“Magude isn’t like it used to be”

ACTA UNIVERSITATIS UPSALIENSIS
Uppsala Studies in Cultural Anthropology no 65

Jossias Humbane

“Magude isn’t like it used to be”

Intersections of social and climate change in Mozambique

UPPSALA
UNIVERSITET

Dissertation presented at Uppsala University to be publicly examined in Geijersalen Eng 6-1023, Thunbergsvägen 3H, Uppsala, Tuesday, 16 December 2025 at 09:15 for the degree of Doctor of Philosophy. The examination will be conducted in English. Faculty examiner: Professor Tobias Haller (University of Bern).

Abstract
Humbane, J. 2025. “Magude isn't like it used to be”. Intersections of social and climate change in Mozambique. *Uppsala Studies in Cultural Anthropology* 65. 249 pp. Uppsala: Acta Universitatis Upsaliensis. ISBN 978-91-513-2657-3.

The thesis examines how rural communities in Magude, southern Mozambique, experience, interpret, and respond to climate change. Drawing on eleven months of ethnographic fieldwork that combined participant observation, in-depth interviews, and oral testimonies, it explores how smallholder farmers, herders, and fishermen perceive and cope with environmental disruptions such as droughts, irregular rainfall, and extreme weather. The study shows how these experiences are shaped by historical memory, cultural beliefs, and everyday struggles, highlighting the importance of traditional ecological knowledge and lived experience in shaping local responses to climate change. Community narratives reveal that climatic changes are understood not only as environmental phenomena but also as social and moral events, often linked to divine punishment, conflict, and the erosion of traditional values.

Situated within the anthropology of climate change and informed by political ecology and critical development studies, the thesis employs four interrelated analytical concepts: adaptation, resilience, local knowledge, and climate justice. It examines how communities draw on culturally embedded knowledge systems to interpret and respond to climate variability and how these responses are constrained by economic marginalisation, land tenure insecurity, and limited state support. Adaptation is treated not as a technical adjustment but as a relational and politically situated process shaped by inequality and power. The study further interrogates the interaction between local coping practices and formal climate governance, revealing tensions between top-down adaptation programs and bottom-up strategies. It argues that local knowledge is frequently overlooked or instrumentalised in official interventions, while rural communities are expected to be "resilient" without structural support.

Empirically, the thesis demonstrates that recurrent droughts, declining crop yields, and rising livestock diseases have disrupted the foundations of Magude's rural economy, leading to an increased reliance on activities such as charcoal production, fishing, and small business. These practices reflect both creativity and constraint within contexts of enduring vulnerability. By centring the voices and experiences of rural Mozambicans, the thesis rehumanises the climate debate and challenges technocratic paradigms through a context-sensitive, ethnographically grounded account of adaptation. The findings have implications for both climate justice scholarship and policy efforts seeking more inclusive and equitable responses to the global climate crisis.

Keywords: Climate change, adaptation, resilience, local knowledge, climate justice, Mozambique, Magude District

Jossias Humbane, Department of Cultural Anthropology and Ethnology, Box 631, Uppsala University, SE-75126 Uppsala, Sweden.

ISSN 0348-5099
ISBN 978-91-513-2657-3
URN urn:nbn:se:uu:diva-570672 (http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-570672)

To the memory of my mother, Isabel Chauque,
and to Francina, Kesley and Keidy Humbane,
with all my love

Contents

Abbreviations

AAA	American Anthropological Association
UNAC	União Nacional de Camponeses (National Farmers' Union)
CFSPH	The Center for Food Security and Public Health
CMIP5	Coupled Model Intercomparison Project Phase 5
CORDEX	Coordinated Regional Climate Downscaling Experiment
CRM	Constituição da República de Moçambique (Constitution of the Republic of Mozambique)
CVCA	Climate Vulnerability and Capacity Analysis
CVM	Cruz Vermelha de Moçambique (Mozambique Red Cross)
DRF	Disaster Recovery Framework
DUAT	Direito de Uso e Aproveitamento da Terra (Right to Use and Benefit from Land)
ENAMMC	Estratégia Nacional de Adaptação e Mitagação das Mudanças Climáticas (National Climate Change Adaptation and Mitigation Strategy)
ENSO	El Niño–Southern Oscillation
FAO	Food and Agriculture Organization of the United Nations
FNDS	Fundo Nacional de Desenvolvimento Sustentável (National Fund for Sustainable Development)
FRELIMO	Frente de Libertação de Moçambique (Mozambique Liberation Front)
GDM	Governo do Distrito de Magude (Magude District Government)
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IIED	International Institute for Environment and Development
INE	Instituto Nacional de Estatística (National Institute of Statistics)
INGC	Instituto Nacional de Gestão de Calamidades (National Institute for Disaster Management)
IPCC	Intergovernmental Panel on Climate Change
KOBWA	Komati Basin Water Authority
LAP	Local Adaptation Plan
MADER	Ministério da Agricultura e Desenvolvimento Rural (Ministry of Agriculture and Rural Development)

MAE	Ministério da Administração Estatal (Ministry of State Administration)
MICOA	Ministério para a Coordenação da Acção Ambiental (Ministry for the Coordination of Environmental Action)
MITADER	Ministério da Terra, Ambiente e Desenvolvimento Rural (Ministry of Land, Environment and Rural Development)
M-Pesa	Mobile Money Service (Vodacom)
MTA	Ministério da Terra e Ambiente (Ministry of Land and Environment)
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PEDD	Plano Estratégico de Desenvolvimento Distrital (Strategic Plan for District Development)
PESOE	Plano Económico e Social e Orçamento do Estado (State Economic and Social Plan and Budget)
PLA	Plano Local de Adaptação (Local Adaptation Plan)
PQG	Plano Quinquenal do Governo (Five-Year Government Plan)
PROSUL	Pro-Poor Value Chain Development in the Maputo and Limpopo Corridors
RENAMO	Resistência Nacional Moçambicana (Mozambican National Resistance)
SDAE	Serviço Distrital de Actividades Económicas (District Economic Activities Service)
SDG	Sustainable Development Goal
SDPI	Serviços Distritais de Planeamento e Infraestruturas (District Services of Planning and Infrastructure)
SES	Social-Ecological Systems
TEK	Traditional Ecological Knowledge
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNODC	United Nations Office on Drugs and Crime
UNRC/HC	United Nations Resident Coordinator / Humanitarian Coordinator
VOA	Voice of America

Acknowledgements

This work would not have been possible without the generosity, patience, and collaboration of many people to whom I owe my deepest gratitude.

First and foremost, I extend my heartfelt appreciation to the community of Magude, where I carried out my research. I am profoundly grateful to all those who shared their knowledge, experiences, and stories with me. Although I am the author of this thesis, I consider them its co-authors. Their insights and trust gave life and meaning to this work.

I would like to pay special tribute to Arlindo António Sitoe, who worked as my research assistant during the early stages of fieldwork. His popularity among Magude's residents was crucial for my integration into the community. Sadly, Arlindo passed away shortly after our collaboration began. His memory remains deeply cherished, and this thesis is, in many ways, also a tribute to him.

I am profoundly grateful to Fenias Dias, my field assistant and later a close friend, for his patience, generosity, and constant availability to assist and discuss countless aspects of my fieldwork. His companionship made the demanding days in the field far more manageable. Even after I returned to Sweden, our collaboration continued. There were many days when I called him to clarify details, confirm information, or discuss new insights as I revisited my field notes. Those long conversations, sometimes filled with laughter and sometimes with thoughtful silences, were crucial for keeping the field alive in my memory and for grounding my writing in the lived realities of Magude. Fenias always found time to talk, no matter how busy he was, and his willingness to continue supporting my work from afar is something I deeply treasure. He became far more than a guide; he was a companion, a collaborator, and a true friend whose contribution is woven into every page of this thesis.

My deepest gratitude goes to my main supervisor, Mats Utas, and to my co-supervisors, Vladislava Vladimirova and Esmeralda Mariano, for their invaluable guidance, encouragement, and unwavering support throughout this journey. Mats provided steady intellectual direction, patience, and trust, allowing me to find my own analytical voice while ensuring clarity and coherence in my arguments. Vladislava offered crucial guidance in refining

the theoretical dimensions of the thesis, helping me to strengthen the analytical depth of my interpretation. Esmeralda's insightful advice on fieldwork and her deep understanding of research contexts in Mozambique were essential for grounding my analysis and maintaining a strong ethnographic focus. Their collective mentorship not only shaped this work but also guided my growth as a researcher and anthropologist.

I am sincerely thankful to Anneli Ekblom and Camelia Dewan for their insightful and constructive comments on the early drafts of my chapters. Their suggestions greatly helped me to strengthen and refine the thesis. I also thank Paula Uimonen for her precise and inspiring reflections during the final seminar. She served as the external examiner in this important moment of my doctoral journey, and her thoughtful engagement and constructive feedback were deeply valuable.

I would like to express my gratitude to the professors and staff of the Department of Cultural Anthropology and Ethnology at Uppsala University, whose companionship, advice, and support created a stimulating and generous environment for learning and growth. My thanks go to: Anamaria Berbec-Chiritoiu, Camelia Dewan, Sverker Finnström, Lee Gallagher, Kajsa Hallberg Adu, Mats Hyvönen, Mahmoud Keshavarz, Don Kulick, Jennifer Lorin, Jakob Löfgren, Claudia Merli, Birgitta Meurling, Aksana Mushkavets, Göran Nygren, Nadia Novell, Jecinta Okumu, Camilla Asplund Ingemark, Emma Granholm Arias, Charlotta Widmark, Annika Teppo, Sten Hagberg, Ulrika Trovalla, and Susann Ullberg. Thank you for the many enriching discussions, your collegiality, and the friendly atmosphere you fostered.

I am profoundly grateful to the Swedish International Development Cooperation Agency (SIDA) for awarding me the scholarship that made my doctoral studies possible. My heartfelt thanks also go to the International Science Programme (ISP) for their continuous administrative and logistical support throughout my time in Sweden. I am particularly thankful to Therese Rantakokko, Monica Lindström, and Ulrika Kolsmyr for their professionalism, warmth, and patient assistance with all bureaucratic matters during my stay in Uppsala. I also extend my gratitude to the ISP coordinator in Mozambique, Hilário Madiquida, and to the programme secretary, Etelvina Cristina, for their tireless support in handling the administrative aspects of the programme in Mozambique.

I also wish to acknowledge the Department of Archaeology and Anthropology at Eduardo Mondlane University in Mozambique, where I am a staff member. I am deeply grateful for their support and understanding throughout this period, especially for allowing me the flexibility needed to

pursue my studies abroad while continuing to contribute to academic life at the university.

To my PhD colleagues and fellow travellers in this academic journey, I am sincerely grateful for your friendship, solidarity, and the many moments of laughter and reflection we shared throughout these years. Your company made the long days of research and writing lighter, and your intellectual curiosity kept the atmosphere vibrant and inspiring. From countless seminars and workshops to coffee breaks filled with humour and mutual encouragement, each of you contributed in unique ways to making this journey not only productive but also joyful and deeply human. My heartfelt thanks go, in alphabetical order, to Alec Forss, Aliaksandra Shrubok, Anastasia Ulturgasheva, Bim Kilje, Book Sambo, Caterina De Marchi, Drishti Mehta, Juan Fabbri, Huai-Tse Yang, Marcelo Camacho, Marcia Manhique, Matias Ezequiel Menalled, Metztli Sarai Hernández Garcia, Paulo Mahumane, Rawan Samamra, Sally Alexander Sallstedt, and Qing Shen. I am proud to have shared this path with such generous and brilliant peoples, whose support and friendship I will always cherish.

To my dear friends who made this path lighter and filled it with joy: Décio Muianga, Gilda Gondola, Julieta Sitoe, Márcia Manhique, Maria Helena, Mito Tondo, Paulo Mahumane, Samuel Matlombe, Sunera Nurmomade, Andreia Massamby, Pascoal Gota, Omar Madime, Book Sambo, Uta Santana, Nando António, Gracinda, Linea Collin. I am deeply grateful for your affection, encouragement, and the countless moments of laughter and companionship that sustained me through this long journey. Beyond the seriousness of academic life, you reminded me of the importance of friendship and shared joy. Our evenings out, long conversations over food and drinks, spontaneous gatherings, and celebrations gave me the balance and strength I needed to carry on with my work. Each of those moments, filled with humour, warmth, and mutual care, offered rest but also renewed inspiration. Thank you for being a constant source of light, reminding me that even amidst the pressures of writing and deadlines, life is best lived with good friends by one's side.

I would also like to thank Jean Bosco, my housemate and friend with whom I have shared a home for the past three years. Your companionship brought warmth and stability to my everyday life in Sweden. From our long conversations to the quiet moments of mutual understanding, your presence made this journey less lonely and much more enjoyable. Thank you for your kindness, humour and friendship which turned our shared space into a real home.

My gratitude also goes to my bandmates in Kuendzeny, Mito and Uta, who helped me relax and find moments of joy through music during the most

demanding phases of this journey. Our rehearsals and performances were more than artistic escapes; they were spaces of laughter, friendship, and renewal. Even when deadlines kept me away, your patience and encouragement reminded me of the importance of balance and joy. Kuendzeny was not just a band but a small community of harmony, creativity, and shared strength.

Above all, my deepest love and gratitude go to my beloved wife, Francina Machango, and our children, Kesley and Keidy Humbane. Your love, patience, and sacrifices gave me the strength to persist even when the path was uncertain. Francina, words cannot fully express my admiration for your courage and resilience. During the many months I spent away from home, you carried the weight of our family on your shoulders, caring for the children, managing the household, and facing daily challenges in my absence. I know it was not easy to balance everything alone, to comfort the children when they missed their father, and to stay strong even when things became overwhelming. Yet, you did it with grace, patience, and unwavering love.

Kesley and Keidy, thank you for your understanding and for always believing in me, even when my studies took me far from home. Your laughter during our calls, your drawings, and your loving messages gave me energy and reminded me why this journey mattered. Every step of this achievement carries your names in it. This thesis, in many ways, is not only mine but also the result of your love, your sacrifices, and your faith in me. You were the quiet strength behind every page I wrote, and for that, I will always be grateful.

To my father and siblings, I extend my heartfelt gratitude for your unwavering support, constant encouragement, and the many sacrifices you made so that I could pursue this dream. Your belief in me, even from afar, has been a source of strength through the most demanding moments of this journey. My father, with your quiet wisdom and resilience, you have always been a model of perseverance and dignity. You taught me the value of patience, humility, and hard work, lessons that have guided me not only in this academic path but also in life. To my brothers and sisters, thank you for standing by me, for your words of comfort, and for the many times you stepped in to support and care for my wife and children when I could not be there. Your generosity and affection gave me peace of mind during my absence and reminded me of the strength and unity of our family. Your love has been a constant reminder of where I come from and why this work matters.

Finally, to my late mother, whose absence I felt deeply throughout this entire journey, this work is dedicated to you. I know that wherever you are, you are smiling with pride. You were the one who believed in me long before I believed in myself. I still remember your words of encouragement, your

prayers, and your tireless care, all of which shaped the person I have become. Though you are no longer here to witness this moment, your love continues to guide and inspire me every day. This achievement is also yours, Mother – a fulfilment of the dreams you carried for me and the sacrifices you made so that I could reach this point. Thank you for everything, now and always.

.

Chapter 1: Introduction

Under the shade of a large tree in the spacious compound of the president of the Moine Breeders' Association, we sat for an interview with Mr Macambaco. He warmly welcomed me and my field assistant, eager to discuss the activities of the association he leads. As we arrived, he proudly gave us a tour of his homestead, which covers a considerable piece of land. The compound consists of six houses, each with its own significance. Two of these homes are shared by his two wives, while the remaining four belong to his sons and their families. At 64 years of age, Mr Macambaco takes great pride in the size of his family – 10 sons and four daughters. However, despite his deep sense of family pride, he confided in us that recent times have been particularly challenging. The burden of providing for such a large household has grown heavier, and his primary struggle is ensuring that they have enough food. Having many children is also a source of strength, however, given that their labour is essential for farming and tending cattle.

"Hunger is everywhere," he lamented. "There is a lot of hunger today." When asked about the reasons behind this, he attributed the crisis primarily to the lack of rainfall. "The heat is unbearable, and there is no rain," he explained. "If the rains came, you would be amazed at the size of the corn growing here. But there is no rain." He gestured towards a barren section of his land. "This is the second time I've tried planting this year. The first time, everything withered and died. The second time, it all dried up again."

Reflecting on the past, he noted that while temperatures were always high, the rains used to be more reliable: "It used to be hot, but the rain fell in the right way. Now, it's divided into sections; some areas get plenty of rain, while others remain dry." This inconsistency ruins the crops. The soil lacks moisture, and production levels drop.

Beyond the unpredictable weather, Mr Macambaco pointed to another factor he believes has contributed to these hardships – war. "Things changed when the wars started. Bloodshed causes drought. God does not like wars, and that is why He punishes people." He expressed deep concern about global conflicts, specifically mentioning the ongoing war in Cabo Delgado, a province in northern Mozambique, as well as the war in Ukraine. In his view,

the turmoil and suffering in these regions have disrupted the natural balance, leading to the erratic weather patterns that now plague his community.

During our hour-long conversation on 6 February 2022, Mr Macambaco shared insights about the hardships he personally faces and about the broader struggles of his community. He spoke of the increasing difficulty in sustaining traditional livelihoods, such as cattle breeding and rain-fed agriculture, the dwindling agricultural yields, and the uncertainties that lie ahead. Despite these challenges, his strength and hope remained evident throughout our conversation. At the time, he was working tirelessly to support his family and preserve the traditions of the Moine Breeders' Association, even in the face of mounting adversity, which I discuss in Chapter Four and Five.

A few days later, I spoke to Mr Carimo, who is the president of the Nhongane Cattle Breeders' Association. In addition to his role in livestock farming, he serves as the first secretary of the Frelimo[1] party in Nhongane, making him a prominent figure in the community. Mr Carimo maintains two separate households: one in Nhongane, where our conversation took place, and another in Magude-sede, the district headquarters. Each residence belongs to one of his two wives. Our discussion unfolded on an extremely hot day, with temperatures soaring to 38ºC. Despite the heat, the atmosphere was relaxed as we sat under a tree, enjoying *canhu,* a traditional beer widely favoured in Magude. We began by discussing how and when he entered the cattle-rearing business, as well as the benefits of being a livestock herder. Mr Carimo shared with me that his work had been prosperous for many years, but 10 years ago, things took a dramatic turn:

> In 2015, I lost 38 head of cattle and had to start again. Of the 48 I had, only 10 were left. Everything was dry, the grass was burnt, and the trees didn't even have a leaf. It was a severe drought. I've never seen anything like it. We lost a lot of cattle here in the community.

In our conversation, Mr Carimo expressed that things were never the same for him after the 2015–2016 droughts.[2] While attempting to rebuild his herd, he encountered further difficulties due to outbreaks of foot-and-mouth disease

[1] FRELIMO (Frente de Libertação de Moçambique – Mozambique Liberation Front) was the nationalist movement that led the struggle for independence from Portuguese colonial rule between 1964 and 1974. After independence in 1975, it transformed into Frelimo, the political party that has governed Mozambique ever since, maintaining continuity in leadership and ideology while adapting to changing political and economic contexts.

[2] The 2015–2016 drought in Mozambique was linked to one of the strongest El Niño events on record, which severely affected rainfall patterns across Southern Africa. The drought had devastating effects on food security, livelihoods, and access to water, particularly in rural communities. See UNICEF (2016). *Mozambique: Drought Humanitarian Situation Report, October Report*. Maputo: UNICEF.

(aphthous fever) and theileiriosis. These two diseases have plagued his cattle ever since. While we talked, he was visibly frustrated. “The cattle are dying because of these diseases,” he explained. “We have tried to treat them, we have tried bathing and deworming, but nothing works. I’ve lost 23 heads to this disease.” The only explanation Mr Carimo could find for this misfortune was the severe droughts.

> When the drought ended in 2016, there was a lot of rain the following year. A lot of cattle died in the bush, and the rain carried all the dirt from their remains into the rivers. Like people, oxen don’t eat other oxen. When they drank the water, they got sick. There was a lot of grass growing where the animals had died, and when the oxen ate the grass, which was infected with bacteria, they got sick.

