the quality of third mission activities in Portuguese universities. *Revista Espaço Pedagógico*, 26(1), 33-46.
- Soergel, B., Kriegler, E., Weindl, I., Rauner, S., Dirnaichner, A., Ruhe, C., ... & Popp, A. (2021). A sustainable development pathway for climate action within the UN 2030 Agenda. *Nature Climate Change*, 11(8), 656-664.
- Stephens, J. C., Hernandez, M. E., & Boyle, M. E. (2009). Learning from University-Community Partnerships (past and present) for sustainable development. *George Perkins Marsh Institute Working Paper*, 4, 2009.
- Stocker, T.F., Qin, D., Plattner, G-K., Tignor, M.M.B., Allen, S., Boschung, J., Nauels, A., Xia, Y., Bex, V. and Midgley, P.M. (2013) *Climate Change 2013: The Physical Basis*, Cambridge University Press, Cambridge.
- Sumner, A., Hoy, C., & Ortiz-Juarez, E. (2020). *Estimates of the impact of COVID-19 on global poverty* (No. 2020/43). WIDER working paper.
- Tagoe, M. (2012). Students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana. *International Journal of Education and Development using ICT*, 8(1), 91-103.
- Talwar, S., Wiek, A., & Robinson, J. (2011). User engagement in sustainability research. *Science and Public Policy*, 38(5), 379-390.
- Tavakol, M., & Sandars, J. (2014). Quantitative and qualitative methods in medical education research: AMEE Guide No 90: Part II. *Medical teacher*, 36(10), 838-848.
- Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic analysis. *The SAGE handbook of qualitative research in psychology*, 2, 17-37.

- Theron, L., Liebenberg, L., & Ungar, M. (2015). *Youth resilience and culture*. Springer. [MU].
- Thomas, D.F. (2004). *Toward an understanding of organization place building in communities*. Unpublished doctoral dissertation, Colorado State University, Fort Collins, Colorado.
- Thomas, D.F. & Cross, J. (2007). Organizations as place builders. *Journal of Behavioral and Applied Management*, 9(1), 33-61.
- Thomas, K., Hardy, R. D., Lazrus, H., Mendez, M., Orlove, B., Rivera-Collazo, I., ... & Winthrop, R. (2019). Explaining differential vulnerability to climate change: A social science review. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), e565.
- Thornton PK, Jones PG, Ericksen PJ, Challinor AJ (2011) Agriculture and food systems in sub-Saharan Africa in a 4 C+ world. *Philos Trans R Soc A* 369(1934):117–136.
- Thunberg, S., & Arnell, L. (2021). Pioneering the use of technologies in qualitative research—A research review of the use of digital interviews. *International journal of social research methodology*, 1-12.
- Tomaszewski, L. E., Zarestky, J., & Gonzalez, E. (2020). Planning qualitative research: Design and decision making for new researchers. *International Journal of Qualitative Methods*, 19, 1609406920967174.
- Trencher, G. P., Yarime, M., & Kharrazi, A. (2013). Co-creating sustainability: cross-sector university collaborations for driving sustainable urban transformations. *Journal of Cleaner Production*, 50, 40-55.
- Trencher, G., Yarime, M., McCormick, K. B., Doll, C. N., & Kraines, S. B. (2014). Beyond the third mission: Exploring the emerging university function of co-creation for sustainability. *Science and Public Policy*, 41(2), 151-179.
- Tuan, Yi-Fu. (1977). *Space and place: The perspective of experience*. Minneapolis, MN: University of Minnesota Press.
- Tumushabe, G., Muyomba-Tamale, L., Ssemakula, E. G., & Lukwago, D. (2010). Uganda local government councils score card report 2008/09: A comparative analysis of findings and recommendations for action. *ACODE Policy Research Series*, (32).
- Turyahabwa, J. (2014). The role of multinationals in eradicating poverty in Africa: Perspectives from different stakeholders in urban Uganda. *Poverty & Public Policy*, 6(1), 24-32.

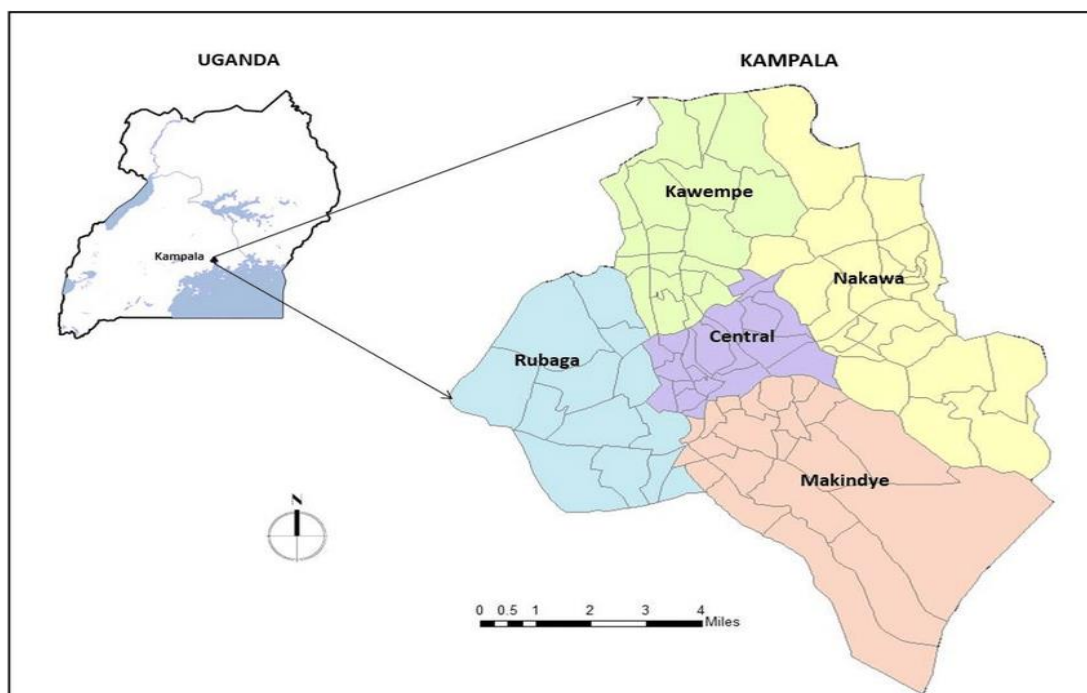
- Tutu, D. 1999. *No future without forgiveness*. New York: Image.
- Twecan, D., Wang, W., Xu, J., & Mohammed, A. (2022). Climate change vulnerability, adaptation measures, and risk perceptions at households' level in Acholi sub-region, Northern Uganda. *Land Use Policy*, 115, 106011.
- Tweheyo, R., Bamwesigye, D., & Kiconco, M. (2024). Climate Change Mitigation in Southwestern Uganda Using Indigenous Knowledge.
- Twinomuhangi, R., Natuhwera, C., & Ampaire, E. L. (2019). Role of Local Policies in Facilitating Adaptation of Smallholder Farming to Climate Change in Uganda. *J. Environ. Earth Sci*, 9, 88-100.
- 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.
- UNICEF. (2020). Global annual results report 2019: goal area 4: every child lives in a safe and clean environment.
- United Nations Educational Scientific and Cultural Organization (UNESCO) (2015). Putting Climate Change Education into Practice. Paris France: *United Nations Educational Scientific and Cultural Organization*.
- Van Campenhout, B., Kabunga, N., Mogues, T., & Mieke, C. (2021). Community advocacy forums and public service delivery in Uganda: Impact and the role of information, deliberation and administrative placement. *3ie Impact Evaluation Report*, 1-104.
- Vendetti, M., Reale, E., Leydesdorff, L. (2011) 'The disclosure of university research for societal demand: a non-market perspective on the "third mission"', <http://arxiv.org/pdf/1111.5684.pdf>
- Vergara-Hernández, C., Marí-Dell'Olmo, M., Oliveras, L., & Martínez-Beneito, M. A. (2024). Taking advantage of sampling designs in spatial small-area survey studies. *Statistical Modelling*, 1471082X231226287.
- Villavicencio Calzadilla, P., Mauger, R., & Du Plessis, A. (2018). Climate change communication in higher education institutions: The case of the North-West University in South Africa. In *Handbook of Climate Change Communication: Vol. 3* (pp. 241-255). Springer, Cham.
- Virtanen A (2010). Learning for Climate Responsibility: Via Consciousness to Action. In: W. L. Filho (Ed.), *Universities and Climate Change*, Berlin Heidelberg: Springer, pp. 231-240.

- Waghid, Y. (2020). Towards an Ubuntu philosophy of higher education in Africa. *Studies in Philosophy and Education*, 39(3), 299-308.
- Wamsler, C., Osberg, G., Panagiotou, A., Smith, B., Stanbridge, P., Osika, W., & Mundaca, L. (2023). Meaning-making in a context of climate change: supporting agency and political engagement. *Climate Policy*, 23(7), 829-844.
- Weber, T., Haensler, A., Rechid, D., Pfeifer, S., Eggert, B., & Jacob, D. (2018). Analyzing regional climate change in Africa in a 1.5, 2, and 3 C global warming world. *Earth's Future*, 6(4), 643-655.
- Wendling, L. A., & Evans, K. (2023). An analysis of community engagement in institution-level strategic plans. *International Journal of Research on Service-Learning and Community Engagement*, 11(1). Article 6. <https://doi.org/10.37333/001c.92019>
- Werndl, C. (2020). On defining climate and climate change. *The British Journal for the Philosophy of Science*.
- Whitmer, A., Ogden, L., Lawton, J., Sturner, P., Groffman, P. M., Schneider, L., ... & Killilea, M. (2010). The engaged university: providing a platform for research that transforms society. *Frontiers in Ecology and the Environment*, 8(6), 314-321.
- Whitmarsh, L. and O'Neill, S. (2011) 'Introduction: opportunities for and barriers to engaging individuals with climate change', in Whitmarsh, L., O'Neill, S. and Lorenzoni, I. (Eds.): *Engaging the Public with Climate Change*, Earthscan, London.
- Willmore, S. B., Day, R., Roby, J. L., & Maistry, S. (2023). Ubuntu among the 'born frees': Exploring the transmission of social values through community engagement in South Africa. *International Social Work*, 66(6), 1803-1815.
- World Bank (2009) Making development climate resilient: *a world bank strategy for sub-Saharan Africa*. World Bank, Washington, DC
- World Bank. (2020). *Poverty and shared prosperity 2020: Reversals of fortune*. The World Bank.
- World Bank. (2023). Africa's Pulse, No. 27, April 2023: Leveraging Resource Wealth During the Low Carbon Transition.
- Wood, L. M., Sebar, B., & Vecchio, N. (2020). Application of rigour and credibility in qualitative document analysis: Lessons learnt from a case study. *The qualitative report*, 25(2), 456-470.