For Mr Carimo, the prevalence of disease among cattle is directly linked to the aftermath of the drought. He firmly believes that before 2015, livestock losses due to illness were far less common. His perspective aligns with that of Mr Macambaco, illustrating how climate change has become a driving force and common explanation of hunger and economic hardship in Magude. Both conversations illustrate the complex nature of climate change, which unfolds in conjunction with other social processes, such as war, and has a number of direct and indirect consequences.

The testimonies of Mr Carimo and Mr Macambaco reveal that farming and livestock rearing have become increasingly difficult in recent years. Lack of pastures and the rise in animal diseases have made it harder for families to sustain themselves. Similar sentiments were echoed by many other farmers, herders, fishermen, and ordinary residents I spoke to during the year I spent in Magude. Their reflections were often summed up in a single phrase as worded by several of those I talked to during this time: “Magude isn’t like it used to be.”

This thesis is about change. More specifically, it examines how residents in Magude experience climate change, and it is a fact they do experience these changes negatively and severely so! I also examine the transformation of rural communities in Magude in response to the effects of climate change. I also explore on how local people describe and make sense of these changes, particularly in terms of how climate variability is reshaping agricultural practices, food security, and rural economies while also intersecting broader socioeconomic shifts. Ultimately, the study examines how communities interpret and respond to climate change based on their lived experiences, cultural values, local knowledge, and intergenerational skills.

Grounded in extensive ethnographic fieldwork, the research draws on semi-structured interviews, participant observation, and oral testimonies gathered

from farmers, cattle herders, fishermen, and others whose livelihoods are directly tied to the natural environment. These narratives reveal that climate-induced disruptions, such as prolonged droughts, erratic rainfall, and extreme weather events, are not only seen as climatic challenges but also interpreted in relation to broader social, economic, and political structures in terms of local meanings and historical memory. The study offers a nuanced account of how adaptation unfolds on the ground, shaped by everyday experience and situated knowledge as well as state driven programmes and initiatives aligned with global climate politics.

This research is situated within the anthropology of climate change, a field that uses ethnographic and culturally grounded methods to examine how climate change is interpreted, embodied, and acted upon in diverse local contexts. Rather than treating climate change solely as a scientific or environmental problem, this approach emphasises its entanglement with lived experience, cultural values, political history, and knowledge systems. The thesis engages with critical debates around how climate knowledge is produced and legitimised, how local understandings of climate interact with external interventions, and how adaptation emerges as both a socio-cultural and a technical process. By doing so, the study contributes to the growing body of work seeking to rehumanise the climate debate. This body of work highlights everyday responses, narratives, and struggles for resilience in places that are often marginalised in global climate governance.

The significance of this research lies not only in the empirical findings but also in its theoretical contribution to ongoing debates around climate change adaptation and the politics of knowledge. In particular, the thesis highlights the value of local ecological knowledge and community-based coping strategies. It challenges the dominant paradigms that privilege technocratic or top-down responses to climate governance. It critically examines how local adaptive practices are shaped by broader historical, socio-economic, and institutional contexts. By situating the case of Magude within the anthropological literature on climate change, adaptation, resilience, rural development, and Indigenous knowledge, this study contributes to a more inclusive and context-sensitive understanding of the human dimensions of climate change, with implications for both academic scholarship and policy formulation.

Climate Change and Disaster Vulnerability in Mozambique

Magude is a district in Maputo Province, situated in the southern part of Mozambique, a country highly vulnerable to extreme weather events. Mozambique is ranked among the 10 most vulnerable countries in the world to the impacts of climate change, and in terms of vulnerability, it is assessed as the most vulnerable on the African continent (World Bank Group 2023:25; Eckstein et al. 2021). This vulnerability is largely due to its geographic location and widespread poverty. Situated within the intertropical convergence zone, Magude is also positioned downstream from several transboundary river basins, most notably the Incomati, Umbeluzi, and Maputo rivers, which are shared with neighbouring countries, including South Africa and Eswatini. The district boasts an extensive coastline, with certain areas lying below sea level (MICOA 2012; Zacarias 2013). In addition to its geographic challenges, Magude faces infertile soils, endemic diseases, and inadequate communication infrastructure. Combined with high illiteracy rates, rapid population growth, and widespread poverty, the district's dependence on rain-fed natural resources further exacerbates its susceptibility to the effects of climate change (MICOA 2007).

Climate variability has long been a defining feature of the savanna landscapes in which Magude is situated. Vegetation, wildlife, and human communities have historically adapted to cycles of small-scale droughts and seasonal floods. Although paleoclimatic research in the region is still developing, existing studies indicate that over the past 2,000 years, southern Africa has experienced recurring climatic fluctuations, including episodic dry spells and localised flooding (see reviews in Hannaford and Nash 2016; Ekblom et al. 2017). However, the current manifestations of climate change differ in both scale and intensity. According to the National Climate Change Adaptation Plan in Mozambique (PNA), there is clear evidence of climate change worldwide, manifested by the warming of the atmosphere and oceans, rising sea levels, and changes in weather patterns (MTA 2021).

In Mozambique, climate change is reflected in the increased frequency and intensity of tropical cyclones, floods, and droughts (MTA 2021:34). Research on decadal-scale climate variability in southern Africa highlights the significant roles of the El Niño–Southern Oscillation (ENSO) and the Indian Ocean Dipole in shaping rainfall patterns and temperature fluctuations across the region (Tyson and Preston-Whyte 2000; Rouault and Richard 2003; Usman and Reason 2004). The intersection of this long-term natural variability with accelerating anthropogenic climate change creates complex

and heightened challenges for adaptation and resilience, particularly in vulnerable areas such as Magude.

Mozambique is increasingly vulnerable to the impacts of climate change, a reality that is already evident in rising temperatures, shifting rainfall patterns, and more frequent extreme weather events. A foundational study by the National Institute for Disaster Management (INGC 2009), titled "Impacts of Climate Change on Disaster Risk in Mozambique," documented notable climatic changes between 1960 and 2005, including a steady increase in temperatures across much of the country, altered rainfall distribution, and a rise in cyclone occurrences. One of the key observations from the INGC study is the shifting pattern of the rainy season: the onset of rains has been increasingly delayed, leading to longer dry periods, and the duration of dry spells, particularly in the north-eastern region, has intensified. These climatic shifts have had significant consequences for agriculture, water availability, and food security, as rural communities that once depended on predictable rainfall cycles are now confronted with irregular precipitation and extended droughts.

These national-level observations align with broader regional climate trends. The Intergovernmental Panel on Climate Change (IPCC) has identified southern Africa as one of the most climate-sensitive regions globally. According to the IPCC *Special Report on Global Warming of 1.5°C* (2018), this region is projected to warm at a rate faster than the global average, with serious implications for both natural ecosystems and human well-being. Rising temperatures are expected to exacerbate droughts, floods, and heatwaves, further threatening already vulnerable livelihoods. Regional climate modelling studies reinforce these projections. Pinto and Hewitson (2018), analysing data from CORDEX and CMIP5 models, project increased climate variability across southern Africa, including more frequent dry spells and shifts in the timing of seasonal rainfall. Similarly, Pinto et al. (2016) demonstrate that while some areas may experience heavier rainfall events, these are likely to be interspersed with prolonged periods of drought, resulting in greater unpredictability and climate-related stress. Together, this growing body of evidence points to a future of increasing climate instability for Mozambique.

This growing climatic instability is also reflected in the increasing frequency and intensity of cyclones affecting Mozambique. Between 1980 and 2007, 56 cyclones and tropical storms passed through the Mozambique Channel, with 15 making landfall along the country's coast (INGC 2009). The same report highlights a marked shift in cyclone activity over time: only four cyclones made landfall between 1980 and 1993, compared to 11 between 1994

and 2007. Cyclones typically occur between October and April, with peak intensity from February to April, bringing strong winds, heavy rainfall, and storm surges that cause widespread damage to coastal communities. Beyond their immediate physical destruction, cyclones pose long-term challenges by damaging infrastructure, triggering extensive flooding, and disrupting essential services such as water supply and electricity (Matyas and Silva 2013; Silva, Matyas, and Cunguara 2015). They also contribute to the degradation of coastal ecosystems, which threatens the livelihoods of populations that depend on fishing and agriculture (World Bank Group 2011).

Droughts and floods have also become increasingly severe and recurrent in central and southern Mozambique, posing significant threats to livelihoods and food security. Drought events, often linked to the El Niño–Southern Oscillation (ENSO), disrupt regional rainfall patterns and lead to prolonged dry periods approximately every three to four years (Reason et al. 2006; Nicholson 2014). These dry spells are particularly devastating for rural populations that rely on rain-fed agriculture, exacerbating chronic food insecurity and reinforcing cycles of poverty. Concurrently, the rainy season, critical for crop production and water replenishment, has become more erratic and destructive. The La Niña phase of ENSO is associated with intense rainfall, frequently resulting in severe flooding, especially in river basins and low-lying coastal zones (Tadross et al. 2009; World Bank 2017). These floods have caused substantial loss of life, widespread destruction of homes and agricultural land, increased disease outbreaks, and mass displacement. Together, these extreme weather events continue to undermine Mozambique's agricultural productivity and economic resilience, deepening the vulnerabilities faced by already marginalised communities.

The escalation of extreme weather events highlights Mozambique's increasing vulnerability to climate-related disasters, which not only cause immediate destruction of infrastructure and livelihoods but also contribute to long-term economic and environmental instability. Between 1980 and 2019, Mozambique experienced 53 natural disasters, including 21 tropical cyclones, 20 floods, and 12 droughts (IFPRI 2023). These events have had a profound and lasting impact on national development, significantly hindering economic progress (INGC 2017). They have also exacerbated existing economic and political challenges, fuelling social tensions and deepening the vulnerabilities of already marginalized communities. The consequences often extend well beyond the immediate aftermath, as recovery and reconstruction efforts frequently fail to fully meet the needs of affected populations. This pattern reflects a broader reality: disasters are not solely the result of environmental extremes but are rooted in persistent structural inequalities and limited

adaptive capacity, which leave communities ill-equipped to cope with or recover from repeated shocks (Kelman 2020).

For example, in 2000, catastrophic flooding struck southern Mozambique, affecting approximately 4.5 million people. The floods resulted in over 800 deaths and caused an estimated US$750 million in damages (World Bank Group 2011). That same month, Cyclone Eline hit the Mozambican coast with winds reaching 260 km/h (Patt and Schoter 2008). The combined effects of the flooding and the cyclone caused widespread devastation, displacing around 500,000 people and destroying roughly 12% of the country's cultivated land, along with large numbers of livestock (Hanlon 2001). In the years that followed, other regions faced similar impacts from extreme weather. Central Mozambique, especially along the Zambezi River, experienced severe flooding in 2001, 2007, and 2008, while the south was hit again in 2013 (DRF 2014). The 2007 floods were exacerbated by Cyclone Flávio, which intensified the crisis and left approximately 285,000 people in need of food assistance for several months (CVM 2014).

The 2015–2016 period was marked by a series of severe weather events that further underscored Mozambique's climate vulnerability. A devastating drought, driven by the El Niño phenomenon, resulted in the worst rainfall deficit in 35 years, affecting 1.5 million people across seven provinces and prompting the government to deliver emergency food aid (UNICEF 2016). The drought caused a 15% decline in agricultural output, triggering a ripple effect that extended into the following years. By 2017, more than 2 million people continued to face food insecurity due to poor harvests and ongoing shortages (IFPRI 2023). In February 2017, recovery efforts were further disrupted when Cyclone Dineo made landfall in the Inhambane province, affecting approximately 550,691 people and destroying 29,173 hectares of crops (UNRC/HC Mozambique 2017). The cyclone's strong winds and heavy rains worsened the area's already fragile conditions, leaving behind widespread destruction and compounding the stress on the region's agricultural sector.[3]

[3] The impacts of climate change have continued to intensify across Mozambique. In March 2019, Cyclone Idai (one of the most powerful and destructive storms to ever strike the country) made landfall in the provinces of Sofala, Manica, Tete, and Zambezia. With wind speeds reaching up to 200 km/h, the category 3 cyclone caused at least 602 deaths, injured over 1,600 people, and destroyed critical infrastructure, including homes, schools, and health centres (OCHA 2019a). Just one month later, Cyclone Kenneth struck northern Mozambique, bringing torrential rains and strong winds to Cabo Delgado province. Although it caused fewer fatalities, resulting in one death, Kenneth affected more than 16,000 people, leading to significant flooding and displacement (OCHA 2019b). Together, Idai and Kenneth were the most devastating cyclones to hit Mozambique in nearly four decades (IFPRI 2023). More recently, on 11 March 2022, Cyclone Gombe struck the coastal region of Nampula in central Mozambique. The storm brought intense rainfall – up to 200mm in 24 hours – and winds reaching 190 km/h, resulting

These recurring natural disasters, driven by climate change and exacerbated by phenomena such as El Niño and La Niña, underscore Mozambique's increasing vulnerability, particularly among rural and coastal communities. Each event compounds existing social and economic hardships, straining the country's capacity to recover, deepening food insecurity, and worsening infrastructure deficits. The cumulative toll of these disasters highlights the urgent need for robust, climate-resilient adaptation strategies to protect lives, support livelihoods, and strengthen Mozambique's ability to withstand the escalating impacts of climate change.

Climate Change and Disaster Vulnerability in Magude District

The findings of the scientific research reviewed above contextualise the lived experiences of farmers, cattle herders, and fishermen in Magude, who have directly witnessed and endured the consequences of climate-induced changes. Fieldwork conducted in the district, which drew on direct observations, interviews, and personal testimonies gathered during the research period, indicates that increasingly erratic and unpredictable rainfall patterns, prolonged droughts, and the growing frequency of extreme weather events are fundamentally reshaping how local communities sustain their livelihoods. As highlighted in the testimonies of Mr Macambaco and Mr Carimo above, these climatic shifts are not experienced as distant or abstract phenomena but as tangible, everyday realities connected with social life and with severe impacts on food production, livestock health, and economic stability. The struggles faced by these communities serve as a stark reminder of the profound and immediate challenges posed by climate change on the ground.

Magude's vulnerability to climate change is exacerbated by several socio-economic factors. The district's underdeveloped infrastructure, including inadequate dams, reservoirs, and irrigation systems, amplifies the impact of climate shocks. The heavy reliance on rain-fed agriculture, combined with the lack of effective irrigation infrastructure, makes the district particularly vulnerable to fluctuations in weather patterns. Additionally, poor access roads hinder the movement of goods, services, and aid, particularly during extreme weather events such as floods and cyclones, thereby delaying recovery efforts.

Over the years, Magude has experienced recurring cycles of flooding and droughts, which have significantly impacted the local economy and the

in widespread flooding and destruction. An estimated 400,175 people were affected, with 77,279 families impacted. The cyclone claimed 20 lives, injured at least 82 people, and displaced nearly 24,000. In total, 45,079 homes were destroyed (OCHA 2022).

livelihoods of its people. The 2015–2016 El Niño-induced disrupted crop yields and creating severe water shortages for both people and animals, leading to increased dependence on humanitarian aid. It is remembered as one of the most severe in recent memory, resulting in widespread famine, water shortages, and the death of livestock, as already discussed. The memory of this drought surfaced frequently in my conversations with residents, shaping local understandings of climate change and reinforcing a perception of increasing environmental instability. These narratives underscore how lived experiences of extreme events inform community interpretations of climatic shifts and influence their adaptive priorities.

As is clear from the above review of climate shifts, the region has also been plagued by erratic rainfall, particularly in the last two decades. This inconsistency, according to farmers, has disrupted the agricultural cycle, leaving many farmers unable to produce enough food for their families. While droughts have caused crop failures, excessive rainfall has triggered floods, as I personally witnessed during my fieldwork in 2022, when torrential rains inundated the region, displacing many people and destroying vital crops. The floods also damaged critical infrastructure, including roads and irrigation systems, which further hindered recovery and exacerbated food insecurity.

The combined impacts of drought, irregular rainfall, and flooding have made it increasingly difficult for Magude's rural population to sustain their livelihoods. Agriculture, which provides subsistence for around 80% of the population, is the primary economic activity, with small-scale family farming dominating crop production and livestock rearing. Fishing and hunting are also essential for survival in some rural areas. However, these livelihoods are highly vulnerable to climate change, and the long-term effects of extreme weather events continue to pose a challenge to the region's economic stability and food security.

Aims and Scope of the Study

Here I examine how local people perceive, interpret, and narrate extreme weather events and how they draw on traditional ecological knowledge to cope with these environmental disruptions. Traditional knowledge, in this context, refers to the "unique knowledge developed over long periods of time, held by a particular society in a specific place" (Naess 2013:100). The Magude region has long been shaped by small-scale climatic fluctuations, and both local ecosystems and communities have historically adapted to these dynamics. Over time, residents have developed a rich body of traditional ecological knowledge grounded in the accumulated experience of managing

uncertainty and variability in the natural environment (Lavrillier and Gabyshev 2018; Ruiz-Mallén and Corbera 2013; Gómez-Baggethun et al. 2013).

While climate change research in Mozambique is extensive, the majority of it is situated within the natural sciences or technical disciplines, focusing on modelling, vulnerability assessments, and adaptation planning at national and regional scales (e.g. Coulson et al. 2022; World Bank 2010; INGC 2009). Few studies have investigated how rural communities understand and respond to climate change through their lived experiences, memories, and cultural practices (Artur and Hilhorst 2012; Arnall 2014; Brida et al. 2013; Osbahr et al. 2008). This thesis addresses that gap by offering an anthropological and ethnographic account of how climate change is made meaningful in everyday life in Magude. It contributes original insights to the anthropology of climate change by exploring how traditional knowledge serves not only as a resource for coping but also as a dynamic system that is continually reworked in response both to new environmental pressures and to governmental and global interventions aimed at climate change adaptation and resilience.

The thesis furthermore investigates how climate disruptions impact local livelihoods and reshape everyday practices. As Morton (2007) emphasises, communities that rely heavily on natural resources are among the most vulnerable to climate variability and change. In these settings, extreme weather events not only undermine agricultural productivity and food security but also damage infrastructure, disrupt access to water, and strain social cohesion (Osbahr et al. 2008). Moreover, these climate-related shocks rarely occur in isolation; they are often accompanied or intensified by broader economic pressures, such as rising food and fuel prices, inflation, or negative impacts of trade liberalisation. As Silva et al. (2015) argue, rural households in Mozambique are simultaneously exposed to environmental and economic shocks, what they call "double exposure," which interact to compound vulnerability.

Through in-depth ethnographic engagement, my research explores how adaptation to climate change is embedded in local practices, including agricultural techniques, resource-sharing systems, and daily decision-making. I will be argued here that adaptation is not solely an ecological process but one shaped by political, economic, and social dynamics. In particular, structural transformations linked to economic liberalisation, such as the withdrawal of state support, land reform, and increased exposure to market forces, have altered the conditions under which rural communities adapt (Eriksen and Silva 2009). These processes intersect with longstanding inequalities, including limited access to resources, weak institutions, and historically embedded political marginalisation, all of which shape the

capacity of communities to respond effectively to climate challenges. The thesis thus calls for integrated approach that bridge climate science and socio-economic analysis, recognising that extreme weather events like droughts and cyclones have unequal and often cumulative impacts on different households (Matyas and Silva 2013; Arndt et al. 2011).

In addition, I critically examine the role of climate governance at both local and national levels. It analyses the extent to which official adaptation policies support or undermines community-based strategies and how (or whether) local voices are meaningfully included in decision-making. By examining the intersection between top-down policies and bottom-up responses, the study illuminates the opportunities and tensions that emerge when formal governance frameworks intersect with local knowledge systems.

In summary, by combining ethnographic insights with critical attention to broader political and economic structures, I aim to advance understanding of how rural communities in Magude make sense of and respond to climate change. I seek to foreground the role of traditional ecological knowledge and lived experience in shaping local adaptation, while also interrogating the effects of state policies, structural inequalities, and market dynamics.

As such I build on anthropological scholarship by centring lived experience, traditional knowledge, and cultural interpretations in the study of climate adaptation, dimensions still underrepresented in Mozambique-focused climate research. The findings also engage broader debates around climate justice, knowledge pluralism, resilience, and the politics of adaptation, offering insights relevant to both academic and policy communities.

Methodology

Entering the Field

I conducted fieldwork in Magude District over an 11-month period, from September 2021 to October 2022. Given the ethnographic nature of my research, establishing trust and securing formal approval from local authorities was a critical first step (Bernard 2017). Upon arrival, I adhered to standard ethnographic protocols by introducing myself to the District Government authorities at the District Headquarters, where I explained the objectives of my research and the purpose of my presence in the region. This initial step was especially important given the strong government presence in Magude. As one local resident cautioned, the district remains particularly wary of visitors who arrive and "ask a lot of questions," especially without clearance from the authorities, reflecting broader patterns of state surveillance and scepticism toward external researchers in rural Mozambique (cf. West 2005).

This form of scepticism tends to emanate primarily from state representatives rather than the local residents.

The wariness of government officials must also be understood within the context of Mozambique's dual system of local governance, which involves a complex interplay between traditional authorities (such as *régulos* and customary leaders) and state-recognised structures (such as elected village secretaries and administrators). These coexisting forms of authority (Buur and Kyed 2005, 2006; Meneses and Santos 2009) give rise to tensions and jurisdictional overlaps, particularly in matters related to the control of information and the regulation of external actors. In such settings, external research can be perceived as politically sensitive or even threatening, particularly when it is not mediated through official channels or is seen as bypassing the authority of the state.

During my initial visit, I was informed that neither the District Administrator nor the Permanent Secretary was available to approve my stay, and I was asked to return the following week. Such bureaucratic delays are common in research settings where state authorities play a central role in managing external engagements and scrutiny (cf. Schatz 2009). When I returned, I was granted an audience with the District Director of Education, who was acting on behalf of the Permanent Secretary. I formally presented my research documentation, including a detailed explanation of my study's objectives, methodology, and intended activities within the district. The Director expressed appreciation for my choice of Magude as a research site, showing interest in the study's potential contributions to understanding local climate change adaptation strategies. She assured me of her support and facilitated my integration into the district's administrative and agricultural networks by directing me to the technicians of the District Economic Activities Service (SDAE). This institutional introduction was a crucial step in securing legitimacy for my research and gaining access to key stakeholders, including local farmers, cattle herders, and community leaders, but potentially it also tainted those introductions as "state sanctioned", something which only time and presence could resolve.

Magude's sparse population and strong governmental oversight made it nearly impossible to operate unnoticed. Every time I visited an administrative office or a village, I was required to present my government-issued clearance. This process, from the perspective of state representatives or their district extension functions as a mechanism for controlling the flow of information, ensuring that outsiders are monitored and their activities regulated. As Gupta (1995) observes, bureaucratic practices in state institutions often serve as a means of maintaining authority over knowledge production and as a way of

managing external influences. Similarly, Scott (1998) demonstrates how such administrative oversight reflects a broader state project of "legibility," wherein governments seek to make populations more visible and governable through bureaucratic documentation and surveillance. In this way, my research activities were not merely observed but systematically processed through layers of official scrutiny, limiting at least initially my ability to engage freely with local communities.

To gain deeper access to the local resident in Magude, I was finally permitted to join the weekly work trips of government technicians who provided technical support to farming communities. These trips allowed me to observe and interact with farmers and livestock breeders while they also providing insights into how the state intermediates build relationships with rural populations. However, by the same association I realised that my presence was misinterpreted. Many community members assumed I was a government official or an extension worker rather than an independent researcher. This misconception shaped the nature of my interactions: initial discussions were framed in ways that aligned with government expectations, thereby informants tended to provide politically correct responses rather than felt experiences. As Scheper-Hughes (1995) notes, power dynamics in ethnographic research can significantly shape the data that researchers collect, particularly when informants feel they must navigate political sensitivities.

Recognising these limitations, I sought to step out of the control of government authorities to foster more equal interactions with community members. As part of this endeavour, I collaborated with Arlindo Sitoe, commonly known as Salas, who served as my local guide. Well known and trusted in the district, Salas played a crucial role in helping to clarify my position as a university student conducting independent research rather than a government representative. This shift, enabled through Salas's interventions, was transformative. Without the weight of state authority attached to my presence, and with Salas's support, conversations became more candid, allowing informants to share their lived experiences, frustrations, and personal interpretations of climate change and state governance. Through Salas's intervention, and by repositioning myself as an outsider embedded within local networks, I was able to foster trust and gather richer, more nuanced insights into how Magude's residents experience and respond to climate change. This connectedness is important because, as Devereux and Hoddinott (1992) emphasise, the success of ethnographic research in rural contexts depends on the researcher's ability to navigate local perceptions and establish credibility within the community.

However, my identity as a "University student" also presented challenges. Many of my informants had limited formal education, so for them, someone who had attended university was perceived as having "studied a lot." This perception sometimes created an implicit hierarchy, with informants deferring to me on topics they assumed I understood better. For instance, when I inquired, "Why do you think it hasn't rained much lately?" some responded with statements like, "I don't know, maybe you who went to university can tell me." These interactions revealed the subtle power dynamics at play, in which formal education was equated with authority on complex issues such as climate change.

To navigate these dynamics, I made a conscious effort to frame my role not as an expert but as someone seeking to learn from local knowledge and lived experience. Rather than emphasising my institutional affiliation or academic credentials, I introduced myself simply as a student conducting research, someone whose primary aim was to listen and understand. While I remained transparent about my background when relevant, I chose not to foreground it, thus doing my best to avoid reinforcing existing hierarchies or creating social distance. This approach was guided by my own ethical considerations: for myself it was important to build trust without misrepresenting an open way myself, and to foster conditions where informants felt their knowledge was valued.

As an employed lecturer at Eduardo Mondlane University, by default I represent an urban elite in Mozambique. In addition, being a PhD student in a Swedish university, studying abroad, in this case at Uppsala University, could be associated with elevated status, expertise, and authority. The combination of these factors, alongside my mandatory state introduction locally, made me all the more transparent about my background, while also emphasising my reliance on local insights to make sense of complex realities. This reframing helped shift the interaction away from perceived hierarchies and toward more reciprocal dialogue. It allowed community members to speak more freely, without the pressure to defer to presumed expertise. As Briggs (1986) reminds us, how researchers position themselves in the field significantly influences the kinds of knowledge they are able to access. In this context, presenting myself not as an authority but as a learner and guest helped create space for local perspectives to surface on their own terms.

Salas played a crucial role in navigating the inland communities and facilitating communication, particularly with Changana-speaking informants. Although I also speak Changana, the variant spoken in this region sometimes differs from what I am used to, making it occasionally difficult for me to fully understand. Salas's knowledge of the region and his relationships with local

leaders and residents helped establish trust, easing my access to individuals who might otherwise have been reluctant to speak with an outsider. Tragically, Arlindo Sitoe (Salas) died in a car accident just two months into our collaboration. His sudden loss was a significant personal loss as we become good friends. The loss of his mediation skills became a setback (not surprisingly), as Salas had served as the key mediator and bridge between me and the local residents. In his absence, I had to find another local assistant to help with translation and to navigate the local context. Although I eventually found others who supported me in the field, the absence of Salas continued to be deeply felt, serving as a reminder of the emotional connections and vulnerabilities that inevitably accompany ethnographic work.

In addition to my base in Magude-sede, I made regular trips to Mapulanguene and Mahele, two of the district's administrative posts. Mapulanguene, located in the far north, is the driest part of the district, where prolonged droughts have made subsistence farming increasingly difficult. By contrast, Mahele, approximately 50 kilometres from Magude-sede, is one of the regions most affected by deforestation, with significant portions of woodland cleared for charcoal production and agriculture. I spent several weeks in these areas, immersing myself in the daily lives of the communities, participating in agricultural activities, attending local meetings, and listening to residents' concerns about environmental changes. As Cerwonka and Malkki (2007) emphasise, extended engagement in the field is essential for capturing the complexities of lived experiences, allowing researchers to move beyond surface-level observations and gain deeper insights into local realities.

Through these experiences, I came to appreciate the intricate ways in which environmental challenges intersect with social, economic, and cultural factors in Magude. While my presence as a researcher initially shaped the nature of my interactions, my efforts to adapt, whether by reframing my role, working closely with local intermediaries, or embedding myself in different parts of the district, allowed me to develop a richer, more nuanced understanding of how communities experience and respond to climate change.

Participants

Magude-sede, the most urbanised area in the district, has the highest school enrolment rate and served as my primary research base. My interactions with young people there were relatively easy, and I quickly integrated into various friendship circles. These informal networks proved invaluable in helping me navigate daily life in Magude and facilitating my entry into farming and pastoralist families. Agriculture and livestock rearing form the backbone of the district's economy, with nearly every household engaging in some form

of subsistence farming, animal husbandry, or both. Over time, I established close relationships with several families, many of whom became key informants. In some cases, my interactions centred primarily around the household head, who was typically the decision-maker in matters related to agriculture and livestock. In other cases, I engaged more with other family members, particularly women and children, whose perspectives provided deeper insight into the day-to-day realities of food production, domestic labour, and climate adaptation strategies.

The agricultural sector in Magude is organised into various associations, including agricultural cooperatives, groups of sugarcane growers, and livestock breeders' associations. While not all farmers and herders are affiliated with these organisations, a significant number participate, as these associations provide a support structure for production, trade, and negotiation with governmental and non-governmental entities. To gain a comprehensive understanding of local farming and pastoralist practices, I closely observed the activities of six associations – two from each category – by documenting their meetings, speaking with their members, and maintaining regular contact with their leadership.

Recognising that the agro-livestock production chain extends beyond producers to include intermediaries such as traders, transporters, and market vendors, I broadened my study to capture their perspectives as well. This expansion led me to engage with informal street traders, market-based vendors, cattle transporters, and slaughterhouse owners, whose roles are crucial in connecting rural producers with urban consumers. These interactions helped reveal the intricate web of economic exchanges, power dynamics, and vulnerabilities that shape Magude's rural economy, particularly in the face of climate change and market fluctuations.

Fishermen also became key informants in my research, offering crucial perspectives on how climate change has disrupted fishing activities in Magude. Many shared their first-hand experiences, describing shifts in fish availability, declining catches, and the increasing unpredictability of water levels. Their testimonies highlight not only the environmental challenges they face but also the economic hardships and adjustments they have had to make to sustain their livelihoods.

As I will discuss in coming chapters, one notable response to the changing climate, particularly the prolonged dry spells, has been increased local charcoal burning. Previously, this sector was largely dominated by foreign actors, but in recent years, more local residents have turned to charcoal production as an alternative source of income. To understand this transition, I engaged with charcoal workers at multiple levels, from kiln owners and

labourers to transporters who facilitate the movement of charcoal to urban markets. Their narratives shed light on the economic diversification strategies emerging in response to environmental pressures.

In addition to studying rural producers and traders, I also worked closely with government technicians responsible for agricultural and environmental management. These included extension workers, livestock inspectors, a district veterinarian, and forest managers, all of whom provided valuable insights into the policies, programmes, and interventions shaping local adaptation efforts. Their perspectives helped contextualise the broader institutional responses to climate change in Magude as well as the challenges of implementing state-led initiatives in rural communities.

Data Collection Methods

I employed a qualitative research methodology, integrating participant observation, in-depth interviews, and informal conversations to gain a deeper understanding of local perceptions, knowledge, and responses to climate change. Qualitative research methods are particularly valuable for studying complex social phenomena because they enable researchers to explore people's lived experiences, interpretations, and meanings in context (Denzin and Lincoln 2011; Creswell 2013).

Participant observation was particularly effective in capturing the daily practices, routines, and interactions within agricultural, pastoral, and fishing communities. I was frequently invited into informants' homes, where I observed meal preparation, household discussions, and agricultural decision-making processes. I also spent extended periods in the fields, working alongside farmers and livestock herders, which provided a first-hand perspective on farming techniques, land management strategies, and the worry and concerns posed by erratic weather patterns. Such immersive engagement helped build trust with community members (cf. Emerson et al. 2011) and allowed me to document not only what people said but also how they enacted resilience in their daily lives.

Beyond agricultural activities, I attended working sessions within local agricultural associations, observing how cooperative farming efforts were structured and how members coordinated responses to climate-induced challenges. I also accompanied cattle herders as they grazed their cattle, which gave me insight into the vulnerabilities of livestock production, particularly in times of drought. During these experiences, informal conversations naturally emerged, with informants sharing concerns about environmental changes, government policies, and their own coping strategies.

Evenings and weekends presented additional opportunities for engagement through informal conversations in social settings, including local bars, entertainment venues, and community gatherings. These casual environments facilitated introductions to new contacts and provided a relaxed atmosphere in which individuals spoke more candidly about their experiences. Such settings have been recognised as crucial in ethnographic research, allowing researchers to access perspectives that might not emerge in formal interviews (Spradley 1979).

In total, I conducted in-depth interviews with 66 persons, capturing a broad cross-section of the community. Most interviews were conducted in Changana, the dominant local language in Magude, while a few were conducted in Portuguese, my primary working language. This linguistic diversity was vital in ensuring that participants could express themselves comfortably in their preferred language (Warren and Karner 2010). I am a Shangaan speaker myself, but the dialect spoken in Maputo, where I live, differs from the dialects spoken in Magude. When necessary, I collaborated with local interpreters to ensure accurate communication. Interviews varied in length, ranging from 22 to 93 minutes, and were recorded, transcribed, and analysed using thematic coding techniques (Braun and Clarke 2006). These interviews covered topics such as perceptions of climate change, changes in agricultural and pastoral practices, local adaptation strategies, and experiences with government and NGO interventions.

Informant demographics were diverse, with participants ranging in age from 15 to 75 years. This broad age range allowed me to capture intergenerational perspectives on environmental change, traditional knowledge transmission, and shifts in livelihood strategies over time (Berkes 2009). Older informants provided historical context, recalling past climate conditions and how agricultural and pastoralist practices have evolved over time. Younger participants, in contrast, highlighted emerging livelihood strategies and the influence of modern technology and external interventions on adaptation practices. While most participants agreed to have their interviews recorded, some government technicians declined to be recorded, citing concerns about the risks this might pose to their positions. In these cases, I relied on detailed note-taking, ensuring that key insights were documented while maintaining the confidentiality and ethical integrity of the research process (Silverman 2011).

Ethics and Positionality

In conducting field research, I adhered to established ethical principles as outlined in key social science codes of ethics, including those of the American

Anthropological Association (AAA 2012) and the European Commission's Research Ethics in Ethnography/Anthropology (Iphofen 2015). These frameworks emphasise voluntary participation, informed consent, transparency, and the protection of participants' confidentiality. At the beginning of each interaction, I clearly explained the research purpose, methods, and what participation would involve, emphasising that participation was entirely voluntary and that respondents could withdraw at any time without consequence. As a result of this prior information, some participants chose to remain anonymous and are represented here solely by their professions or roles.

Although I initially gained formal access through government channels, my decision to present myself as an independent researcher, not affiliated with any state institution, was especially important in a context where outsiders can be met with distrust, particularly when they are seen as speaking on behalf of the government or other external powers. To foster trust and reduce social distance, I adopted a posture and attitude grounded in humility and mutual respect. While I was fully transparent about my institutional affiliation and academic background during the informed consent process and whenever such information was relevant or requested, I chose not to emphasise these aspects in informal interactions. This decision was not made out of a desire to conceal my difference, but rather to emphasise my role as a learner and guest in the community, someone there to listen and engage with local knowledge rather than impose external interpretations.

Confidentiality was upheld throughout the study. Participants were given the option to remain anonymous, and regardless of their response regarding anonymity, I decided that all names used in this thesis would be pseudonyms. These ethical measures were crucial in establishing relationships of trust and in conducting research in a context marked by historical and ongoing power asymmetries.

Reflections on Methodological Challenges

Conducting fieldwork in Magude presented several methodological challenges, particularly related to access, trust-building, and positionality. Gaining formal approval from government authorities was a bureaucratic process, reflecting the district's cautious stance toward outsiders. This requirement sometimes constrained my interactions, as community members initially perceived me as being affiliated with the state. Overcoming this hurdle required a shift in approach – stepping away from official networks and working with a local guide to clarify my role as an independent researcher.

However, even after clarifying my independence from state structures, challenges related to positionality persisted. Rather than emphasising my academic credentials in informal exchanges, I focused on cultivating relationships based on mutual respect and open dialogue while remaining fully transparent about the purpose of the research and my institutional affiliation whenever it was relevant or requested. This approach helped reduce perceived social distance and encouraged more candid, reciprocal interactions.

Additionally, language and cultural nuances significantly shaped my engagement with participants. Although conducting interviews in Changana my "mother" language (and the dominant local language) enabled access to deeper insights, it also presented interpretive challenges, as I am not a fully fluent speaker of Changana. Being from and urban context, my primary language is Portuguese, which meant that capturing the full nuance of participants' expressions required careful listening, contextual understanding, and, at times, collaborative interpretation. The unexpected loss of Arlindo António Sitoe, my local assistant, early in the research process further complicated my ability to navigate certain linguistic and social contexts, necessitating a rapid and ongoing process of adaptation throughout the fieldwork.

Despite these challenges, participant observation over an extended period proved invaluable, allowing me to move beyond formal interviews and observe daily life, informal exchanges, and unspoken adaptation strategies. Engaging in routine activities with informants helped bridge social divides, making it possible to capture the complexities of how people experience and respond to climate change in Magude.

In addition, I have a positionality as a male researcher which significantly influenced the dynamics of fieldwork. In a context shaped by patriarchal norms, men were generally more available and willing to engage in extended conversations, which meant that the majority of my interviews were conducted with male informants. This shaped both the accessibility of certain types of knowledge and the perspectives captured through the research. While I sought to include women's voices, their participation was more limited due to social norms around gender roles, time constraints related to household responsibilities, and, at times, a reluctance to speak openly in the presence of male outsiders. As a result, the knowledge produced through this research is more closely aligned with male interpretations and experiences of environmental change and adaptation. This gendered lens is a limitation to the project, as it inevitably narrows the scope of insights into how climate impacts are understood and navigated within the broader community.

Theoretical Framework

This thesis draws on an interdisciplinary theoretical framework to examine how climate change is experienced, interpreted, and navigated in Magude. The framework integrates insights from anthropology, political ecology, and critical development studies, with a particular emphasis on four interrelated concepts: adaptation, resilience, local knowledge, and climate justice. These concepts were selected not only because of their centrality in climate change discourse and policy but also because they resonate with the lived realities, struggles, and forms of knowledge expressed by people in Magude. Each concept provides a distinct yet overlapping analytical entry point, helping to explore how climate variability is understood and acted upon in everyday life, how vulnerability is produced and managed, and how certain responses are legitimised while others are overlooked or marginalised. Rather than treating these concepts as static categories, the thesis mobilises them as analytical tools that operate at multiple levels. On the one hand, it traces how these notions are included in local narratives, institutional discourse, and development interventions; on the other, it uses them critically within the analysis itself to question dominant framings, expose power asymmetries, and highlight alternative forms of agency and critique. In doing so, the thesis aims to develop a more grounded understanding of climate responses in Magude, one that is rooted in the experiences and interpretations of local people, as well as in critical theoretical approaches that examine the power dynamics of development and climate governance. Thus, the thesis centres on local agency while revealing how broader structures influence environmental and rural life.

Adaptation

The concept of adaptation has its roots in the biological sciences, particularly in ecology, where it originally referred to an organism's ability to adjust to changing environmental conditions, enabling the species to survive and reproduce. In this framing, adaptation was understood as an evolutionary process driven by genetic change and natural selection, occurring gradually over generations without deliberate intent (Oliver-Smith 2016). Over time, however, the concept was appropriated into other disciplines, particularly disaster studies and development theory, where it was redefined as a way to explain how individuals and communities manage environmental hazards and socio-economic stressors. In frameworks such as the Sustainable Livelihoods Approach (Chambers and Conway 1992; Scoones 1998), adaptation has become central to discussions of vulnerability and resilience, linking everyday practices to broader development concerns.

Within international climate policy, adaptation is often defined in broad, technocratic terms that downplay the political and social dimensions of climate change. A widely cited example is the Intergovernmental Panel on Climate Change (IPCC), which defines adaptation as "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (IPCC 2001:982). Although this definition has become standard in policy and development circles, it has been widely critiqued for its depoliticised framing. It treats climate change as an external, neutral threat to which systems must adjust, without acknowledging how climate risk is unevenly distributed and shaped by global inequalities. Scholars such as Taylor (2015) argue that this kind of framing reinforces a problematic separation between "climate" and "society," obscuring the role of capitalism, colonial legacies, and structural injustice in producing both environmental change and vulnerability. Likewise, Orlove (2005) points out that such frameworks tend to assume predictable, calculated responses to climate impacts, overlooking the cultural, emotional, and historical dimensions that influence how people actually perceive and respond to environmental change.