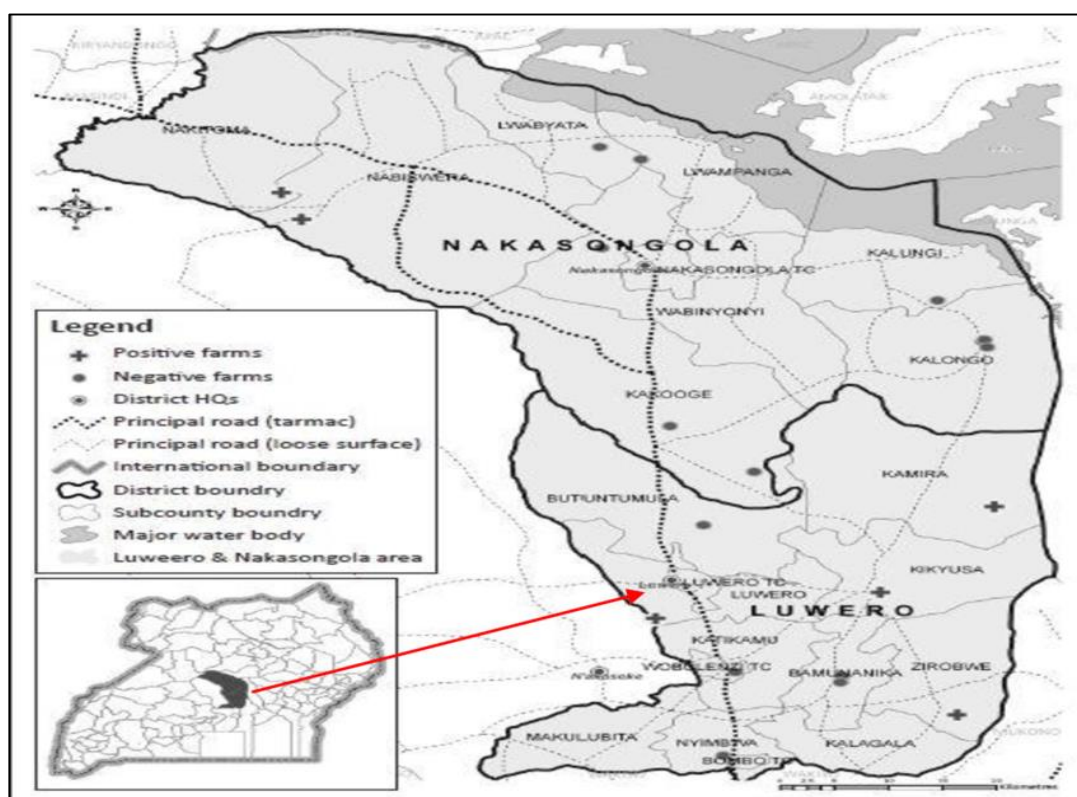
- Wulff, A. (2021). At the frontier of climate change: Red alert from the European Alps, the Arctic and coral reefs. *Ambio*, 50(6), 1123-1129.
- Wyckoff, M.A. (2014). Definition of Placemaking: Four Different Types. Planning and Zoning News. Retrieved from <http://pznews.net/media/>
- Yarime, M., Trencher, G., Mino, T., Scholz, R. W., Olsson, L., Ness, B., ... & Rotmans, J. (2012). Establishing sustainability science in higher education institutions: towards an integration of academic development, institutionalization, and stakeholder collaborations. *Sustainability Science*, 7(1), 101-113.
- Yin, R. K. (2009). *Case Study Research Design and Methods* (Fourth Edition ed.). Thousand Oaks, California: Sage Publications Inc.
- Yin, R. K. 2015. *Qualitative Research from Start to Finish*. New York: Guilford Publications. Yin, R. K. (2016). *Qualitative Research from Start to Finish* (2nd ed.). New York: The Guilford Press
- Yin, R. K. (2016). *Qualitative Research from Start to Finish* (2nd ed.). New York: The Guilford Press
- Zainal, Z. (2007). *Case study as a research method*. *Jurnal Kemanusiaan*, 5(1).
- Ziervogel, G., New, M., Archer van Garderen, E., Midgley, G., Taylor, A., Hamann, R., ... & Warburton, M. (2014). Climate change impacts and adaptation in South Africa. *Wiley Interdisciplinary Reviews: Climate Change*, 5(5), 605-620.
- Ziervogel, G., Enqvist, J., Metelerkamp, L., & van Breda, J. (2022). Supporting transformative climate adaptation: community-level capacity building and knowledge co-creation in South Africa. *Climate Policy*, 22(5), 607-622.
- Zenios, S. A. (2022). The risks from climate change to sovereign debt. *Climatic Change*, 172(3), 1-19.

APPENDICES

Appendix I: Kampala and Luwero Districts



Luwero District



Appendix II: Consent Form

Title of the study: University-Community Engagement Opportunities to Address Climate Change and sustainability in African Context: A Comparative Case Study of Ndejje University and Makerere University

Investigator(s): MANDELA

NELSON Institution(s): MOI

UNIVERSITY Introduction

The investigator is a student at Moi University, Kenya pursuing a Doctorate of Philosophy of Educational Research and Evaluation. This informed consent explains the study to you. After the study has been explained, any questions you may have been answered, and you have agreed to take part in this research study, you will be asked to sign a consent, which you will receive a copy to keep. This study is designed to investigate university-community collaborations towards climate change issues at the two selected cases of Makerere and Ndejje Universities in Uganda.

A brief description of the sponsors of the research project

The sponsor of this research study is CERM-ESA which is a joint project between the Moi University (Kenya), University of Oldenburg (Germany), Uganda Management Institute (Uganda), Nelson Mandela University (South Africa), and the University of Dar es Salaam (Tanzania) and is funded by the German Academic Exchange Service (DAAD) with funds from the German Federal Foreign Office.