In my thesis, I build on this critique by using adaptation as a tool to interrogate not only how people respond to environmental changes but also how their responses are shaped (and often constrained) by political and economic structures, sometimes maintained in the name of "climate change adaptation." My research focuses on the ways in which adaptation is intertwined with the histories of marginalisation and developmental neglect in Magude. Here, climate variability interacts with persistent structural issues such as insecure land tenure, underinvestment in rural infrastructure, and forms of state engagement that have been sporadic, extractive, or misaligned with local priorities. In this context, adaptation emerges not merely as a response to climate stress but as a socially embedded and politically charged process.

Anthropological studies offer valuable insights for this analytical approach. Rather than treating adaptation as a one-size-fits-all solution, anthropologists emphasise its relational, situated, and processual nature. Oliver-Smith (2016, 2017) proposes that adaptation should be viewed as a historically grounded and culturally mediated phenomenon, in which local knowledge, institutions, and practices evolve in response to shifting conditions. This orientation informs my use of adaptation as an entry point for examining how different actors in Magude (such as farmers, cattle owners, and NGOs) navigate overlapping uncertainties that are not only environmental but also economic and social. Rather than assuming adaptation is a neutral response to climate

change, I explore how it is shaped by broader structures of inequality and contested through everyday practices.

An intersectional lens further enhances the analytical utility of adaptation. As Fiske et al. (2014) argue, adaptive capacity is never evenly distributed; it is structured by intersecting inequalities of gender, class, ethnicity, and power. These dimensions are central to my analysis in Magude, where women, youth, and the landless often face distinct limitations in accessing resources or participating in decision-making. By incorporating intersectionality into the conceptualisation of adaptation, the thesis seeks to uncover how these overlapping structures of exclusion shape both the strategies people pursue and the outcomes they are able to achieve.

This intersectional approach was effectively applied by Finan and Rahman (2016) in their research in Bangladesh, demonstrating that adaptation is deeply stratified. While elite male landowners retain control over key resources, poor women and landless labourers face structural barriers that severely limit their capacity to adapt successfully. These findings challenge generalised models of adaptation and highlight the need to critically examine power dynamics, social exclusion, and difference. Crate's (2016) study of the Viliui Sakha in Siberia also offers a compelling example of how adaptation is experienced unevenly and shaped by local histories and cultural logics. Her research reveals how environmental stress is closely intertwined with generational shifts, youth migration, and economic restructuring. The insights offered by these two studies support my methodological commitment to capturing the situated and uneven nature of adaptation in Magude, where responses to climate variability are shaped by specific histories of labour migration, land allocation, and state neglect.

Building on this foundation, Sen's (2023) concept of "everyday adaptation" is particularly valuable for my analytical framework. It draws attention to the routine, often invisible practices through which people navigate climate stress, such as managing health under precarious conditions, adjusting domestic routines, or walking long distances to fetch water. These practices, frequently overlooked by formal policy, are grounded in lived experience and represent meaningful forms of adaptation. They also challenge top-down, expert-led models that dismiss local knowledge and existing coping strategies. Rather than passive responses, these micro-practices reveal how people creatively negotiate marginality, albeit within precarious constraints. Similar dynamics emerge in Magude in the form of strategies such as adjusting the farming calendar, engaging in informal trading, or adhering to different associations. These are adaptive responses, yet they are heavily constrained by broader structural inequalities.

Crane et al (2011) further caution against overly deterministic models of adaptation that rely heavily on predictive data and ignore the socially embedded nature of decision-making. Their critique supports the argument that people in Magude are not passive victims of environmental shocks but are actively reshaping the economy and social life in response. As such, they are agents whose actions are grounded in prior experience, cultural meanings, and social relationships. However, Dewan's (2021) concept adds a critical layer to this analysis. She cautions against the tendency to attribute complex socio-environmental challenges solely to climate change, thereby obscuring their political and historical roots. Her research in the Bengal Delta illustrates how issues such as soil salinisation and land degradation are shaped not only by climatic shifts but also by colonial infrastructure, capitalist agricultural practices, and institutional neglect. By isolating climate as the singular cause, reductive translations erase the structural dimensions of vulnerability. This concept of "climate reductive translations" is also useful for analysing rural vulnerability in Magude, where climate variability interacts with the legacies of land reform, shifting development priorities, and persistent economic inequalities.

Throughout this thesis, then, adaptation is used as more than a descriptive label. It functions as an analytical lens to interrogate how people in Magude respond to environmental uncertainty within the constraints and possibilities shaped by history, politics, and everyday life. It enables an examination of both agency and structure, revealing how seemingly individual strategies, such as livelihood diversification or seasonal migration, are deeply entangled with broader forces. By anchoring adaptation in ethnographic and critical theory, the thesis aims to challenge depoliticised, technocratic narratives and instead foreground the lived, situated, and contested nature of climate responses in southern Mozambique.

Resilience

Building on the discussion of adaptation, this thesis also critically engages with the concept of resilience, not merely as a buzzword in climate and development policy but as an analytical tool to understand how people in Magude confront, negotiate, and sometimes resist the structural and environmental pressures shaping their lives. Though increasingly present in policy and academic discourse, the meanings and uses of resilience remain contested, making it all the more important to examine how the term operates in different contexts and whose interests its different iterations serve.

The term originates in ecology, especially in the work of C. S. Holling (1973), who defined resilience as the capacity of ecosystems to absorb small

scale disturbances and reorganise without losing their essential structure and function. This challenged earlier ecological models based on equilibrium and introduced a more dynamic, non-linear understanding of change. Holling's contribution opened the way for thinking about complex systems as capable of shifting between multiple stable states, an idea that has since influenced both environmental sciences and development theory (Berkes et al. 2003).

The evolution of resilience since was embedded into the social-ecological systems (SES) framework further expanded its scope by emphasising the interdependence of human and natural systems. This approach positioned resilience as involving the ability not just to absorb shocks but also to learn, reorganise, and potentially transform. SES thinking introduced the idea that resilience encompasses social dimensions, including local knowledge, institutional adaptability, and collective learning (Folke 2006).

As the concept migrated into the social sciences, its meaning shifted even further. In climate change and development contexts, resilience is commonly reduced to the ability of individuals or communities to "absorb, recover, and adapt" to external stressors (Henshaw 2016; Pokrant 2017). This functionalist approach is prevalent in policy discourse, where resilience is often framed as a capacity that can be measured, developed, and delivered through targeted interventions. In this thesis, I use resilience as an analytical lens to understand how people in Magude navigate overlapping climatic, economic, and institutional crises. Rather than treating resilience as a fixed outcome, I focus on the everyday practices, relationships, and historical conditions that shape how people cope with uncertainty and imagine their future.

Anthropologists and critical development scholars have raised concerns about the technocratic use of resilience in climate change and development policy. In this view, resilience is treated as a measurable and transferable capacity that can be engineered through external interventions, programmes, or toolkits. Such an instrumental approach tends to individualise responsibility while neglecting the structural conditions and historical legacies that shape people's vulnerabilities and responses. Finan and Rahman (2016), for instance, argue that resilience must be understood as a socially embedded process shaped by collective memory, trust in institutions, social cohesion, and histories of marginalisation. These factors deeply affect how people recover from or cope with shocks. Similarly, Magis (2010) reorients the discussion toward communities' internal capacities, defining resilience as the development and mobilisation of resources to actively engage change rather than passively absorb it. Drawing from these perspectives, I explore how resilience in Magude is imagined and enacted not only through formal plans or projects but also through informal networks, collective labour

arrangements, and resource-sharing practices that reflect both creativity and constraint.

At the same time, I remain attentive to critiques that warn against the political neutrality often associated with resilience discourse. Béné et al. (2012) argue that resilience, in its dominant usage, is analytically weak and may normalise conditions of structural disadvantage. Communities can be labelled "resilient" even when they are merely surviving under precarious and unjust circumstances. As an analytical tool, then, resilience requires constant interrogation: what kinds of resilience are being encouraged, by whom, and to what end? In Magude, for example, strategies such as subsistence farming, informal charcoal trade, and seasonal migration may be described as resilient, but they are in fact the very limited options shaped by rural neglect and uneven development. These are precisely the kinds of ambiguous practices this thesis seeks to unpack.

Resilience, in this sense, cannot be divorced from power. As Béné et al. (2012) and also Reid (2013) argue, resilience frameworks often fail to address the structural conditions that produce vulnerability in the first place. By focusing on a community's ability to "bounce back" or adapt, these frameworks risk displacing demands for justice, redistribution, and accountability. Therefore, in my analysis of Magude presented here, I employ resilience as a means to examine how communities are expected to absorb multiple stresses without corresponding structural support or meaningful changes in governance. This includes interrogating how resilience is mobilised by different actors: for instance, how development agencies frame community responses in terms of empowerment while sidestepping questions of land tenure or infrastructural neglect.

Beyond its role in governance, the concept of resilience is also closely tied to processes of subject formation. Reid (2013) argues that resilience discourse frames the poor as responsible for their own survival, casting learning and adaptability as moral obligations. In this framing, vulnerability is not primarily attributed to structural injustice but is recast as an expected condition of life, one that can be endured through ingenuity and constant adjustment. In the context of Magude, I adopt a critical stance towards how the government and NGOs frequently employ terms such as "local capacity" and "community resilience" without addressing the structural constraints that people face. Using resilience as an analytical lens enables me to examine how responsibility for coping is assigned and whose knowledge and strategies are legitimized within dominant development narratives.

Moreover, resilience is not only about practices but also about epistemology. While resilience strategies often claim to be participatory or

context-sensitive, they frequently rely on dominant scientific frameworks that marginalise local knowledge. As Reid (2013) points out, this reflects a persistent epistemic hierarchy in which expert-driven models are privileged over lived experience. My study examines how local knowledge relating to rainfall, soil conditions, animal behaviour, and seasonal timing is integrated or dismissed within official adaptation strategies. Resilience, as I use it in this thesis, becomes a way to explore not only how communities survive change but also how knowledge is contested and authority is negotiated in the process.

Throughout this thesis, resilience is approached not merely as a neutral descriptor of local practices, but rather as a critical lens through which to examine how people in Magude are expected to cope with, adapt to, and absorb climate-related and structural pressures. Rather than celebrating resilience as an inherent quality or a successful policy, I trace how the concepts of resilience and adaptation are invoked in official documents, asking under what conditions resilience can move beyond a demand to endure and become a transformative political possibility. In this thesis, the approach is therefore to explore how everyday coping practices, such as social networks, shared labour, and improvisation, are shaped not only by local agency but also by wider histories of inequality and shifting responsibilities in development and climate governance.

Local Knowledge

A frame helpful in critiquing dominant epistemological perspectives that claim and impose globally defined buzzwords, such as adaptation and resilience, is local knowledge. I draw on local knowledge as an analytical lens to explore how people in Magude interpret, respond to, and live with environmental change in their own words. Rather than treating local knowledge as a supplementary or anecdotal layer, I approach it as a dynamic and politicised system of meaning-making, deeply embedded in historical relationships to land, spirituality, and community. As with adaptation and resilience, the concept of local knowledge is not taken here as self-evident; rather, it is a contested terrain through which power, legitimacy, and environmental governance are negotiated.

Mainstream adaptation and resilience discourse (as reflected in the frameworks of the IPCC, multilateral climate funding mechanisms, and much of the global development literature) either ignores or treats local knowledge systems in reductive and instrumental ways. While policy frameworks frequently emphasise the importance of "community participation" and "traditional practices," such references are often instrumentalised, treating local knowledge as a source of isolated information that can be extracted and

used to support externally defined goals. For example, farmers' observations about rainfall patterns or planting cycles may be incorporated into climate forecasting tools or agricultural extension programmes, yet the broader cultural, ethical, or spiritual systems that shape those observations are commonly disregarded. In this form, knowledge becomes a resource to be translated and operationalized rather than a worldview to be engaged with on its own terms (Agrawal 1995; Nadasdy 1999). This instrumental approach strips Indigenous and place-based knowledge systems of their epistemological, cultural, and political depth, rendering them legible only to the extent that they align with dominant scientific or bureaucratic paradigms.

Before engaging substantively with this knowledge, it is crucial to interrogate the very categories used to describe it. Labels such as "Indigenous," "local," or "traditional" are often deployed interchangeably, yet they carry distinct conceptual and political implications depending on context. Scholars have long debated the analytical utility of these concepts. Kuper (2003) critiques "Indigenous" for its essentialist undertones, noting its historical replacement of the term "primitive," while Barnard (2004) highlights its strategic value despite analytical limitations. In the African context, where long histories of migration, assimilation, and shifting group boundaries complicate fixed claims to identity, definitions of indigeneity remain especially contested (Lanzano 2013; Pelican 2009). In Magude, for instance, understandings of environmental change are shaped by layered histories of mobility, state intervention, and agrarian change, making it difficult to draw clear boundaries between "traditional" and "modern" ways of knowing.

To avoid these essentialisms, some scholars adopt broader terms, such as "local" knowledge. Yet this move introduces its own set of questions: What constitutes local knowledge? Who produces it and who owns it? And how is it mobilised, legitimised, or marginalised in climate governance? Addressing these questions is crucial to understanding the epistemic hierarchies that determine whose knowledge is valued in the context of climate change mitigation.

Scholars have offered various definitions of local and traditional ecological knowledge, emphasising its context-specific, experiential, and relational character. Naess (2013:100) defines local knowledge as "the unique knowledge developed over an extended period of time and held by a given society in a specific location," while Lavrillier and Gabyshev (2018:2) describe traditional ecological knowledge as a cumulative body of beliefs, practices, and observations about the relationships among living beings and their environments, transmitted across generations and shaped by long-term

adaptive processes. This form of knowledge is typically practical and concrete, grounded in intuition and holistic understanding, in contrast to the quantitative and reductionist logic of modern science. Bannister and Hardison (2006) further emphasise that traditional knowledge is not static but dynamic and evolving – a culturally embedded system developed through generations of lived experience and deep interdependence with specific environments. It encompasses not only survival strategies and ecological insights but also spiritual and religious beliefs, ethical norms, and practices that guide human–environment relations.

Ethnographic work deepens this view. Rosengren's (2022) research with the Matsigenka of the Peruvian Amazon shows how knowledge is embedded in spiritual and ethical relationships with the landscape. Weather, for example, is not understood as a set of meteorological events but as a domain shaped by spiritual beings. This ontological difference from Western science reveals a core tension in environmental governance: what happens when knowledge systems that understand the world through interdependence, reciprocity, and spirituality are forced to conform to data-driven models of sustainability?

This thesis uses such insights to frame local knowledge in Magude as more than a collection of observations. It is a way of being in the world, encompassing social memory, ethical norms, and practices of care and responsibility. Aswani et al. (2018) stress that local knowledge systems are often open to innovation and hybridisation, incorporating new tools and ideas in ways that align with existing cultural logics. This flexibility is central to how people in Magude adapt to changing rainfall, soil conditions, or resource pressures, combining, for example, spiritual beliefs, livestock knowledge, and folk forecasting. In this sense, adaptation is not external to local knowledge; it is one of its expressions and fields.

Yet this dynamic capacity of local knowledge is often misrecognized. Ehlert (2007) argues that Indigenous knowledge continues to be portrayed as intuitive and non-rational, in contrast to the "objectivity" and "universal validity" attributed to science. Theodory (2016) takes this further, contending that the very notion of "Indigenous knowledge" is a Western construct that reproduces a binary between "tradition" and "modernity," reinforcing broader hierarchies embedded in development discourse. Nadasdy (1999) offers a deeper critique, arguing that the terminology of Traditional Ecological Knowledge masks dynamic epistemologies under the guise of timelessness. The term "traditional" suggests that such knowledge is bound to the past, while "ecological" imports a Western notion of nature as separate from humans. In contrast, many Indigenous worldviews understand humans and non-humans as entangled in ethical, spiritual, and relational networks.

Traditional Ecological Knowledge, then, is not simply a body of empirical observations; it is a way of living and relating that encompasses responsibility, reciprocity, and care for future generations (Nadasdy 1999).

These dynamics are not unique to Magude. Across contexts, the selective recognition of local knowledge can become a form of appropriation rather than empowerment. Rosengren (2022) and Nadasdy (1999) both highlight how Indigenous knowledge is often stripped of context, reduced to fragmented data, and reinserted into bureaucratic systems that reinforce top-down control. Dahlström's (2009) study of Sámi reindeer herders in Sweden illustrates how official recognition of Sámi knowledge led to tighter regulation and constrained political agency, with Sámi expected to perform the role of "ecological stewards" to gain credibility. This dynamic, in which recognition depends on conformity, raises important questions about the conditions under which knowledge is validated.

In Magude, these processes are visible in how local explanations of drought, delayed rains, or livestock diseases are treated by different actors. While community elders and pastoralists often interpret climate shifts through both environmental signs and ancestral narratives, development practitioners may prioritise satellite data or agronomy models. By analysing these interactions ethnographically, this thesis explores how knowledge is contested and how, through its governance, certain groups are included while others are excluded. Ultimately, my work demonstrate how knowledge governance influences both adaptation outcomes and broader understandings of environmental change.

Ultimately, genuine engagement with local knowledge requires a rethinking of the politics of knowledge itself. As Bannister and Hardison (2006) and Jacka (2016) suggest, more equitable forms of collaboration should recognise different knowledge systems as coexisting, rather than forcing integration into a single, dominant framework. Local knowledge in Magude is not "less than" science; it is rooted in a different epistemology, one that prioritises relationality, ethics, and history. When brought into dialogue with other forms of knowledge on equal footing, it can offer important insights into climate variability and contribute to more grounded and context-sensitive responses.

By approaching local knowledge as an analytical lens, this thesis seeks to uncover the deeper power dynamics at play in climate governance. It asks not only what kinds of knowledge people in Magude draw on to navigate environmental change but also how that knowledge is recognised, ignored, or reshaped within adaptation planning, development discourse, and institutional practice. In doing so, it challenges dominant narratives that treat local

knowledge as marginal and offers a more politically engaged understanding of how communities relate to environmental change – not just as observers but as epistemic actors navigating contested terrains of legitimacy, memory, and survival.

Climate Justice

Having explored adaptation, resilience, and local knowledge as key lenses through which to understand how communities in Magude respond to environmental change, I introduce climate justice as a cross-cutting framework that binds these perspectives together and highlights the structural dimensions of vulnerability and response. While adaptation describes strategies of response, resilience reveals the social capacity to navigate change, and local knowledge uncovers the epistemic terrain on which these responses are built, climate justice offers a critical perspective that directs attention to questions of power, responsibility, and equity. It asks: Who bears the burden of climate impacts? Who gets to decide what counts as a viable response? And how are existing inequalities reinforced or challenged in the process? In this study, climate justice is not treated as an abstract moral claim but rather as an analytical approach to examining how adaptation occurs within broader systems of power, exclusion, and contestation, both locally and globally.

Climate justice is a central concept in this study's theoretical framework, providing a critical lens to examine how climate change affects communities unequally and how adaptation responses can either challenge or reproduce existing power structures. It highlights that those who have contributed least to the climate crisis, such as poor rural communities, women, and Indigenous peoples, often face its most severe consequences, while those most responsible enjoy greater protection and resources (Mohanty and Subhadra 2023; Agyeman et al. 2011). In Magude, where historical marginalisation, limited infrastructure, and gendered labour patterns shape exposure and response to environmental stress, the climate justice lens allows for a deeper analysis of whose vulnerability matters and on whose terms global adaptation policies are framed.

Aligned with insights from environmental anthropology, climate justice positions climate change not simply as an environmental or technical issue but as a fundamentally political and social process. Drawing on Schlosberg's (2007) multidimensional theory of justice, this study considers climate justice to involve not only the fair distribution of resources and risk but also the recognition of marginalised identities. It further encompasses the meaningful participation of communities in decision-making and their capability to live

dignified lives under climate stress. These elements are central to my critical analysis of Magude, where institutional responses often overlook the differentiated impacts of climate change across class, gender, and age. By highlighting these inequalities, the concept of climate justice provides a critical lens through which to examine how power and inequality shape adaptation processes: who adapts, how, and at what cost?