Purpose:

The purpose of this study is to explore the opportunities for university-community engagement towards climate change action in an African context at two universities of East Africa. This is to enhance the third mission of higher institutions of learning in addressing the challenges of climate change and achieving a sustainable world. Particularly, this is so as to facilitate university-community engagement opportunities that enhance and promote climate change adaptation and mitigation practices through equitable partnerships and citizenry promotion of sustainable communities.

Who will participate in the study?

You have been requested to take part in this study since you are thought to be with the required information for this study. The study will last for approximately three

months and 40 people will take part in this study. The researcher will arrange an interview and focus group discussions on separate days to avoid inconveniences.

Risks/discomforts:

There is no foreseeable risk of harm or discomfort that will arise from your participation in this study. The only risk or discomfort will be an inconvenience in terms of time spent during the interview.

Benefits:

You will get feedback on the discoveries and advancement of the investigation, and that any new data that influences this research study participants (including incidental discoveries) will be made accessible to look into by the members. The research findings could be used to address several challenges facing the educational sector as a result of climate change and potentially be used source for funding to strengthen adaptation and mitigation to climate change.

Compensation for Participation

Research participants shall be fairly be compensated for inconveniences, time spent and in case there are expenses incurred in taking part in a study such as travel costs, refreshments, meals, and any other compensation deemed appropriate by the UCUREC. During the Focus Group Discussion (FGD), the participants will be provided with some snacks and refreshments.

Confidentiality:

Your identity will not be revealed to anyone as I shall only use codes to identify participants. Information obtained will only be accessible by the researcher and the project supervisor. Soft copies of the data will be protected by password and hard copy files will be kept under lock and key. Confidential information will only be accessed by the principal investigator. There won't be any recognizing names on the interview transcript: they will be coded and the key to the code will keep bolted away. Your names and some other recognizing point of interest will never be uncovered in any publication of this research. The tapes will be destroyed at the end of this research study. The results of the exploration will be published as a research paper and might be published in a professional journal.

Alternatives:

You do not have to participate in this study if you are not interested. You will not lose any benefit in case of no participation.

Cost:

There will not be any additional cost incurred as a result of participating in this study.

Questions:

For questions regarding your rights and welfare as a research participant” contact the Chairman of Uganda Christian University Research Ethics Committee (UCUREC), Prof Peter Waiswa, 0772405357, peter.waiswa@ki.se) REC Administrator: Mr. Osborn Ahimbisibwe 0704482044/0775737627, oahimbisibwe@ucu.ac.ug) Contact information: P.O.BOX 4 Mukono.

If you have any questions related to the study, you can contact the principal investigator, Mandela Nelson on telephone number 0777749215 or email mandelanelson26@yahoo.com

Consent for audio recording. Tick yes or no.

YES

NO

Statement of Consent

..... has explained to me what will be done, the dangers, advantages involved and my rights as a member of this investigation comprehend that my choice to take part in this study will not influence or affect me whatsoever. In the utilization of this data, my identity will be disguised. I am mindful that I may pull back at any point. I comprehend that by signing this form, I do not defer any of my legitimate rights however simply show that I have been educated about the exploration contemplate in which I am willfully consenting to take part in. A duplicate of this form will be given to me.

NameSignature of the participant.....date.....

Name.....Signature of the interviewer.....date.....

Appendix III: Interview Guide for University Management

Introduction

My name is Mandela Nelson, a PhD student at Moi University doing research on university-community engagement opportunities on climate change action and sustainability in an African context: a comparative case study of Ndejje and Makerere Universities. You are among the few people chosen to help me in the achievement of the research project. If it is not too much trouble to answer the inquiries as well as could be expected, you are guaranteed that all information given will be treated with confidentiality and anonymity.

Possible probs

That was useful, however, might you be able to give more detail?

- Could you elaborate more on that?
- Your example was useful, however, would you be able to give me another guide to enable me to get it better?

Interview Questions

1. How do you understand university-community engagement? (Explain and relate to university's third mission) What does it involve?
2. What is your university's mandate around community engagement?
3. Are there any institutional strategies for community engagement at your university?
4. Who are your external stakeholders/partners/communities involved in the engagement activities of your universities? (Civil society, NGOs, NPOs, government (traditional, local gov, municipalities, national gov), professional bodies/community of practice associations, media (formal, traditional, social, networks, platforms), other educational institutions, university alumni, independent research councils)
5. Do you know of any good examples of engagement in the field of climate change at your university?
6. How do you develop and coordinate community engagement programs on climate change action and sustainability?
7. What kind of activities do you engage in with the (above-mentioned) stakeholders/partners/communities regarding climate change?
8. How effective do you think these engagement activities are regarding addressing climate change issues?

9. Tell me more on the most recent successful community engagement activities on climate change that were held by the University
10. What formal structures do you use or have created for engagement in your institution and with stakeholders/partners/communities? (MoU, Advisory Board, Committees etc?)
11. In your opinion, what are some of the major constraints you encounter in the university-community collaborations in the efforts to address climate change? finances, resources, human capital, ...
12. How did the COVID-19 pandemic impact your engagement activities towards climate change activities?
13. What opportunities/measures that might be able to support policy making and enhance third mission towards climate change issues?
14. What other final thoughts do you have for the universities in Africa to effectively engage the communities and address climate change?

I thank you for taking off some of your valuable time to share with me your experiences. I hope you will be willing to share with me more information or clarifications on some areas in case I need to. Once again, I assure you of confidentiality and that your responses will be used for academic purposes only.

END

Appendix IV: Interview Guide for Community Leaders Introduction

My name is Mandela Nelson, a PhD student at Moi University doing research on university-community engagement opportunities in African context: a comparative case study of Ndejje and Makerere Universities. You are among the few people chosen to help me in the achievement of the research project. If it is not too much trouble to answer the inquiries as well as could be expected, you are guaranteed that all information given will be treated with confidentiality and anonymity.

Interview Questions

1. How do you understand university-community engagement? What does it involve?
2. Do you think the universities are doing enough to promote community engagement?
3. Are you aware of the university's mandate around community engagement?
4. Do you have any mandate as a community/partner around community engagement?
5. Are there any strategies for community engagement in your community/entity?
6. Do you know of any good examples for engagement in the field of climate change in your community/entity?
7. How do you develop and coordinate community engagement programs on climate change action and sustainability?
8. What kind of activities do you engage in with the (above mentioned) university regarding climate change issues?
9. How effective do you think these engagement activities are regarding addressing climate change issues?
10. Tell me more on the most recent successful community engagement activities on climate change that were held by the University
11. What formal structures do you use or have created for engagement in your in your community/entity and the university? (MoU, Advisory Board, Committees etc)
12. In your opinion, what are some of the major constraints do you encounter in the university-community collaborations in the efforts to address climate change?
13. How did the Covid-19 pandemic impact your engagement activities towards climate change activities?

14. What opportunities/measures that might be able to support policy making and enhance third mission towards climate change issues?
15. What other final thoughts do you have for the universities and communities in Africa to effectively engage the communities and address climate change?

I thank you for taking off some of your valuable time to share with me your experiences. I hope you will be willing to share with me more information or clarifications on some areas in case I need to. Once again, I assure you of confidentiality and that your responses will be used for academic purposes only.

END

Appendix V: Document Review Guide

The following items will be reviewed in the documents

Background information about the case universities

- Location of the university
- Historical background
- University policies and strategic plans
- Facts and figures about students and staff
- Any other information on climate change education programs at the university.

University's mandate around university-community engagement

- University policy statements, missions, and visions

Documents about University-community engagement activities

- Only from 2018 to date ...
- Strategic plans,
- work plans,
- policies,
- reports,
- media coverage,
- brochures,
- pamphlets,
- curriculums,
- feedback forms

Documents about formal structures that the case universities have created for engagement in your institution and with stakeholders/partners/communities?

- (MoU, MoA, Advisory Board, Committees,)

Appendix VI: Community Engagement Plan

NAME: Mandela Nelson

UNIVERSITY: Moi University, Eldoret, Kenya.

TOPIC: University-Community Engagement Opportunities to Address the Issues of Climate Change in African Context: A Comparative Case Study of Ndejje and Makerere Universities

a. Goal and objectives to be achieved.

The goal of this plan is to give appropriate guidance to the researcher on how best he can involve research participants and the general Ndejje and Makerere Universities and the communities around the universities. I aim at ensuring that this research represents well what is on ground, that participants will not be imposed on ideas, concepts and information that does not belong to them as I embark on a comparative case study whose aim is detailed below.

The aim of this study is to explore the opportunities for university-community engagement towards climate change action in an African context at two universities of in Uganda (Ndejje and Makerere Universities). Therefore, the researcher will have to engage community leaders, especially chairpersons of local council one of cells around and within the universities, councillors, heads of organisations, civil society leaders in the communities and extension workers. The engagement will be in terms interviews that will be (with their consent) recorded. These participants will be engaged to have a discussion about; community engagement activities implemented by the case universities on climate change, how the case universities develop and coordinate community engagement programs on climate change action, major constraints in the university-community collaborations in the efforts to address climate change at the case universities and opportunities that might be able to support policy making and enhance the third mission programs towards climate change issues and sustainability at the case universities. The information given will inform data analysis and report writing for specifically academic purposes and societal transformation.

b. The key community stakeholders to be involved.

Local council one chairpersons

Civil society leaders

Area councilors

Extension workers

c. Sensitization and Education

The researcher and his team will sensitize participants before they are recruited or engaged in any activities. This includes a broad-brush of the study, the aims, approaches, and potential benefits, and most importantly the ethical and informed consenting processes.

d. The research team responsible for managing community engagement activities.

Only the researcher/Investigator (Mandela Nelson)

e. Approach(es), activities and mode of implementation as well as the justification for selecting the approach(es).

The only activity involved will be conducting an interview. This will involve a guided discussion about the study's objectives and research questions. With the consent of the participants, the researcher will record the interview to enable transcriptions and thematic data analysis. This approach has been chosen by the researcher due to its suitability to the research design and methodology of the study (Qualitative; a comparative case study).

f. Communication strategy for the engagement.

The research will visit the community leaders physically and make appointments for the interviews. The researcher will also get phone numbers of the participants so that he calls for reminders before the interview dates.

g. An evaluation plan for the community engagement activities.

The researcher will make initiatives to always evaluate the interviews conducted with the participants in the community. For instance, after interviews, the researcher will engage the participants for feedback on the conduct of the interview, listen to the recorded audios and together with the academic supervisor, recommend areas for quality improvement.

h. Plan on mitigation, identification, documentation and addressing of risks, conflicts

as well as grievances resulting from community engagement efforts.