The analytical value of climate justice is further deepened through engagement with political ecology, which situates environmental change within long-standing histories of colonialism, capitalist development, and state formation (Robbins 2011; Nixon 2011). Political ecology also reveals how adaptation policies, especially those driven by donor agendas or national development plans, often impose models that are ill-suited to local realities. In Magude, such tensions emerge when top-down interventions fail to align with local land-use patterns, gendered labour divisions, or customary forms of authority. Political ecology thus allows this thesis to link the micro-level experiences of adaptation to macro-level structures of inequality.

This intersection is particularly salient in contexts like Magude, where donor and state driven adaptation programmes frequently adopt technocratic orientations that marginalise the situated expertise of local actors. Artur and Hilhorst (2012) demonstrate that externally designed adaptation initiatives in Mozambique are often shaped by hierarchical assumptions about who holds knowledge, thereby reproducing inequalities and limiting local agency. Similarly, Osbahr et al. (2008) and Eriksen and Silva (2009) show that adaptation practices in southern Mozambique frequently overlook gendered divisions of labour and the central role of women in sustaining household and community resilience. Djoudi et al. (2016) further highlight the dangers of gender-blind adaptation, where women are treated as a uniform category and their differentiated roles, responsibilities, and vulnerabilities are ignored. This research uses climate justice to unpack such blind spots, emphasising the need to understand gender not as a fixed identity but as a relational position within broader hierarchies of power and resource access.

Moreover, the perspective of climate justice challenges representations of vulnerable communities as passive victims or recipients of aid. In line with Anguelovski and Martínez Alier's (2014) notion of the "environmentalism of the poor," this thesis highlights how communities in Magude engage in everyday acts of resistance and negotiation, whether through collective water-sharing practices, innovative farming techniques, or strategic cattle herding. These actions are not merely pragmatic responses; they are also claims to dignity, autonomy, and continuity, shaped by memory, identity, and aspirations for the future. Much like the Sarayaku's defence of Sumak Allpa

in Ecuador (Anguelovski and Martínez Alier 2014), Magude residents articulate resilience and adaptation as inherently political acts, deeply entangled with land rights, belonging, and generational futures.

In this thesis, climate justice functions not as a normative horizon but as a critical methodological tool. It reveals how adaptation and resilience efforts are shaped by intersecting inequalities – of class, gender, generation, and geography – and how these processes are often directed by actors distant from the communities they affect. Climate justice also calls for a decolonial approach to knowledge, where inclusion means valuing and sharing power with different systems of knowledge, not just inviting people to the table.

In this view, local actors in Magude are not merely data sources or passive beneficiaries; they are knowledge holders, political subjects, and rights-bearers whose perspectives must inform adaptation processes at every level (Sultana 2022; Whyte 2017). In sum, integrating climate justice with political ecology, adaptation, and local knowledge provides a more grounded, relational, and historically conscious understanding of how climate change is experienced and contested. In the context of Magude, it enables an analysis that extends beyond technical fixes to examine the social and political conditions that render some lives more precarious and others more protected. This approach challenges dominant models of adaptation by centring justice, accountability, and the right to remain visible and valued in a rapidly changing world.

Taken together, adaptation, resilience, local knowledge, and climate justice form the core analytical framework of this thesis. Rather than treating these concepts as abstract or universal, this study approaches them as situated, contested, and deeply entangled with histories of power, marginalisation, and resistance. Adaptation is viewed not simply as a set of technical adjustments to climate change but as a socially embedded and culturally mediated process shaped by structural constraints and local agency. Resilience is understood as a dynamic and political capacity, not just to recover from shocks but to challenge the conditions that produce vulnerability in the first place. Local knowledge is analysed as a living system of meaning-making that contests dominant epistemologies and offers grounded alternatives to technocratic adaptation. Climate justice ties these perspectives together by asking who is affected, who decides, and whose knowledge counts, foregrounding the moral and political stakes of climate response.

These theoretical frameworks guide the research's ethnographic and analytical choices. It informs not only how fieldwork was designed and conducted in Magude but also how findings are interpreted, with attention to

social difference, power asymmetries, and the broader political economy of rural Mozambique.

Structure of the Thesis

This thesis, in addition to this introduction, is structured into six chapters, each addressing distinct yet interconnected aspects of how climate change is reshaping livelihoods and cultural life in Magude. The structure is designed to gradually build an in-depth understanding of the research problem, situating the district's socio-environmental dynamics while tracing the multiple dimensions of adaptation, resistance, and negotiation within local communities.

Chapter Two, "Contextualising Magude: Geography, History, and Society," provides the necessary background to the district, covering its geographical features, history, demographics, and sociocultural dynamics. By examining the physical landscape, historical trajectories, economic activities, and migration patterns, this chapter establishes the broader context for understanding the environmental and social challenges that underpin local experiences of climate change in Magude.

Chapter Three, "Local Cosmologies and the Politics of Climate Adaptation in Magude," explores how communities interpret climate variability through ancestral rituals, moral reasoning, and religious beliefs. It analyses the role of rituals, seasonal ceremonies, and Christian interpretations of climate change in shaping local understandings of droughts, floods, and ecological crises. The chapter also examines the tensions between these cosmologies and state-led adaptation programmes, highlighting an epistemological gap between local knowledge and technocratic frameworks.

Chapter Four, "Agriculture and Climate Change Adaptation in Magude," investigates how recurrent droughts, erratic rainfall, and pest outbreaks undermine food production and rural livelihoods. It documents local adaptation strategies, such as flexible planting schedules, crop diversification, seed exchanges, and small-scale irrigation, while also examining how structural inequalities surrounding land and gender constrain their effectiveness. The chapter situates agriculture as a central site where resilience, experimentation, and inequality converge under changing climatic conditions.

Chapter Five, "Livestock: Magude, 'The King of Cows'," analyses the cultural, economic, and symbolic significance of cattle in the district. It illustrates how climate change has exacerbated the challenges of water scarcity, disease outbreaks, and pasture decline, threatening both herds and

the rituals that sustain them. The chapter highlights resilience practices, such as nocturnal grazing, dipping associations, and the renegotiation of gender and generational roles, while also revealing how smallholders are disproportionately affected compared to wealthier ranchers. Livestock thus emerges as a key arena where adaptation is both cultural and political but also constrained by structural inequalities.

Chapter Six, "Adapting to a Changing Environment: Small Business, Charcoaling, and Fishing," examines the rise of extractive and alternative livelihoods as coping strategies in the face of agricultural and pastoral decline. It analyses the expansion of charcoal production and fishing, exploring their economic importance, gendered and generational dynamics, and ecological costs. The chapter highlights how these activities provide short-term survival but also deepen deforestation, resource conflict, and inequality, creating a vicious cycle of resilience and vulnerability.

Chapter Seven, "'Magude Isn't Like It Used to Be'," is the conclusion. It synthesises the central findings of the study, bringing together insights from the empirical chapters to show how climate change is reshaping livelihoods, identities, and cultural life in Magude. The chapter examines the epistemological and structural dimensions of adaptation, emphasising the importance of incorporating local knowledge and climate justice into governance frameworks. Finally, it situates the thesis within the broader field of climate change anthropology and identifies avenues for future research.

Together, these chapters contribute to a holistic understanding of how climate change is experienced in Magude, while tracing the complex interactions between local practices, national policies, and global discourses in shaping environmental and livelihood outcomes.

Chapter 2: Contextualizing Magude: Geography, History, and Society

The district of Magude, situated in Mozambique's southern province of Maputo, presents a complex and dynamic sociocultural landscape shaped by its rich historical trajectory and distinctive local practices. Over the years, the population of Magude has experienced profound transformations resulting from a combination of colonial legacies, protracted armed conflicts, shifting migration patterns, uneven economic development, and the changing presence and policies of the state. These processes have not only altered the district's demographic composition but have also influenced land use, gender relations, and the organisation of daily life. This chapter provides a comprehensive overview of Magude, starting with its historical background and proceeding to a discussion of its geographic and climatic features as well as its demographic profile. It further explores key sociocultural dynamics that are crucial to understanding life in the district today, particularly land tenure systems, gender relations, and the enduring impact of internal and cross-border migration. By tracing these interconnected dimensions, the chapter seeks to illuminate the broader structural forces and local strategies that shape everyday resilience and adaptation in Magude.

Location and Climate

The district of Magude is situated in the north-eastern part of Maputo Province, positioned at latitude 26° 02' 00" South and longitude 26° 17' 00" East. The district lies approximately 150 kilometres from Maputo City, the capital of Mozambique, which means that the roads and other infrastructure are fairly good. Although Magude is relatively accessible from the capital, it is distinctly rural. Magude is geographically bounded by several neighbouring regions. To the north, it shares borders with Gaza Province, specifically the districts of Massingir, Chókwè, and Bilene. To the south, it is bordered by Moamba District, while to the southeast, it adjoins the Manhiça District. To the west, it is bordered by the South African Republic, highlighting its strategic location near an international boundary.

The district of Magude covers an area of 6,961 square kilometres and is divided into five administrative posts: Magude-sede, Mapulanguene, Panjane, Mahel, and Motaze. Magude-sede serves as the district headquarters and is the most urbanised area, hosting all major state services, including the district government building and the Administrator's palace. This central hub contrasts sharply with the other administrative posts, which are predominantly rural. These rural areas are characterised by a forest-savanna mosaic, scattered settlements, and simple wooden housing structures, with only a minority of houses built from more durable materials such as brick and cement.

In the rural regions, the majority of the population are small-scale farmers. Their houses are typically located along roadsides and are surrounded by small vegetable gardens in the backyards and granaries for storing crops. These communities often lack access to basic infrastructure such as electricity and piped water. Instead, energy is primarily sourced from solar panels while water is obtained from wells or dams, reflecting the resourcefulness of the residents in meeting their daily needs. The infrastructure in these rural areas (as in other areas in Mozambique) is basic, stressing the government's relatively small involvement in services. Roads are predominantly unpaved, with some being sandy and others composed of clayey soil, making transportation challenging, particularly during the rainy season. The lack of proper road networks affects the accessibility and availability of basic services, such as healthcare, education, and access to markets, further exacerbating the socio-economic challenges faced by these communities.

According to the Köppen climate classification, the Magude District is characterised by a dry sub-tropical climate. Official data indicate that the district's average annual temperature ranges between 22ºC and 24ºC, while the annual precipitation varies between 600 and 800 mm (MAE, 2005). These historical figures contrast with more recent and updated data obtained from the CHIRPS platform (Figure 2), which indicate that the average temperature in the district from 1990 to 2020 ranged from 29.3°C to 31.3°C. These findings suggest that the district has become markedly warmer in recent years. Both sources point toward a general trend of warming in the district in recent decades.

Figure 1. Location of Magude District (Drawn by Cesar Mahumane)

The southern region of the country, where Magude is located, is predominantly marked by arid and semi-arid climates. However, the district exhibits significant climatic variability. In the southern part of the district, specifically in the town of Magude, the climate is classified as sub-humid to sub-arid. As one moves northwest within the district, the climate progressively becomes drier, adopting semi-arid characteristics. In addition to this spatial variability,

the district is also marked by high interannual rainfall fluctuations, with alternating decadal dry and wet phases, strongly shaped by broader climatic phenomena such as El Niño and La Niña, as discussed in the introduction (World Bank 2017; Nicholson 2014; Tadross et al. 2009; Reason et al. 2006).

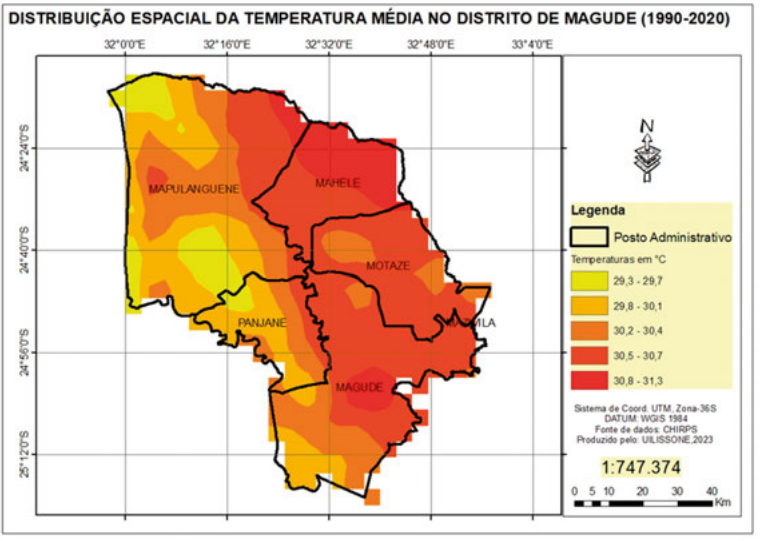

Figure 2. Average temperature in Magude District, 1990–2020 (Source: CHIRPS, Sérgio Ulissone)

Magude's climate regime is characterised by two well-defined seasons. The first is a hot and rainy season, extending from October to May, during which the district receives most of its annual rainfall. This period is essential for agriculture and the replenishment of water resources in the region. The second season is cool and dry, occurring from April to September, marked by milder temperatures and low levels of precipitation, directly influencing agricultural activities and water supply.

Demography

The population profile of Magude District reflects both the long-term impacts of historical conflict and more recent demographic trends. According to Jornal Notícias (6 October 1986), between 1984 and 1986 the district had an estimated population of about 100,000 people. This population, however, declined drastically due to the effects of the civil-war, falling to fewer than 20,000 inhabitants (Jornal Domingo, 25 February 1990). In the post-conflict period, particularly from the early 2000s onward, the district began to slowly recover demographically. Between 2017 and 2024, the population increased

from 64,147 to an estimated 83,897 (INE 2023). Despite this growth, Magude continues to have a relatively low population density (recorded at 9.6 inhabitants per square kilometre in 2021) well below the provincial average of 88.4 inhabitants/km² (INE 2023).

In terms of age structure, statistics from the district (INE 2022, 2023) show that the population of Magude is relatively young, with a large proportion of children and adolescents. In 2021, the 0–14 age group represented about 35% of the total population. The population pyramid for Magude has a broad base, due to the high proportion of youth, and a narrow apex, due to the small proportion of elderly individuals. Gender distribution is nearly balanced, with a slight predominance of males. In 2021, there were 39,835 men and 35,175 women. Literacy remains a significant challenge in the district. The illiteracy rate stood at 30.6% in 2021, considerably higher than the provincial average of 12.5%, underscoring substantial barriers to educational access and attainment (INE 2022).

Magude is predominantly a rural district with a traditional family structure that includes a significant presence of extended households. According to the 2017 Census (INE 2022), the district recorded a total of 13,883 households, with an average size of approximately 4.5 members. However, reviewing the internal composition of these households reveals a more complex picture. Medium-sized households (with four to six members) were the most common, totalling 1,940 households with four members, 1,837 with five, and 1,580 with six. There was also a notable number of large households, with 807 consisting of 10 or more members, reflecting the enduring role of extended family arrangements, where multiple generations and kin often cohabit under one roof (see Table 2).

2007 Census (ha)	**2017 Census**				
	Population (ha)	**Age 0–19**	**Age 20–59**	**Age 60+**	**Growth %**
53,221	62,297	33,456	24,005	4,836	17

Table 1. Population of Magude District (Source: INE 2018)

In addition to extended households, there were 2,964 nuclear households with children and 2,275 single-person households. Female-headed single-parent households (1,635) were significantly more common than male-headed ones (165), pointing to a trend of women-led families. The diversity in household configurations, from large multigenerational households to single-person ones, suggests that Magude's family structure is shaped by a variety of socio-economic and cultural factors, including male migration to urban areas or to

South Africa, the absence of paternal figures, widowhood, economic hardship, and environmental pressures

DISTRICT AND RESIDENCE AREA	TOTAL	HOUSEHOLD NUMBER								
		1	2	3	4	5	6	7	8	9
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
TOTAL OF PROVINCE	452,051	59,322	54,857	70,204	81,701	71,502	53,342	24,829	14,876	8,611
URBAN	314,215	35,757	36,461	48,979	57,997	51,687	38,877	17,955	10,884	6,342
RURAL	137,836	23,565	18,396	21,225	23,704	19,815	14,465	6,874	3,992	2,269
DISTRICT OF MAGUDE	13,883	2,342	1,665	1,851	1,940	1,837	1,580	861	587	413

Table 2. Household number (Source: INE 2022)

These patterns highlight the complexity of family dynamics in Magude, where extended and nuclear households coexist alongside a significant presence of female-headed families and single-person households. The persistence of extended households is particularly notable in rural areas (INE 2022), where they serve as vital support networks in the face of limited access to formal services and ongoing economic challenges.

History of the District

Early History

The early history of the area now constituting Magude District is deeply embedded within broader regional trajectories of settlement, production, and exchange in southern Africa. Archaeological evidence establishes the emergence of agro-pastoralism in the region by the first centuries AD (Huffman 2007; Morais 1988; Sinclair et al. 1993; Russell et al. 2014; Lander and Russell 2018; Mitchell 2024:241–248). These early farming communities developed through complex interactions with indigenous hunter-gatherer populations, pointing to a long-standing pattern of coexistence and socio-cultural entanglement (Kohtamäki 2014).

From approximately 900 AD, southern Africa saw the rise of increasingly centralised political formations, notably on the Zimbabwe Plateau, in the Limpopo Valley, and along long the coast of Inhambane (Huffman 2007; Macamo 2006:149–159). Magude has not been excavated or explicitly linked to these polities, but its geographical location suggests it was integrated into wider spheres of economic and political interaction. The cattle economy functioned as a principal driver of this integration, underpinning mobility, facilitating exchange, and signifying social status across the region (Pwiti 1996).

These inland developments were increasingly connected to burgeoning maritime networks. From the late 15th century, Portuguese maritime activity along the Mozambican coast established trading posts that linked the hinterland to transoceanic circuits of goods, people, and ideas. This commercial presence intensified during the 18th century with the arrival of Dutch, Austrian, and British traders, particularly around Delagoa Bay (Newitt 1995). Although early colonial accounts again omit direct reference to Magude, it is highly probable that commodities and influences from this coastal trade filtered into the interior, gradually reshaping local economies and social structures.

This early history demonstrates that Magude should not be viewed as an isolated peripheral area but as part of a dynamic and interconnected landscape characterised by evolving patterns of production, circulation, and political authority, which emerged long before the formal imposition of colonial administration.

The Gaza State

Beginning in 1818, Shaka Zulu, the Zulu king who had consolidated power in the region of present-day KwaZulu-Natal in South Africa, initiated a series of military campaigns that led to the conquest of several local kingdoms, prompting the displacement of numerous groups. Among those fleeing was the Nguni group led by Soshangane, who migrated northward into Mozambican territory. They initially settled in the area of Lourenço Marques (between 1822 and 1827) before expanding further north and establishing the Gaza State. At its height, the territory of Gaza extended from Maputo Bay to the Zambezi River, encompassing large parts of what are now the provinces of Maputo, Gaza, Inhambane, Manica, and Sofala.

Following Soshangane's death in 1858, the Gaza State was engulfed in a prolonged and violent succession struggle that lasted nearly a decade. The conflict pitted his sons Mawewe and Umzila (also referred to as Mauheue and Muzila) against each other. Mawewe, the son of a Swazi wife, asserted his claim to power by killing and expelling his brothers and forming a strategic alliance with Mswati, the king of Swaziland. This alliance reinforced the influence of the Nguni people across the southern Mozambican plains. While Mawewe received some support from Portuguese traders based in Inhambane, he failed to gain the backing of Portuguese authorities in Lourenço Marques or of British officials in Natal (Newitt 1995:295). Despite Mawewe's initial advantage, Umzila was seen as holding a stronger claim to the throne, given his prior administrative experience. Soshangane had entrusted him with governing the territory between the Save and Zambezi rivers, where he had

maintained effective control for nearly twenty years (Ferreira 1982:187–188). Umzila eventually emerged victorious in the civil war and consolidated his rule over Gaza.