As indicated in (f) above, the researcher will ensure that there is clear evaluation of the whole process of the engagement efforts. The researcher will ensure that he explains the intention of the study explicitly, give out consent forms and ensure that participation is out of willingness. In case of any arising risks or complaints, the researcher will clearly document the grievances, acknowledge them, and review the whole engagement activity involved to avoid any single infringement on the participants welfare. In case of any risks or gradients, the researcher will develop resolutions options and prepare an immediate response immediately depending on the grievance reported. This mechanism will be monitored and evaluated to ensure no similar comfortability arises among the participants.

i. Ethical approval

This research was reviewed and approved by the Uganda Christian University Research ethics Committee (UCU-REC) which is overseen by the Uganda National council for Science and Technology (UNCST), if there are any ethical concerns, please contact UCU-REC Chairperson, Prof. Peter Waiswa, 0772405357, pwaiswa@ucu.ac.ug, or UCU-REC Manager, Mr. Osborn Ahimbisibwe, 0775737627, oahimbisibwe@ucu.ac.ug

Appendix VII: Focus Group Guide for Students

My name is Mandela Nelson, a PhD student at Moi University doing research on University-community engagement opportunities in an African context: a comparative case study of Ndejje Makerere Universities. You are among the few people chosen to help me in the achievement of the research project. If it is not too much trouble to answer the inquiries as well as could be expected, you are guaranteed that all information given will be treated with confidentiality and anonymity.

Time of discussion:

Date:

Place:

Facilitator:

Number of participants:

Questions

1. How do you understand university-community engagement? (Explain and relate to the university's third mission) What does it entail?
2. Are you aware of the university's mandate around community engagement? If yes, what is it?
3. Do you have any mandate as students around university-community engagement?
4. Are there any university strategies for community engagement in your community/entity?
5. Do you know of any good examples for engagement in the field of climate change in your university?
6. How do you develop and coordinate community engagement programs on climate change action and sustainability?
7. What specific community engagement programs/activities have you been involved in implemented by your university in relation to climate change and sustainability?
8. Tell me more on the most successful community events on climate change that were held by your university on climate change
9. How effective do you think these engagement activities are regarding addressing climate change issues?

10. Who were the key people that made these activities successful?
11. What challenges did you encounter during the community engagement programs or activities?
12. What opportunities/measures might be able to support policy making and enhance third mission towards climate change issues?
13. What other final thoughts do you have for the universities and communities in Africa to effectively engage the communities and address climate change?

I thank you for taking off some of your valuable time to share with me your experiences. I hope you will be willing to share with me more information or clarifications on some areas in case I need to. Once again, I assure you of confidentiality and that your responses will be used for academic purposes only.

END

Appendix VIII: Research Permit, Ndejje University



UGANDA CHRISTIAN UNIVERSITY
A Centre of Excellence in the Heart of Africa

UG-REC-026 Approval Version 4.0

07th November, 2022

07/11/2022

Nelson Mandela

Type: Protocol amendment

UG-REC-026 APPROVAL NOTICE

To: Nelson Mandela, Principal Investigator

Re: UCU-REC Application titled; University-community engagement opportunities to address climate change in African context: a comparative case study of Ndejje and Makerere Universities

Application Number: UCUREC-2022-400

Version: 4.0

Type: ☐ Initial Review
☐ Protocol Amendment
☐ Letter of Amendment (LOA)
☐ Continuing Review
☐ Material Transfer Agreement
☐ Other, Specify:



I am please to inform you that the UG-REC-026; UCUREC approved the above referenced application.

Approval of the research is for the period from 7th November 2022, to 7th November, 2023.

This research is considered minimal risk category.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and additions to the protocol or the consent form must be submitted to the REC for re-review and approval prior to the activation of the changes.

1 of 2

A Centre of Excellence in the Heart of Africa

P.O. Box 4, Mukono, Uganda (East Africa), Plot 67-173, Bishop Tucker Road, Mukono Hill, Tel: +256 (0) 31 235 0800, www.ucu.ac.ug
 Ugdachristianuniversity @UCUniversity, Founded by the Province of Church of Uganda, Chartered by the Government of Uganda.

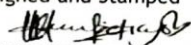
The REC application number assigned to the research should be cited in any correspondence.

3. Reports of unanticipated problems involving risks to participants or other must be submitted to the REC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for REC review.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Regulations require review of an approved study not less than once per 12-month period. Therefore, a continuing review application must be submitted to the REC eight weeks prior to the above expiration date of 7th November 2023 in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to notify the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by UG-REC _026:

	Document Title	Language	Version	Version Date
1.	Amended Proposal			
2.	Data Collection Tools	English	1.0	2023-03-10
3.	Informed Consent Form			
4.	Risk Management Plan			


Signed and Stamped


 Prof. Peter Waiswa,
 UCUREC Chairperson,
pwaiswa@musph.ac.ug



Appendix IX: Institutional Research Permit: Makerere University

MAKERERE UNIVERSITY
P. O. Box 7062 Kampala-Uganda
Website: www.rgt.mak.ac.ug



Email: drgt@rgt.mak.ac.ug
Twitter: @MakDRGT

DIRECTORATE OF RESEARCH AND GRADUATE TRAINING

March 23, 2023

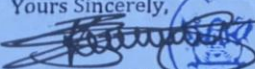
**To: Members of Staff and Students
College of Agriculture and Environmental Sciences
Makerere University**


Re: Approval for Mr. Mandela Nelson a Researcher from Moi University to Collect Data

This is to confirm that Mr. Mandela Nelson, who is a student at Moi University, has been authorized to collect data in Makerere University.


He is collecting data for a research project entitled "*University-Community engagement opportunities to address climate change in an African context: a comparative case study of Ndejje and Makerere University.*" A data collection workplan is herewith attached.

Any assistance rendered to him will be highly appreciated.