These events had ramifications on the Magude are as its founder became embroiled in the dispute. In 1861, Magudzo, already a sovereign leader in his own right, took advantage of the internal conflict by aligning himself with Umzila and pledging loyalty to him. In recognition of this support, Umzila later appointed Magudzo to govern the region of Vecha (also known as Spelonken) in present-day northern South Africa. However, Magudzo grew dissatisfied with life there and sought permission from Umzila to return and oversee his ancestral lands. He first settled in the Magul hills, later relocating to a nearby village that he named after himself – Magudzo (Ferreira 1982:189). Over time, the region came to be known as the land of King Magudzo. According to oral tradition, when Portuguese officials arrived, they struggled to pronounce "Magudzo" correctly and instead referred to the area as "Magude," a name that has persisted to the present day (INE 2005).

Colonial Legacies and the Struggle for Independence

In the late 19th and early 20th centuries, Mozambique was fully incorporated into the Portuguese colonial system. In districts like Magude, this integration was manifested through compulsory labour regimes, the imposition of head taxes, and the large-scale recruitment of migrant labour for South African mines. These policies systematically undermined local production systems and inextricably bound households to regional labour markets and remittance economies (Newitt 1995; Newitt 2017:119–146). Portuguese authority was exercised through a dual system of governance, combining a sparse network of administrative posts with the co-option of African chiefs (*régulos)*, a structure that profoundly shaped the character of everyday political life (Newitt 2017; Rita-Ferreira 1982).

By the 1950s, nationalist sentiment had coalesced, fuelled by long-standing grievances over forced labour (*chibalo*), systemic racial discrimination, and political exclusion. This mobilisation was further galvanized by the wave of decolonisation sweeping across Africa. In 1962, several clandestine groups consolidated to form the *Frente de Libertação de Moçambique* (FRELIMO), which initiated an armed struggle for liberation two years later. Although the insurgency was primarily concentrated in the northern provinces, FRELIMO leveraged crucial international solidarity and material support from newly independent African states (Funada-Classen 2012:2–5; Newitt 2017:147–172).

The protracted and costly colonial wars in Africa ultimately exhausted Portugal's authoritarian Estado Novo regime. The 1974 Carnation Revolution overthrew the dictatorship, precipitating negotiations with African nationalist movements. This culminated in Mozambique's independence on 25 June 1975, with Frelimo ascending to power as the governing party (Funada-Classen 2012; Newitt 1995).

The post-independence period was characterized by an ambitious state-building project under Frelimo's socialist leadership. Land was nationalized, communal villages were promoted to reorganize rural production, and the government launched extensive health and education campaigns to overcome the legacies of colonial neglect. However, the nascent state inherited a fragile economy, acute shortages of skilled personnel, and profound tensions between its centralised policies and diverse local realities. These internal contradictions, compounded by active external destabilisation by Rhodesia and apartheid South Africa, created fertile ground for armed opposition. By 1977, Mozambique was engulfed in a devastating civil war between the Frelimo government and the Resistência Nacional Moçambicana (RENAMO), a conflict that would endure for 15 years and exact a catastrophic human and economic toll (Funada-Classen 2012; Newitt 2017).

People

The Magude district is predominantly inhabited by the Tsonga-Changana language group, a language group which was formed by amalgamation of many languages and groups. Following the establishment of the Gaza Empire (1821–1897), historians and scholars began referring to the populations of southern Mozambique collectively as "Tsongas." The term was popularised by the Swiss missionary Henri Junod in his monograph *Usos e Costumes dos Bantos* (1996 [1974]) to describe the populations along the Save River. According to Guerra Hernandez (2015), citing the Tsonga Grammatical Dictionary, the term "Tsonga" (Ithonga, pl. Amathonga) historically referred to a vassal or member of a subjugated tribe. It was once used pejoratively by the Nguni invaders to indicate a subordinate social status, often associated with roles such as trade slaves or vassals with tax obligations (Harries 1994, 2007:156–176). This reflected the social hierarchies shaped by domestic slavery and power dynamics in the region during that period. However, the term later became appropriated as a positive label of Tsonga-Changana identity.

Today, the so-called "Tsonga" groups are socially and spatially differentiated into five groups: Ronga, Changana, Chope, Tshwa, and

(Bi)tonga. The Ronga, Bitonga, and Chope groups maintained relative autonomy and non-submission to Nguni domination. In contrast, the Changana and Tshwa groups emerged from the influence of Nguni interventions south of the Save River (Hernandez 2015). The term "(va)Tshwa" was used by the Portuguese to describe groups that assimilated Nguni social and cultural forms. The name "Changana" is attributed to the limited resistance offered by these groups to their Nguni conquerors, especially to King Sochangane/Manicusse, the founder of the Gaza State. The term "Changana" is mythically believed to be derived from Sochangane's name and came to designate populations between the Inkomati and Save rivers who were subjected to the Gaza monarchs, excluding the Chope, Bitongas, and Tshwa peoples (Litsure 2020:56).

Historically, the Changana people have been widespread across the present-day Gaza Province. For many years, the district of Magude was administratively part of Gaza until Decree No. 80/1970 of 23 February, which transferred the Council of Magude from Gaza to Lourenço Marques. Since that administrative change, Magude has belonged to Maputo Province. Today, the district remains predominantly inhabited by the Changana people, with Xi-Changana being the most widely spoken language.

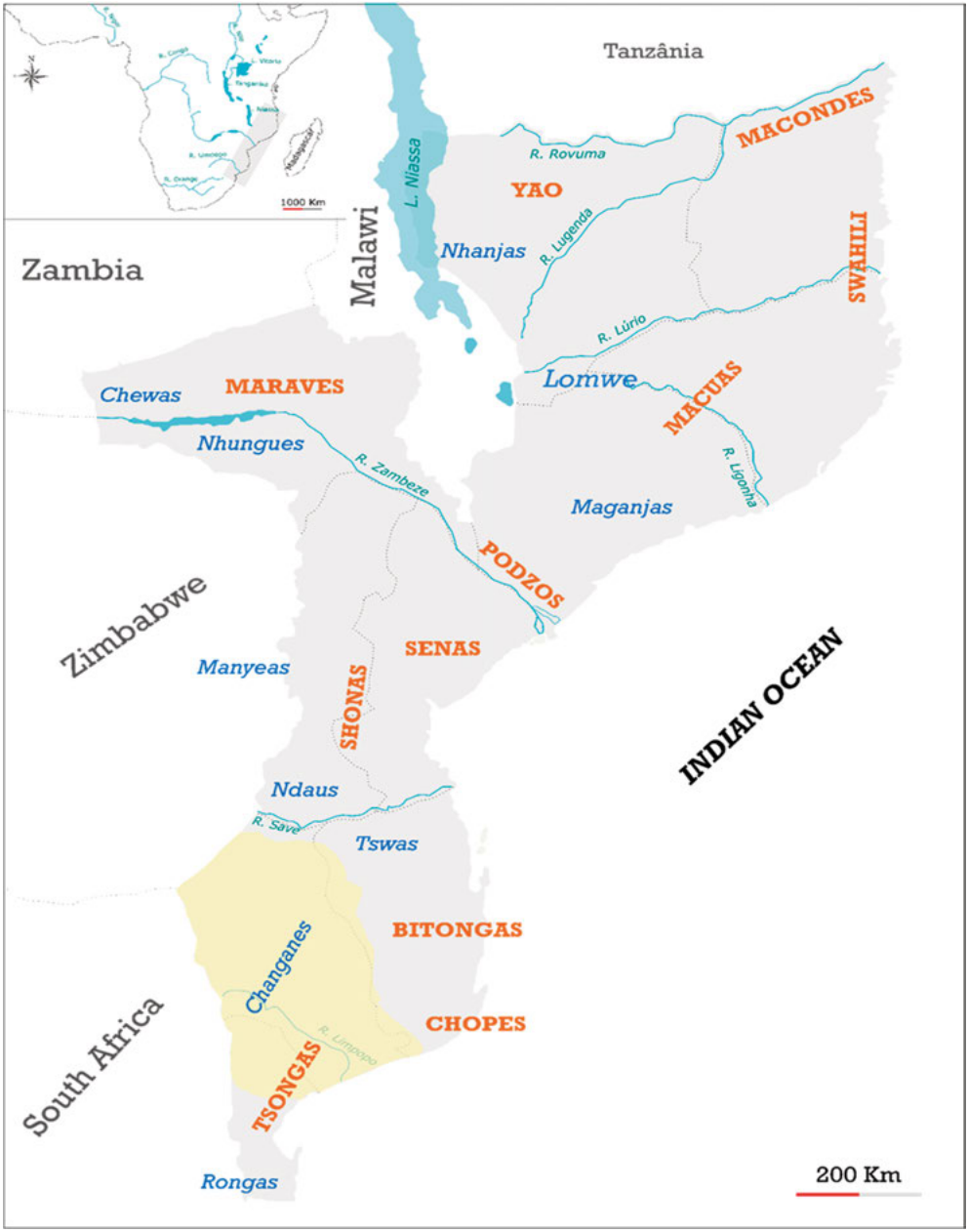

Figure 3. Distribution of the Changana ethnic group (Drawn by Cesar Mahumane)

Gender and Household Relations

The Changana speaking people of Magude, like all Tsonga groups, follow a patrilineal system in which lineage, inheritance, and family identity are traced through the male line (Newitt 1995). This form of descent, however, should not be equated with an all-encompassing patriarchy. Women occupy central roles in household economies, ritual life, and kinship negotiations, and their authority coexists with male-based descent structures. The kinship system nevertheless exerts a profound influence on social organisation, marriage practices, and family dynamics. In traditional marriages (*lobola*), children are affiliated with the father's family, and the paternal line determines their surname, family rights, and inheritance. This arrangement channels wealth, property, and social status through the paternal line, reinforcing male authority and continuity. Succession in property, leadership, and family responsibilities is most often passed from father to son, sustaining male-centred patterns of inheritance (Bagnol 2008; Arnfred 2015).

Marriage in Magude is predominantly patrilocal. Upon marriage, women move to their husband's household, integrating into his family. The *lobola* system, involving the transfer of goods, livestock, or money from the groom's family to the bride's family, formalises the marriage (Furquim 2016). This practice not only secures the groom's family's rights over the bride's domestic and reproductive contributions but also reinforces inter-family alliances. Although deeply symbolic, reflecting respect, commitment, and unity of familial lineages, *lobola* also serves as a form of social security for the bride's family (Arnfred 2015; Furquim 2016).

Patrilocal residence strengthens the male-dominated lineage, ensuring that children are raised within the paternal family framework. Additionally, the *lobola* system defines marital legitimacy. High *lobola* payments, often made in cattle, and the tradition of children belonging to the husband's lineage create significant barriers for women seeking divorce. As Arnaldo (2004) observes, divorce is more difficult among Tsonga patrilineal groups compared to matrilineal societies in northern Mozambique. The requirement that a divorced woman's family return the *lobola* poses a substantial challenge, particularly for households with limited resources, as they may struggle to repay the bride wealth (Rachide 2017). This dependency becomes especially constraining when husbands migrate for work and cease communication, leaving women in precarious situations without the means to dissolve the marriage (Rachide 2017).

While the *lobola* system continues to shape marriage practices and gender relations, it is also undergoing change. There has been a gradual decline in *lobola* practices, with many couples opting for cohabitation without *lobola* or

formal marriage, which has contributed to increased autonomy for women. Based on my field observations and interviews, many couples today choose to live together without initially performing the *lobola* ceremony due to its high costs. In these cases, the man often expresses a commitment to fulfilling the *lobola* arrangement once his financial situation improves (at times it becomes a lifelong promise that sometimes remains unfulfilled).

Marriage in Magude also has important economic implications. It expands the household workforce, with wives and children contributing to agricultural production and domestic duties. In polygynous households, this dynamic is further amplified, as the presence of multiple wives enables a more effective division of labour. This allows families to cultivate larger fields, manage more livestock, and diversify their agricultural activities. These are all crucial strategies for coping with climate-related shocks, such as drought. As Notelid and Ekblom (2021) argue, larger family units are better positioned structurally to accumulate and store wealth, which contributes directly to greater resilience. Conversely, smaller households, particularly those headed by widows with limited support networks, are disproportionately vulnerable, often lacking the labour capacity and material assets required to sustain livelihoods in stressful conditions.

Polygyny is prevalent, driven by both cultural traditions and economic incentives. Wealthier men, capable of paying *lobola* for multiple wives, gain social prestige and economic advantage. Having multiple wives not only symbolises masculinity but also enhances social status and community respect (Rosário 2008). A local chief, whom I interviewed about family structure, shared with me his general view on marriage: "A man with only one wife is not considered man enough here." This perspective, stemming from a social figure of importance in the village, emphasises the role of marriage as a norm in reinforcing male authority and social hierarchy.

Having multiple wives in Magude is not only a source of social prestige but also a symbol of economic strength. Wealthier men are more likely to engage in polygyny because they can afford to pay *lobola* for several wives and ensure financial stability for their extended families. For example, Ngovene, a former mine worker in the Rand (South Africa), is now one of the most prominent cattle breeders in Pajane and holds considerable regional influence. He has five wives, two in Magude and three in South Africa, and is the father of 15 children. He explained his marital choices by stressing a similar sentiment as the above-quoted chief: "Here in Magude, if you want to take part in important decision-making meetings with others, you need to have at least two wives."

Another key aspect of gender dynamics in Magude is the concept of the *munumuzana* (the head of the household), the man who is recognised as

holding primary authority within the household. A man who owns his home, has a wife for whom *lobola* has been paid, and has children is seen as accomplished and earns the title of *munumuzana*. As the head of the household, he is the one who makes final decisions and whose word carries unquestioned authority.

This status is closely tied to respect and service from his wife, who is expected to perform domestic tasks as acts of submission and reverence. In everyday life, this may include greeting him formally, preparing meals, or attending to his personal needs, all as visible expressions of respect. When asked to define a *munumuzana*, one woman described him as follows:

> He is the head, he is the man of the house, he is that man in whom everything he does must be respected, must be treated like a king, with all due respect. There is no other person above him. He is the husband or father of the house.

This definition reflects the deeply rooted patriarchal values within household structures, where masculinity is affirmed through authority, provision, and public recognition. This figure is often respected but also seen as authoritarian and sometimes sexist. His authority is particularly visible in the gendered expectations placed on women. For example, it is customary for the wife to prepare a bucket of hot water for the husband to bathe in the early morning, to greet him formally, and to serve his food while kneeling, an act seen as a sign of deep respect. I witnessed these practices first hand, especially in the more rural areas of inner Magude, where women and even children kneel when speaking to the *munumuzana*, whether he is the husband or the father, further underlining his central role as head of the family.

Domestic chores in Magude remain strongly gendered, with men traditionally abstaining from household tasks, which are viewed as the domain of women. However, attitudes are shifting, particularly among younger generations and in more urbanised areas such as Magude-sede. Jossefa, a young male agricultural technician, shared his personal struggle with these traditional expectations. Although he is willing to participate in domestic tasks, such as bathing his daughter, his actions have been met with disapproval from his family. His experience highlights the tension between entrenched gender norms and the gradual evolution of gender roles, as younger individuals begin to challenge long-standing cultural expectations in favour of more equitable domestic partnerships.

Women in Magude also express shifting attitudes. Dércia, a 21-year-old woman, acknowledged the importance of respecting her husband but emphasised changing norms: “We are entering a phase of civilisation. At some

point, my husband must listen to me." Her husband, influenced by experiences in Maputo, shares household responsibilities, challenging traditional gender expectations. Despite these changes, community resistance persists. Some neighbours criticised Dércia's husband for performing domestic tasks, reflecting lingering traditional attitudes. Nonetheless, in places like Magude-sede, where external influences converge, there is a gradual erosion of rigid gender roles, contrasting with the more conservative interior regions.

Overall, gender and household relations in Magude reveal a complex interplay between tradition and change. While patriarchal norms continue to shape societal expectations, emerging shifts in social practices and roles suggest a gradual redefinition of gender roles, especially among younger generations and urban populations.

Key Economic Activities in Magude

The district of Magude has an economy predominantly based on subsistence agriculture and livestock farming. Agriculture remains the principal economic activity, with local households primarily cultivating maize, peanuts, beans, cassava, sesame, and sweet potatoes. These crops are mainly grown for household consumption, with surplus produce sold in local markets. Most families work on small plots of land, typically less than one hectare, using traditional farming methods that rely on manual labour and animal traction. While low levels of mechanisation can constrain productivity and limit opportunities for scaling up, they may also offer certain adaptive advantages by reducing dependency on external inputs such as fuel, machinery, and credit (Scoones 1998; de Schutter 2010). In this context, vulnerability to climate shocks cannot be attributed solely to the absence of mechanisation, as more intensive systems may also introduce new forms of risk, particularly when support infrastructure is weak or unevenly accessible. A detailed discussion focusing on agricultural practices will follow in Chapter Four.

In addition to crop production, livestock farming constitutes a vital pillar of the local economy. Magude is the largest cattle-producing district in the province, with an estimated 102,384 head of livestock, the vast majority of which are held by smallholder households (INE 2023). Cattle serve not only as a key economic asset, providing meat, milk, and draft power, but also function as a cultural marker of wealth, prestige, and social identity. Households furthermore rear goats, sheep, pigs, and poultry, which contribute to dietary diversity, income generation, and broader household food security. A detailed discussion of livestock production will follow in Chapter Five.

Despite the significance of these agricultural activities, the district faces several challenges, including vulnerability to extreme weather events such as droughts and floods, the main theme of this dissertation. Conflicts related to land ownership also pose obstacles to agricultural expansion and investment. The lack of clearly defined land rights often leads to disputes, hindering the development of sustainable agricultural practices. Natural resources play a significant role in the local economy. The exploitation of firewood and charcoal remains a primary source of domestic energy for the majority of households (GDM 2020). However, this activity is not without environmental costs, as it contributes to deforestation and soil erosion, gradually degrading the land's productivity (Sitoe et al. 2012). The sale of wood and charcoal is an essential source of income, especially for families living in more remote areas. Additionally, fishing in the Incomáti River provides a complementary source of food and income. Fish, such as tilapia, are an important component of the local diet, although the sustainability of fishing practices is often challenged by fluctuating water levels and environmental degradation (GDM 2023; SDAE 2022). Both the production of charcoal and the economy of fishing will be discussed in Chapter Six.

Informal trade is the predominant form of commerce within the district. It is characterised by the sale of firewood, charcoal, vegetables, and artisanal drinks made from sugarcane in local markets (GDM 2023). However, the absence of a formalised marketing chain limits the potential for growth and reduces profitability for small-scale traders. Furthermore, limited access to market information, such as price trends, buyer demand, and regulatory requirements, prevents traders from making informed decisions. As Notelid and Ekblom (2021) observe, these factors collectively constrain rural local economic development and undermine the potential for livelihood transformation.

While carpentry, metalwork, pottery, and the artisanal production of beverages support local livelihoods, they remain limited in scale and are hindered by a lack of capital and modern equipment. The Xinavane Sugar Company has played an important role in stimulating sugarcane cultivation in the district through its commercial engagement with local farmers (O'Laughlin and Ibraimo 2023). By purchasing sugarcane from smallholders and offering seasonal employment, the company has contributed to income diversification and encouraged the growth of family-based sugarcane farming (Joaquim et al. 2022).

Weak infrastructure and limited basic services directly limit market opportunities in Magude. The district's 806 kilometres of roads are unpaved and poorly maintained, and during the rainy season many routes become

impassable. This isolates farmers from local markets, delays the sale of perishable goods, and increases transport costs for traders. Rail connections for both cargo and passengers are limited and unreliable, hindering the movement of bulk commodities such as sugarcane and charcoal. Irregular access to Maputo, the main provincial market, prevents producers from benefiting from better prices and stronger demand in the capital. Electricity supply further illustrates these barriers: power is available only in the district headquarters, forcing most rural households to depend on firewood and charcoal. This reliance not only increases household labour burdens but also fuels deforestation and constrains opportunities for small-scale agro-processing or other energy-dependent businesses. Limited and unreliable energy access thus restricts value addition, job creation, and the diversification of local economies.

These livelihood sources are increasingly under pressure from multiple economic challenges. Agriculture remains highly dependent on rainfall, so droughts and floods often wipe out harvests and reduce household food and income security. With little economic diversification, most families rely on farming, livestock, charcoal production, and informal trade, leaving them exposed to both climate and market shocks. Land conflicts discourage long-term investment in agriculture, while deforestation from charcoal production and farmland expansion erodes soil fertility and depletes wild resources. Poor infrastructure, especially roads that become impassable in the rainy season, restricts trade and raises costs. Limited access to formal credit further constrains investment in farming and small enterprises, narrowing opportunities for economic growth.

Land Ownership in Contemporary Magude

Land ownership in Magude has long been central to livelihoods, kinship, and authority, shaped over time by customary systems as well as by the disruptions of colonialism, socialism, and war. Today, it remains the foundation of agricultural production and livestock rearing, with the availability and security of tenure directly influencing community resilience. Climatic events such as prolonged droughts and recurrent floods now intersect with these historical legacies, reshaping land-use patterns and local perceptions of rights. To understand how these dynamics play out in Magude today, it is necessary to situate them within the broader national framework of land tenure.

National Land Tenure Framework

The history of land tenure in Magude reflects broader national shifts shaped by colonialism, socialism, and post-war reconstruction. Under Portuguese colonial rule, land was declared state property, displacing local communities and marginalising traditional authorities. Large tracts were allocated to settlers and plantation owners, while customary leaders were replaced with colonial appointees lacking legitimacy (Chilundo et al. 2005; Newitt 1995). This undermined customary land governance, subjecting communities to exploitative labour conditions and restricting access to ancestral lands (Myers et al. 1994).

After independence in 1975, land was made state-owned under a socialist model that promoted cooperatives and communal villages. Rather than regaining access to land, however, many rural communities experienced continued dispossession and exclusion from state agricultural schemes (Covane 2001; Hermele 1988). Traditional leaders, seen as remnants of colonial indirect rule (Florêncio 2008), were further sidelined, deepening the disconnect between state-led governance and local land practices. The 1978–1992 civil war worsened land insecurity, causing displacement and contested claims among returnees and wartime settlers. Economic liberalization and growing investor interest intensified competition over land, revealing the inadequacy of existing frameworks (Covane 2001).

In response, the 1997 Land Law (Law 19/1997) introduced significant reforms. It recognised customary tenure as legally valid, gave traditional leaders a formal role in land administration and local decision-making (Gonçalves 2006; Peters 2004), and allowed for community land demarcation (*delimitação comunitária*). It also guaranteed women's equal land rights and established three routes for obtaining land-use rights (DUATs): customary occupation, good-faith occupation, and state allocation (Tanner 2002; Filipe and Norfolk 2017). These provisions aimed to reconcile state authority with local realities and foster inclusive development.

Despite its progressive design, the 1997 Land Law has faced significant implementation challenges in rural areas, such as Magude. Limited institutional capacity, low legal literacy, and scarce resources hinder land registration efforts, leaving most residents reliant on customary systems mediated by traditional leaders (Tanner 2010; Norfolk and Hanlon 2012). While these systems work locally, they offer limited protection against external claims or investments. Ambiguities between state and customary authority, weak oversight, and limited understanding of the national land laws among the majority contribute to land insecurity and governance gaps. In Magude, land rights are primarily based on kinship and social affiliation, and

the effectiveness of traditional leaders depends on their local legitimacy and ability to navigate between customary norms and formal procedures. The coexistence of legal and customary systems continues to shape access and control over land.

Land Tenure in Magude

Like other countries on the African continent, such as Senegal, Equatorial Guinea, Côte d'Ivoire, and Burkina Faso, Mozambique has adopted a combination of formal and traditional laws for access to land (Mandamule 2017). This legal dualism, enshrined in the 1997 law, allows land rights to be acquired either through the formal means of the state or through customary norms and practices. According to customary law, individuals and local communities, especially in rural areas, can access land in three main ways: through intergenerational inheritance, through marriage, and by loan[4] (Macaringue 2021; Negrão 2000).

The most common form of land acquisition in Magude is through succession or inheritance. Each local family has a piece of land that has been in the family for generations, and land rights are passed down patrilineally, from father to son. When the son marries, the head of the family identifies a piece of land in the family area and gives it to him to live and farm with his wife. Unmarried daughters can use their parents' land, but after marriage, they must use their husband's land. While male children have direct rights to land, women acquire it indirectly, through marriage. It is only through her status as a wife that a woman can access her husband's land, but even then, there is no guarantee that she can continue to use it if her husband dies. If a woman gets divorced or her husband dies, she may be left vulnerable and lose the land acquired through marriage (Kaarhus and Dondeyne 2015).

The 2007 law attempted to ensure equal rights for men and women, stating in Article 13 that "Individuals, men and women, who are members of a local community, can apply for individualised titles, after division of the respective community areas of land."[5] In practice, however, women still have limited access to land (Ikdahl et al. 2005; Waterhouse 2000). Madamule (2018) notes that the predominantly male-centric nature of Mozambican society, especially in rural areas, is one of the reasons why women find themselves in an

4 A land loan occurs when an individual or family, through mutual agreement with another individual or family, temporarily gives up a piece of land for use for a specified period. During this time, the borrower is prohibited from undertaking long-term projects, such as building a house or planting trees, but is allowed to use the land for agricultural production, specifically for crops with short production cycles.

5 The 1997 Land Law – Lei de Terras (Lei No. 19/1997).

unfavourable situation when it comes to accessing resources. As a result, many women have been excluded from formalising land ownership, since in practice DUATs are often issued in the man's name – an outcome rooted not in the law itself but in prevailing legal traditions and customary norms. Kaarhus and Dondeyne (2015) further explain that women's vulnerability is also reinforced by the law's recognition of customary systems of land access, where patriarchal lineage descent prevails and limits women's direct rights to land. These norms mirror broader social and cultural structures that grant men greater authority and control over land ownership and management.

Inheritance not only gives the right to occupy land but also provides legal recognition of land held without the need for formal registration. This means that formal registration of land is optional, depending on whether individuals request it from state authorities. According to Article 15 of the 1997 Land Law,

> The proof of the right to use and benefit from land may be provided by: (a) presentation of the respective title; (b) testimonial evidence presented by members, men and women, of the local communities; (c) expert opinion and other means permitted by law.

This explicit mention of both men and women underscores that the law does not, in principle, restrict women's ability to provide testimony in support of land rights.

The law also makes clear that the absence of a formal title does not affect the right to use and benefit from land acquired through customary occupation or good-faith occupation (Article 13). In Magude, most of the population has not attempted to seek a formal DUAT. One reason for this is that their right to the land is already recognised. Another reason is that the costs of obtaining DUATs are high, and instead they rely on local leaders to mediate in land disputes. I should mention, however, that a number of people did manage to have their land registered in 2017 as part of the MozLand Project (Terra Segura). Funded by the World Bank and managed by the Ministry of Land and Environment and the National Fund for Sustainable Development (FNDS), Mozland was launched in 2015. It aims to strengthen land tenure security in selected districts, thereby improving the efficiency and accessibility of land administration services (World Bank 2023).

In the current context of increasing demand for and disputes over fertile land, especially near urban areas, Macaringe (2021) notes that holding a DUAT title provides a greater degree of tenure security for farmers. He argues that formal law prevails over customary law in cases of land disputes. In situations where a party claims the right to use and benefit from land on the

basis of customary rules and practices (inheritance, marriage, or loan) and the other party claims the land on the basis of the DUAT title (document), the state, through the courts and/or other institutions for the administration of justice, favours the latter (Macaringue 2021:3). Moreover, customary land tenure is often disregarded when larger-scale projects or concessions are involved, as DUATs provide formal legal backing that the customary arrangements lack.

In addition to individual land registration, the Land Code allows for the existence of communal DUATs. This means that property titles can be registered in the name of the community rather than in individual names. This measure was included in the law to ensure that the land rights of local communities are protected. In Magude, for example, residents use communal land to collect firewood, produce charcoal, gather building materials, graze livestock, and produce food. The land registration process is complex and involves several stages, one of the most important of which is the demarcation of the communal area. The law advocates an "open borders land delimitation system." This means that while local community lands are protected, access to resources within the community area are open to outside interests (such as investors) – but only after consultation with the residents to gain its consent (Chilundo et al 2005). The process is expensive and is usually funded by NGOs; therefore, few communities in Magude have registered their land. The failure to register community land due to lack of funds has been identified as one of the main weaknesses in the implementation of the law (Tanner 2002; de Quadros 2003).

Customary law gives access to land not only to the indigenous people but also to anyone who wants to settle in the community, as long as they apply through the community leaders. In Magude, the community leadership in consists of four leaders organised into two groups. The first group is made up of the Mukhulo (*Régulo*) and the *Hosy ya missava* (Chief of the Land). The *Régulo* is a first-rank leader, and the Chief of the Land is a second-rank leader. These two leaders, who represent the traditional leadership of the community, address community issues, including witchcraft, ceremonies, and land allocation. The other group includes the Village Secretary, a first-rank leader, and the Head of the 10 Houses, a second-rank leader. Unlike the traditional authority, these two leaders are chosen from amongst candidates and community members in an election administered by the local government. They also play an administrative role and are involved in all processes that require state intervention, including land allocation.

Both groups actively participate in land management, but their coexistence has often been marked by tension. Traditional leaders derive legitimacy from

lineage, ritual authority, and local recognition, whereas state-appointed authorities draw theirs from government structures and party politics. This overlap has led to disputes over jurisdiction, competition for recognition, and struggles over who holds final authority in community decision-making. As Buur and Kyed (2006) argue, Decree 15/2000[6] institutionalised this dual structure by recognising both *régulos* and Frelimo-appointed secretaries as "community authorities," creating a situation in which authority is both shared and contested. Cambaza (2009) similarly notes that while the land law recognises customary practices, tensions arise when traditional and administrative leaders interpret or apply rules differently, particularly in land allocation and conflict resolution.

To understand how land allocation plays out locally, I will describe the case of Mr Machava, a government official who recently transferred to Magude. He first lived in a government quarter in the Magude town but later needed a home in Chivonguene, about 50 kilometres away, where he was assigned to work. He contacted the Village Secretary and asked for land to build a house and keep cattle. The Village Secretary, in turn, met with the *régulo*, a Chief of the Land, and some influential community members (the Elders' Council) about his case. Later, Mr Machava was invited to a meeting with the village community to get to know them and to formally express his interest in living with them. After his introduction to the community, his request was accepted. In accordance with customary law, he was given five hectares of land to live on and cultivate. He was also allowed to graze his cattle on communal land. To celebrate the decision, Mr Machava was required to buy a goat and two bottles of wine to share with the community as part of a customary ceremony marking his formal integration and land allocation.

The allocation of new land to newcomers is more common in the inner areas of Magude, where more land is available. In Magude town, which is densely populated, there is very little vacant land available. Available land is generally sold, despite Article 109(2) of the Constitution of the Republic (CRM) stating that land belongs to the State and cannot be sold or otherwise alienated or mortgaged. Not only is land being sold, but it is also a highly profitable business. Dias, a resident of Magude Town who has been working in the town since 2017, had no choice but to buy the land on which he built his house. As he explains:

[6] Decree 15/2000 (20 June 2000) created the category of *autoridades comunitárias* (community authorities), which included both traditional leaders (*régulos*) and state-appointed figures such as neighbourhood secretaries and heads of 10 or 100 households. These authorities were formally recognised as intermediaries between the state and local communities, with responsibilities in areas such as land consultations, tax collection, and community mobilisation (Buur and Kyed 2006; Cambaza 2009).

> Once I had identified a piece of land, I went to the owner, and we negotiated the area. When we had an agreement, we informed the Village Secretary, who in turn called the *régulo*. They asked me to pay 2,000 Mt [USD 31][7] for a certificate confirming that I owned the land.

Dias's land was only large enough for a house, but he would have preferred a bigger plot. Larger plots are difficult to find, although some are for sale. Dias did find someone willing to sell him one hectare for 25,000 Mt (USD 391), but he decided not to proceed with the deal after being warned that the area was susceptible to flooding.

Access to land is often mediated through monetary transactions, provided that community members are willing to sell and that the transfer is legitimised by local leaders. Such transactions take place in the presence of local authorities, who serve as witnesses. Buyer and seller sign a written declaration, with each retaining a copy. The two traditional leaders serve not only as witnesses but also as mediators in the event of disputes. However, village secretaries, who are administrative representatives of the state, do not always enjoy the approval of the *régulo*. Their legitimacy is questioned, particularly when they are not native to the locality where they exercise authority, and their involvement is often perceived by traditional leaders as undue interference. An example of this can be seen in a conversation I had with a respected *régulo* in the district:

> I belong to the royal family. My grandfather is one of the sons of Magutso, the leader after whom this district is named. I know how things work here. Last year, there was a government project to parcel out land for housing and farms and allocate DUATs. When the technicians arrived in the communities, they met the village secretaries, but many were not from Magude. They are people who have just settled here and have been appointed as secretaries. They don't know the reality of this land, so in some places, they have allocated land to people who are not the rightful owners.

The tension between traditional and administrative leaders has historical roots. As mentioned above, for a long time traditional leaders were marginalised and replaced by Frelimo party officials who often lacked popular legitimacy. The 1997 Land Law, however, temporarily boosted the position of *régulos* by recognising customary tenure and allowing traditional authorities to play a role in confirming land rights through community consultations (Cambaza,

[7] Exchange rate at the time of writing: 1 USD = 64 Mozambican Meticais (Mt).

2009). Decree 15/2000 went further by giving *régulos* official status as "community authorities," enabling them to act as intermediaries between the state and local communities (Buur and Kyed 2006). Yet this recognition also reinforced tensions. Village secretaries, whose authority derived directly from state and party structures, continued to compete with *régulos* for influence. As Buur and Kyed (2005) point out, state recognition of traditional leaders created an ambiguous situation in which *régulos* gained formal legitimacy but remained dependent on administrative structures and vulnerable to political interference. In practice, both groups of leaders are involved in land allocation and conflict resolution, but their overlapping roles often generate competition over who holds the final word.

One of the most common conflicts in Magude has been over the occupation of land by war-displaced people. During the civil war (1975–1992), many people fled the district and abandoned their homes (see the section on migration in this chapter). Some never returned, and others returned long after the end of the war to find their land occupied. The *régulo,* when discussing this with me, explained this problem saying:

> It may be that a family has left their land to flee the war to Maputo or South Africa Even though they are far away, they know they were born here and traditionally own the land. If that land is registered in someone else's name, that's a problem that could go to court.

This was precisely the situation that afflicted Geraldo when he returned home, not from the war but from South Africa, where he had worked for over 30 years. Geraldo went to work in the mines in 1990 and did not return to Mozambique until 2021. His return was provoked by accidents at work, and the healer he had consulted about his bad luck at work told him that the solution was to return home. His parents had died a few years earlier, and the house and land had therefore been abandoned for some years. When Geraldo returned home, he found part of the family land occupied. Although local leaders recognised his identity, they considered his claim weak, noting that he had been presumed dead or disappeared, having shown no "sign of life" for decades. Under customary norms, land rights are closely tied to continued use and presence. Prolonged absence from the land or community, without maintaining ties to them, weakens one's legitimate claim. Though Geraldo was accepted back into the community, he had to share the land with the new owner. In this case, the new occupant had the legal right to the land because the law gives land rights to those who have occupied the space in good faith for more than 10 years.

Migration and Economic Impacts

Male migration from rural southern Mozambique, particularly in the Magude district, has long been a tradition and an integral part of community life. Over generations, migration has become both a way of life and a means of earning a livelihood. Three key factors have historically driven and continue to shape these migratory flows: employment in South Africa's mining sector, the impact of the civil war, and the pursuit of improved living conditions.

Mining Work in South Africa

Mozambique's long history of supplying migrant labour to South Africa began in the 1860s with the migration of workers to the sugar plantations of the British colony of Natal (Harries 1994:19–20, 24). This trend intensified with the discovery of diamond mines in the 1860s and gold mines in the 1880s, leading to a sustained flow of Mozambican labour to South African industries (Farré 2016). At the time, due to Portugal's limited military and financial capacity to govern the entire territory, the Portuguese administration opted to lease sovereignty and control over various regions to powerful private companies, known as majestic and tenant companies. These companies, backed by international capital, managed the northern and central territories under government supervision (Arnfred 2015; Wuyts 1980). Meanwhile, the southern region of Mozambique remained under direct Portuguese control and was transformed into a key labour supplier for South African plantations, particularly in the mining sector (Lubkemann 2009).

This labour migration system was further institutionalised through a mutually beneficial arrangement between the Portuguese colonial administration and South Africa. In exchange for access to Mozambican railways and the port of Lourenço Marques for mineral exports, South African mining companies secured a steady flow of Mozambican labourers through formal, state-regulated channels (Farré 2009:220). For Portugal, controlling migration helped curb clandestine departures while ensuring the return of workers who could pay taxes and inject earnings into the colonial economy. South African gold mines, especially on the Witwatersrand, faced a persistent shortage of cheap unskilled labour since white workers generally occupied skilled or supervisory positions and resisted underground manual work. To fill this gap, mining companies relied heavily on foreign African workers, recruiting approximately 200,000 annually, many from Mozambique (Patrício 2016). Between 1900 and 1940, an average of 80,000 to 100,000 Mozambicans worked in the mines each year under 12- to 18-month contracts,

with the number peaking at nearly 160,000 in 1975 (Arnfred 2015; Patrício 2016).

This large-scale migration had significant social and economic impacts in southern Mozambique, particularly in the provinces of Inhambane, Gaza, and Maputo, from where many men were recruited for the mines. While some sought to escape the burdens of hut taxes (*imposto de palhota*) and forced labour under the Portuguese colonial Xibalo system (Newitt 1994:142–143, 410–411; Allina 2014), others were motivated by the prospect of earning comparatively better wages. These earnings enabled migrants to improve their households, build better homes, purchase goods, and sometimes open small businesses. As Covane (2001) observes, such returnees were often referred to as *madjonidjoni*, a term that reflected their ability to construct concrete houses and acquire urban-style goods. This emergence of a relatively secure, materially better-off class contributed to growing socio-economic differentiation in rural communities (Rodgers 2008).

The economic gains from mine migration not only transformed household livelihoods but also reshaped social relations in rural southern Mozambique. As young men acquired independent incomes, they gained the means to pay *lobola* without relying on elders, gradually shifting generational power dynamics (Lubkemann 2009:56). Financial autonomy enhanced their ability to make marital choices and, in some cases, marry multiple wives, elevating their social status and contributing to what Lubkemann (2009) describes as "transnational polygamy," the practice of maintaining families both at home and in South Africa. Over time, mine migration evolved from a livelihood strategy into a culturally embedded rite of passage, through which young men could attain adulthood, establish households, and ensure intergenerational continuity through remittances (Farré 2013, 2016).

In Magude, the legacy of mine migration remains deeply embedded in family histories, with many households recounting stories of patriarchs who spent decades working in South African mines. Although many of these men have retired, their children or nephews often continue the migratory cycle, underscoring its enduring role in shaping local livelihoods (Lubkemann 2009). However, this long-standing pattern faced disruption after independence in 1975. The Mozambican government, led by Frelimo, sought to break from colonial-era policies and distance itself from apartheid South Africa, aiming to curb emigration as a political stance and to promote national self-sufficiency through agricultural development (Farré 2009:220). At the same time, South African mines began reducing their reliance on unskilled foreign labour, limiting opportunities for young Mozambicans as recruitment systems shifted toward specialised workers (Lubkemann 2009).

This shift aligned with Frelimo's broader socialist agenda, which prioritised rapid modernisation through state-controlled, mechanised agriculture (Farré 2013). The government promoted large-scale state farms and cooperatives while encouraging communal village settlements. However, this model sidelined family farming and failed to address historical grievances around land access. Many poorer peasants, unable to reclaim land seized during colonial rule, grew disillusioned as former Portuguese estates were simply transformed into state-run farms (Covane 2001). As a result, despite official efforts to discourage labour migration, many continued to seek work in South Africa. Following the end of apartheid and South Africa's democratic transition in 1994, migration to the mines further declined. Between 1996 and 2005, the number of Mozambican mineworkers dropped from 56,000 to 46,000 due to factors such as tighter migration laws, mine closures, and the high mortality rate among miners linked to the AIDS epidemic (Muanamoha et al. 2010:888). Nevertheless, for many households, migration remained a critical livelihood strategy (van der Berg 1987; De Vletter 2006; Mercandalli and Anseeuw 2017).