Yours Sincerely,

Edward Bbaale, PhD
PROFESSOR AND DIRECTOR



CC. Deputy Director (Administration and Graduate Training)



In future correspondence please quote the reference number above

Appendix X: Institutional Research Permit: Ndejje University



NDEJJE
UNIVERSITY

Fear of God brings Knowledge and Wisdom

Directorate of Research and Innovations

P. O. Box 7088, Kampala – UGANDA

Tel: +256 414 663 680

Email: @ndejeuniversity.ac.ug

Website: www.ndejjeuniversity.ac.ug

Date : 23rd June, 2023

To : Mr. Mandela Nelson
School of Education
Moi University
P.O Box 3900
Eldoret, Kenya

Dear Mr Mandela,

RE : PERMISSION TO CONDUCT RESEARCH AT NDEJJE UNIVERSITY

Reference is made to your letter requesting for permission to collect data for your study: "University-community engagement opportunities to address climate change in an African context: a comparative case study of Ndejje and Makerere Universities" at Ndejje University.

This is to inform you that permission is hereby granted to you as per your request. However, you will be expected to follow the Uganda National Council for Science and Technology research guidelines and strictly provide proof of a Research Ethical clearance from National Council of Science and Technology or any other registered REC center.

By copy of this letter, the University Security and Academic staff are informed and requested to accord you the necessary support.

Yours Sincerely,

Dr. Primrose Nakazibwe (PhD)
Director Research and Innovations

Appendix XI: Research Permit; Uganda National Council for Science and Technology



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS1731ES

27 June 2023

MANDELA NELSON
MINISTRY OF EDUCATION
Kampala

Re: Research Approval: University-community engagement opportunities to address climate change in African context: a comparative case study of Ndejje and Makerere universities

I am pleased to inform you that on 27/06/2023, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of 27/06/2023 to 27/06/2024.

Your research registration number with the UNCST is SS1731ES. Please, cite this number in all your future correspondences with UNCST in respect of the above research project. As the Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. Keeping all co-investigators informed of the status of the research.
2. Submitting all changes, amendments, and addenda to the research protocol or the consent form (where applicable) to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval prior to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local REC for review with copies to the National Drug Authority and a notification to the UNCST.
4. Unanticipated problems involving risks to research participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST notification after review by the REC.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

Please note that this approval includes all study related tools submitted as part of the application as shown below:

No.	Document Title	Language	Version Number	Version Date
1	Data collection tools and informed consent	English	1	18 April 2023
2	Interview Guide, Community Leaders	English	1	23 June 2023
3	Interview Guide, University staff	English	1	23 June 2023
4	students FGD	English	1	23 June 2023
5	ICF Students FGD	English	1	23 June 2023
6	ICF Community leader	English	1	23 June 2023
7	ICF university staff	English	1	23 June 2023
8	Project Proposal	English	1	
9	Approval Letter	English		
9	Nelson Administration Clearance, Makerere	English	1	23 June 2023
10	Community Engagement plan	English	1	23 June 2023
11	COVID Risk mitigation plan	English	1	23 June 2023
12	Consent form, Community Leaders	English	1	23 June 2023
13	Consent form, students' FGD	English	1	23 June 2023
14	Consent form, university staff	English	1	23 June 2023
15	Interview Guide, Community Members	English	1	23 June 2023
16	Interview Guide, university staff	English	1	23 June 2023
17	students' FGD	English	1	23 June 2023

Yours sincerely,



Dr. Christopher Ddamulira

For: Executive Secretary

UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

LOCATION/CORRESPONDENCE

*Plot 6 Kimera Road, Ntinda
P.O. Box 6884
KAMPALA, UGANDA*

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: <http://www.uncst.go.ug>

Appendix XII: Recruitment information

Moi University,
Schools of Education
Department of EMPS
P.O Box 3900,
Eldoret.

Dear Participant,

.....

.....

Re: Recruitment Information

I am a postgraduate student at Moi University undertaking to investigate dynamics related to " **University-community engagement opportunities to address climate change in African context: a comparative case study of Ndejje and Makerere Universities in Uganda**". This is to kindly request and inform you that you have been selected to participate in this study.

Be guaranteed that any data given will be treated in the strictest confidentiality and none of the members will be exclusively recognizable in the subsequent thesis, report or different publications. The members will be allowed to stop participating in this study whenever they want to or to decline to respond to specific inquiries.

Participation in this study is intentional and you may join without anyone else unrestrained choice. You reserve a privilege to pull back from this study whenever without any consequence to you. After the completion of this study, I will disseminate the findings in terms of publications, conferences and organizing workshops with relevant communities and universities. I will ensure that the participants get a copy of the report of findings.

In the event that you have any issues relating to your rights and interest in the investigation, it would be ideal if you contact the Chairperson, Uganda Christian University Research Ethics Committee, Dr. Peter Waiswa Tel: No., +256772405357, email: Peter.Waiswa@ki.se or Uganda Christian University REC Administrator: Mr. Osborn Ahimbisibwe 0704482044/0775737627, oahimbisibwe@ucu.ac.ug

Thank you in advance.

Yours Faithfully,

MANDELA NELSON

Appendix XIII: Uganda Data Collection COVID-19 Risk Management Plan

In recognition that we remain in a global COVID-19 pandemic where the situation is still volatile and uncertain, data collection will proceed under strict COVID-19 risk management protocols as informed by the Uganda Ministry of Health, International Best Practice for Data collection and Compassion International's own data collection principles and standards. With respect to these sources of guidance, all data collection in Uganda will be done under the strict guidance and authority of Compassion Uganda leadership. Overall, the approach will reflect an abundance of caution and it will be necessary to remain flexible in order to respond to changing circumstances as the global pandemic and local Uganda situation evolves.

Uganda Ministry of Health (MOH)

The MOH has encouraged people to stay safe. MOH has provided numerous guidelines and standard operating procedures (SOPs) for Ugandans to follow as they go about the day-to-day activities in the current time to prevent Covid-19 infections. These guidelines cover a range of scenarios that are relevant to our context including workplace meetings, use of public transport, mass gathering (currently discouraged), and use of masks. The researcher has taken the initiative to read and adhere to the relevant MOH guidelines. These are available at <https://www.health.go.ug/covid/project/guidelines/> and the most recent updates will be provided to all at data collection points.

International Best Practice for Data Collection

The United Nations has established clear and comprehensive guidance on mitigating and managing the risk of COVID-19 transmission during field surveys, covering general principles, planning, field organization, fieldwork and post-field work. These categories of risk management form the framework for this research study risk management plan. Documentation is available at https://unstats.un.org/iswghs/news/docs/COVID-19_TechnicalGNote_final.pdf and the most recent updates will be provided at data collection points.

General Principles

- Do no harm- Within the context of this general research principle, the researcher and the participants will do all that is necessary to prevent and/or limit the transmission of COVID-19 amongst participants and their families

- Minimise field data collection -we will only undertake field data collection that is absolutely necessary
- Clear Policies and Practices- we will ensure availability of high quality, timely and well-documented guidelines for safe data collection

Planning

- Assessing COVID-19 Situation- all planning will involve regular and timely assessment of the prevailing COVID-19 situation (including intermediate places where travel through an area is required to reach a study site). All relevant advice from government, Compassion Uganda leadership and local actors will be sought and applied to develop a realistic and conservative picture of the COVID-19 risk.
- Decision-making-final decisions on whether or not to commence or halt data collection will be made collectively by a multi-disciplinary team comprising of Compassion Uganda leadership, the researcher and local study site leadership. The local study site leadership will be able to veto any decision by the team to commence data collection.
- Budgeting-the study budget will be finalized based upon a COVID-19- safe data collection protocol and will include contingencies for additional COVID-19-safe costs such as additional time, extra transportation to ensure appropriate physical distancing and personal protective equipment.

Field Organisation

- Study site Orientation- the researcher and the participant(s) at each site selected to participate in the study will be given an orientation on the requirements of the study, expectations for coordinating and managing COVID-19-safe logistics at their site during data collection.
- Study site Management- coordination and management of interviews and discussions in COVID-19 safe conditions will follow the standard national and local government advice. Unless otherwise advised, this should include:
 - Avoiding overcrowding and body contact; all should keep at least 1.5 meters between each other.

- Select appropriate interview locations that balance the need for privacy and COVID-19 safety. The ideal would be outdoors, but if indoors, adequate ventilation should be ensured.
- All individuals participating should be temperature screened daily
- Anyone feeling generally unwell (fever, cough, etc.) should be excluded from participation.
- All participants must be encouraged to wash and sanitize their hands on arrival for the meetings and as frequently as possible.
- Meeting premises should be provided with adequate handwashing facilities with soap and water or alcohol-based gel (hand rub).
- The interview areas should be kept clean and hygienic –clean all surfaces with disinfectant after each interview (soap and water or JIK) (e.g., chairs, desks and tables)
- Ensure adequate waste management facilities (waste bins and bin-liners, cans)
- Ensure availability of adequate personal protection equipment (eg masks)

Field Work

- Researcher:
 - If appropriate and practical, wear a mask throughout the interview to protect all concerned
 - Respect physical distancing by maintaining at least 1.5 meters between enumerator and interviewees at all times
 - Carry out your own assessment of COVID-19 risk at the site for yourself and the interviewees
 - Advise interviewees of the COVID-19 safe measures being taken and why
 - Avoid handshakes or any physical contact with study site staff and interviewees
 - Offer a mask to the interviewees
 - Wash and sanitize hands and interview site (chair, doors, electronic tablets etc) between each interview

- Regularly monitor self for COVID-19 symptoms (fever, cough, fatigue, loss of taste and smell) and at least before and following site visits.
- If symptoms of COVID-19 are experienced, the enumerator should be excluded from the site visit or interview and follow the country's health quarantine protocols.
- If an interviewee displays symptoms of COVID-19 they should be excluded from interview and their parents advised through the study site leadership.
- **Interviewees**
 - Each interviewee should cover his/her mouth and nose with a tissue or a handkerchief when coughing and sneezing.
 - Ensure used tissues or masks are disposed of in a waste bin or a designated area where it can be safely disposed of.
 - Wash hands with soap and water or use an alcohol-based hand rub immediately after using the tissue or handkerchief. Avoid touching eyes, nose, and mouth always.
 - Avoid all physical contact including handshakes and hugging.

Post-field Work

- Maintain contact with participants for 2 weeks to monitor the health status of all involved in the study
- Ensure contact tracing of all who had close contact with any COVID-19 positive individual(s)
- Provide all necessary support to any who contracted COVID-19 as a result of participation in the study.

Appendix XIV: Similarity Index/Plagiarism Report



SR555

ISO 9001:2019 Certified Institution

THESIS WRITING COURSE

PLAGIARISM AWARENESS CERTIFICATE

This certificate is awarded to

MANDELA NELSON

DPHLERE/5876/22

In recognition for passing the University's plagiarism

Awareness test for Thesis entitled: **UNIVERSITY-COMMUNITY ENGAGEMENT OPPORTUNITIES TO ADDRESS CLIMATE CHANGE IN AFRICAN CONTEXT: A COMPARATIVE CASE STUDY OF NDEJJE AND MAKERERE UNIVERSITIES.** with similarity index of 3% and striving to maintain academic integrity.

Word count: 99629

Awarded by

Prof. Anne Syomwene Kisilu

CERM-ESA Project Leader Date: 22/06/2024