The Civil War

The civil war that erupted shortly after Mozambique's independence in 1975 had a devastating impact on rural communities, especially in the south. The conflict, which lasted from 1976 to 1992, was fought between the Frelimo government, supported by the Soviet bloc, and the RENAMO insurgency, backed by apartheid South Africa and Rhodesia (now Zimbabwe) (Manning 2010; Clapham 1996). It caused widespread destruction, displacement, and loss of life. Around 1.7 million people fled to neighbouring countries, with many rural civilians caught in the crossfire as both sides targeted communities to undermine support for the other (Patrício 2016). The war's toll was compounded by environmental disasters, including the 1977 floods and the 1981 drought, which devastated crops, infrastructure, and livestock, thereby worsening food insecurity and undermining already fragile rural livelihoods (Covane 2001; Harries 1994).

The compounded effects of war and environmental disasters plunged rural communities into extreme hardship. Beyond the immediate devastation, the prolonged conflict disrupted agricultural cycles, destroyed infrastructure, displaced farming populations, and severely limited access to markets, conditions that fuelled widespread famine. Many families lost both crops and livestock, stripping them of essential food sources and income. In the context of political instability, violence, and environmental degradation, migration became a critical coping strategy. As a result, many rural Mozambicans

continued to migrate, particularly to South Africa, in search of security and livelihood opportunities (Covane 2001; Harries 1994; Patrício 2016).

In Magude, many individuals shared personal memories of the war period, recalling how the intensity of the conflict triggered a mass exodus from the northern border area of Mapulanguene into South Africa. As one anonymised account described:

> There was nobody left; we all ran away. Mapulanguene was the last stronghold, and the fighting was most intense there. Some fled to Massingir, others to Maputo. Many of them crossed into South Africa through the border near here. The border is not far – about nine kilometers if you take a shortcut and 15 km from the main road.

Another recalled:

> The largest enemy base was in Moamba, the Ngungue base, about 40 kilometers from here. People eventually fled to South Africa. Even today, most people living along the South African border are Mozambicans. Some have returned and stabilised, but many still live there.

These accounts are consistent with reports from Mozambique's two main wartime newspapers, *Jornal Notícias* and *Jornal Domingo*. For instance, on 6 October 1986, *Jornal Notícias* reported:

> According to our interviewee [Pedro Uetimane, Administrator of Magude District], the political and military situation in Magude began to deteriorate seriously in 1984, when a group of armed bandits from the south of Inhambane invaded some areas in Magude District and eventually established bases there. Pedro Uetimane stated that the presence of this group of armed bandits severely disrupted the normal lives of the 100,000 people living in Magude, forcing many farmers to abandon their fields and other assets.

A later report on 25 February 1990 captured the demographic collapse:

> Located about 150 kilometres north of Maputo province, most of the 14 villages that make up Magude district are now abandoned. The population, estimated at 72,000 in January of last year, has now fallen to less than 20,000, all of whom are considered to be in a state of emergency.

These reports underline the profound demographic impact of the war on Magude District. Before the arrival of Renamo forces in 1984, the population

was estimated at about 100,000 families. By 1989, it had fallen to 72,000 and by 1990 to fewer than 20,000, a stark indication of the conflict's devastation. Although the population has slowly increased since then, it has not yet regained pre-war levels; in 2023, it stood at 83,897 (INE 2023). The war and the resulting displacement also left lasting scars on farming and livestock activities in the district. Fields were abandoned, reducing soil fertility and destroying perennial crops. Cattle herds, vital for wealth, status, and ritual life, were decimated by theft, disease, and distress sales. Many households never recovered their herds or fields. Even today, the war's legacy is visible in smaller livestock numbers, fragmented landholdings, and reliance on remittances and informal trade.

Beyond its demographic impact, the war, compounded by severe flooding in 1977 and drought in the early 1980s, had a profound effect on the socioeconomic landscape of southern Mozambique. These disruptions worsened living conditions, particularly for migrants who, in earlier decades, had achieved relative prosperity through mine work (Covane 2001). The decline in mining recruitment, combined with restricted land access and the collapse of rural livelihoods, created a growing class of unemployed and displaced individuals. Despite fewer opportunities, interest in migration resurged, even among educated youth who might have otherwise pursued different paths. For many, as Rodgers (2008) notes, migration was no longer primarily about fleeing war but about seeking economic survival. Covane (2001) similarly observed that many migrants chose not to return to rural areas after the war, opting instead to remain in urban centres or mining regions where prospects seemed more stable. This marked a shift in the nature and meaning of migration in the region, one that would persist well beyond the end of the conflict.

A New Generation of Migrants

During the conflict, many fled as refugees to neighbouring countries such as South Africa, where passport and visa requirements were relaxed, facilitating undocumented migration – a pattern that persisted long after the war ended (Farré 2009; Muanamoha 2008). The end of apartheid and the introduction of more liberal border controls further intensified cross-border movement, particularly among young people. Unlike earlier periods dominated by formal mining jobs, post-war migration increasingly involved informal work in sectors such as domestic service, agriculture, construction, and street vending (Agadjanian and Hayford 2018). On the Mozambican side, limited job prospects, due to an economy centred on capital-intensive megaprojects, left many unskilled workers without opportunities (Patrício 2016). At the same

time, a saturated informal sector in Maputo and recurring climate shocks in rural areas pushed more young people to seek livelihoods abroad.

With limited prospects in both rural areas and urban centres, many young Mozambicans turned to migration as one of the few viable paths to economic survival. However, this movement increasingly occurred through informal and undocumented channels, exposing migrants to risks such as exploitation, poor working conditions, xenophobia, and deportation (Human Rights Watch 1998). As Farré (2017) notes, this marked the rise of a new type of migrant, distinct from earlier generations. Previously, sons would take over from their fathers, maintaining a cycle that supported extended families. Farré (2013) describes the breakdown of this model as a "broken link," where the new generation, often undocumented and precariously employed, struggles to send remittances or sustain the familial support system that once defined labour migration in the region.

In Magude, undocumented migration, particularly among young men, remains widespread, with many crossing into South Africa in search of economic opportunity. Despite the risks of exploitation and legal vulnerability, migration remains a critical livelihood strategy. Remittances support household consumption, education, *lobola,* and small businesses and are often reinvested in agriculture and livestock, key pillars of rural resilience. This long-standing pattern of intergenerational migration, especially among men, has deeply reshaped rural life, reinforcing gendered divisions of labour. As men engage in non-agricultural wage work abroad, women have taken on the primary responsibility for farming, making agriculture increasingly female-driven (Raimundo 2008). Female-headed households remain common, with women playing a central role in sustaining food security and local livelihoods.

However, while the "migratory spirit" endures, attitudes among the younger generation are shifting. Many youths in Magude express growing reluctance to migrate, influenced by stories of hardship, job insecurity, and xenophobic violence in South Africa (Agadjanian and Hayford 2018). As one 19-year-old put it, "Most young people my age who have been there have seen that the conditions there are not easy… I've seen a lot of people who have gone there but are now here in Tonga working with us." Such accounts, along with fears of deportation and precarious living conditions, contribute to a more cautious view of migration.

Yet migration still remains embedded in local life. During the festive season, Magude comes alive as returning migrants reunite with families, their presence evidenced by crowded markets, South African license plates, and displays of consumer goods that signal economic achievement. These returns,

however, also reveal migration's dual nature. While some succeed and contribute visibly to household well-being, others face setbacks or never return, leaving emotional and financial gaps in their wake. This duality underscores migration's complex role as both a source of hope and a reflection of structural hardship in rural Mozambique (Patrício 2016; Muanamoha 2008).

Conclusion

This chapter has provided an in-depth contextualization of Magude, shedding light on the district's geography, historical transformations, demographic profile, sociocultural dynamics, and livelihood strategies. Located in the semi-arid interior of southern Mozambique, Magude is characterised by a rural landscape, limited infrastructure, and climatic variability that profoundly shape local life and agriculture. The district's population, still recovering from the devastating impacts of the civil war, remains relatively low in density and young in age, with significant challenges related to literacy and access to services.

Magude's history has been shaped by regional political shifts, from the formation of early agro-pastoral settlements and the establishment of the Gaza Empire through to colonial rule and post-independence upheavals. The district's population is predominantly Changana, a group whose social organisation is rooted in patrilineal and patrilocal systems that continue to inform gender roles, marriage practices, and inheritance patterns. While traditional values remain dominant, especially in rural areas, subtle shifts in gender relations and household roles are emerging, particularly among younger generations and in more urbanised zones.

Economically, Magude is largely dependent on subsistence agriculture and livestock farming, with limited industrial or commercial diversification. Agricultural practices are constrained by low mechanisation and high exposure to climate shocks. Livelihoods are further shaped by long-standing patterns of male labour migration to South Africa, which have historically provided economic support but also reconfigured local gender dynamics and family structures. Migration remains both a vital coping strategy and a source of vulnerability, particularly in the current context of legal restrictions and precarious employment.

Land tenure emerges as a critical axis of local life. The coexistence of formal legal frameworks and customary systems creates a dual structure in which land rights are negotiated through kinship, tradition, and state channels. While the 1997 Land Law formally recognises customary rights and community land claims, limited implementation capacity and enduring

patriarchal norms continue to restrict women's access to land and expose local residents to potential insecurity. Tensions between traditional authorities and administrative appointees underscore broader contestations over legitimacy, power, and the management of land rights, especially in the face of growing competition over fertile land and development pressures.

All together, this chapter highlights how historical legacies, climatic variability, sociocultural systems, and governance structures converge to shape the daily lives, vulnerabilities, and adaptive strategies of Magude's residents. These contextual insights are crucial for understanding how communities in the district engage with broader environmental, social, and economic transformations.

Chapter 3: Local Cosmologies and the Politics of Climate Adaptation in Magude

Climate change has become one of the central determinants of environmental governance and international development over the past decades. However, the ways in which it is interpreted, named, and addressed vary significantly across state institutions, multilateral organisations, and local communities. This chapter starts from the premise that climate change is not only a physical phenomenon but also an object of epistemic and political contestation.

In Mozambique, the state has progressively adopted an institutional approach to climate change aligned with global climate agendas, incorporating concepts such as adaptation, resilience, and low-carbon development into national policy documents such as the National Strategy for Adaptation and Mitigation (ENAMMC), the Local Adaptation Plans (PLAs), and the National Adaptation Plan (NAP). While these policies seek to address the country's environmental and social vulnerabilities, they often operate through a technocratic language that remains detached from the ways in which local populations understand and relate to the environment and to climate.

In contrast to large national strategies and plans, this chapter explores rural communities' experiences of climate change and environmental knowledge that function as their own informal strategies, thereby shaping local "climate agendas." Alongside technical and scientific frameworks, there are rituals and ceremonies, fused with or challenged by religious beliefs, that offer distinct interpretations of environmental crises. Practices such as the *ku palha* rain ritual, ecological taboos, and even Christian readings that associate droughts with divine punishment reveal the multiple layers of meaning through which climate change is made sense of in rural Mozambique. Drawing on fieldwork in Magude, this chapter examines how official discourses interact with – or diverge from – local ecological and religious knowledge. In doing so, it seeks to contribute to a more plural understanding of climate change, one that recognizes local ways of knowing not as peripheral but as integral to effective and culturally grounded adaptation strategies.

Mozambique Climate Adaptation Framework

As outlined in the introductory chapter, Mozambique is among the countries most vulnerable to climate change, facing increasing exposure to extreme weather events such as prolonged droughts, recurrent floods, tropical cyclones, and erratic rainfall. These climatic stresses severely impact key sectors of the economy, especially agriculture, pastoralism, water resources, and infrastructure, deepening socio-economic vulnerabilities and exerting sustained pressure on rural livelihoods. In response, the government has implemented a series of policy measures aimed at managing climate risks and fostering long-term resilience.

Over the past decade, Mozambique's approach to climate adaptation has been shaped by an increasing dedication to integrating climate considerations into national development planning. A cornerstone of this process was the adoption of the National Strategy for Adaptation and Mitigation of Climate Change (ENAMMC) in 2012. This strategy positioned adaptation at the centre of policy-making, linking it to sustainable natural resource management, disaster risk reduction, and institutional capacity-building (Nuvunga 2021). One of its key objectives is to "establish guidelines for action to build resilience, including the reduction of climate risks, within communities and the national economy, and to promote low-carbon development and a green economy through its integration into sectoral and local planning processes" (MICOA 2012:x). Resilience, as defined by the ENAMMC, refers to the ability of individuals and systems to anticipate, absorb, adapt to, and recover from climate shocks while sustaining or advancing their development trajectories (MICOA 2012: vii).

This conceptual framing of resilience has been operationalised through a multi-level planning architecture designed to mainstream climate adaptation across sectors and levels of governance. The ENAMMC provides overarching guidance to integrate climate risks into national policies such as the National Adaptation Plan (NAP) and ensures their translation into subnational planning through instruments including Local Adaptation Plans (PLAs) and Strategic Plans for District Development (PEDDs). These instruments align with a broader development framework, including the government's five-year plan (PQG)[8] and the annual economic and social plan and budget (PESOE).

Further strengthening this institutional architecture, Mozambique's Nationally Determined Contribution (NDC) reinforces the integration of adaptation into development processes. The NDC operational plan (2020–

8 Plano Quinquenal do Governo (Five-Year Government Plan), the main strategic document that sets out Mozambique's political, economic, and social priorities over a five-year period, serving as the principal guide for government action.

2025) outlines 99 targeted adaptation measures across priority sectors, including agriculture, water, health, infrastructure, and disaster risk management, and emphasises synergy with existing national strategies such as the ENAMMC and PQG (MITADER 2018). It emphasises that adaptation should not only reduce vulnerability but also support sustainable livelihoods and enhance adaptive capacity at all levels.

These national efforts reflect Mozambique's broader alignment with international climate governance frameworks. The country has committed to major multilateral agreements, including the UNFCCC, the Paris Agreement, the Sustainable Development Goals (SDGs), and the Sendai Framework for Disaster Risk Reduction (MICOA 2012). Through active participation in global platforms such as the Conference of the Parties (COP), Mozambique presents itself to the world as a committed actor in the global response to climate change. This alignment not only legitimises its climate agenda on the international stage but also facilitates access to crucial resources, including climate finance, technical expertise, and international partnerships (Khan and Roberts 2013; Weikmans and Roberts 2019).

Nevertheless, this alignment with global agendas brings significant implementation challenges. International frameworks often presuppose the existence of strong institutions and technical capacity (Chambote and Shankland 2011), conditions that are not consistently present in Mozambique. Although national policies have embraced global concepts such as resilience and low-carbon development, translating these into effective local action remains problematic. Climate governance continues to be highly centralised, restricting the autonomy of district and municipal authorities.

While Local Adaptation Plans are formally conceived as district-level instruments, in practice most were drafted by central-level technicians, with district officials consulted rather than empowered to shape strategic decisions (MITADER 2018, 2019). Their implementation depends on approvals and resources managed in Maputo, since local administrations lack direct budgetary allocations for adaptation and possess only limited capacity in budgeting, resource mobilisation, and technical execution (MITADER 2018). This structural dependence has generated recurrent delays and bottlenecks, a situation documented in an evaluation commissioned by the Ministry of Land and Environment in partnership with UNDP and later synthesised by IIED using the TRACTION framework. That evaluation, *Lessons Learned from the Implementation of Local Adaptation Plans in Mozambique* (IIED 2022:4), observes:

> Despite the early successes in the design of LAP, the process of implementing them ended up being held hostage by resource

> availability. Financial asphyxiation characterized the public sector during this period. Resources for field work, technical teams and multisectoral meetings, among others, were scarce and this contributed to the poor quality of the LAP. The process of developing LAP became more centralized and local control was lost. Poorly functioning local authorities without alternative mechanisms for community engagement meant a reduction in the participation of communities in the LAP processes. These limitations were understood by some partners who began to distance themselves from LAP and to find other platforms from which to implement resilience interventions.

This assessment highlights how financial constraints and centralised control progressively undermined the very instruments designed to promote decentralised and participatory adaptation, ultimately weakening their legitimacy and effectiveness. Consequently, many PLAs remain underfunded or imprecise in operational terms. Although 125 PLAs have been developed nationwide, only a small proportion have progressed beyond the design stage due to inadequate resource transfers from the central government (MTA 2023). A UNDP evaluation found that, by 2018, only around 30% of districts had operational PLAs and that even these were often too general to be translated into concrete strategies (UNDP 2018).

Moreover, limited technical capacity at the local level continues to hinder effective implementation. Many communities lack access to training, infrastructure, and practical tools necessary to carry out adaptation plans. At the same time, because district administrations are primarily extensions of provincial and national authority, these planning exercises often sit uneasily with local governance realities, reinforcing a top-down approach rather than building on existing community-based structures and practices. This situation persists due to several factors, including a chronic shortage of resources, a rigid, highly centralised administrative system, and limited local authority autonomy. In some cases, these issues are further exacerbated by political interests and weak accountability mechanisms. Whether due to unwillingness or incapacity, the outcome is the same: implementation remains slow, fragmented, and heavily dependent on Maputo. The sections below analyse some of these structural factors and their implications for how adaptation is understood and practised in Magude.

Magude Local Adaptation Plan

Mozambique's climate adaptation agenda, as articulated in the National Strategy for Adaptation and Mitigation of Climate Change (ENAMMC 2013–

2025), emphasises decentralisation through the creation of Local Adaptation Plans (PLAs). These instruments are designed to empower district-level authorities to develop context-specific strategies for addressing climate-related risks and vulnerabilities. In Magude, the PLA, developed in 2015, outlines a range of interventions aimed at strengthening community resilience in the face of recurring droughts, floods, erosion, and environmental degradation. Its priorities include infrastructural investments such as the construction and rehabilitation of water reservoirs and irrigation systems, the introduction of drought-tolerant crop varieties, the promotion of agroforestry, and the adoption of conservation agriculture (GDM 2015).

In this plan, adaptation is primarily imagined as a technical and developmental project aimed at reducing vulnerability through the "modernisation" of local livelihoods. "Modernisation" here is understood as the transfer of know-how and technology from elsewhere – introducing new crop breeds supposedly tolerant of changing climatic conditions, promoting imported economic models such as agroforestry, and advancing notions of "conservation" rooted in genecological thinking, colonial histories of resource capture and overexploitation, and inequitable global environmental governance. The plan does not provide a long-term appraisal on the possible impacts of such imported modern innovations and their possible incompatibility with existing technology, local knowledge, and social and cultural patterns in the region. The failure of the plan to embrace the necessary extent of existing social patterns and ontological reality as well as the resulting problems are discussed below.

Resilience according to the plan is the capacity to "minimize the effects of extreme events such as droughts, floods, [and] erosion" and to enable communities to "cope with and benefit from climate change" (GDM 2015:1). To achieve this, the government proposes investments to "build and expand the capacity of water storage and irrigation infrastructure" (GDM 2015:23) and to "increase levels of production and productivity in staple food crops in order to achieve self-sufficiency" (GDM 2015:23). Other measures include expanding veterinary services and livestock facilities, improving roads and housing to withstand floods and erosion, "expanding environmental education," and "promoting community reforestation and the use of renewable energy" (GDM 2015:25). Such measures reveal the blindness of state authorities to local environmental knowledge and customary patterns of land governance and use. At the institutional level, the PLA calls for "strengthening local disaster risk management committees" and "training technicians in new technologies to address climate change" (GDM 2015:26). In short, the Magude PLA frames adaptation as a set of planned technical, infrastructural,

and organisational interventions through which communities are expected to become resilient. As pointed out by scholars analysing failures of state-driven development and commons governance (Agrawal 2003; Agrawal 2008; Hara et al. 2009; Haller 2007), such framings of resilience also lack instruments to measure the long-term impact of the designed measures. In addition, gaps between planned measures and their implementation in rural regions increase their unpredictable impacts and inefficiency.

The priorities of the Magude PLA closely align with global adaptation frameworks despite the criticism that the latter have received (Cavanagh 2014; Grove 2014; Reid 2013; Agrawal and Perrin 2009; Haller 2007). For instance, irrigation and water storage correspond to the Sendai Framework's emphasis on disaster risk reduction (UNDRR 2015), while the promotion of drought-tolerant seeds and conservation agriculture by both the FAO and the IPCC highlights their centrality to climate-resilient agriculture (FAO 2017; IPCC 2019). Similarly, agroforestry and other ecosystem-based measures align with the Paris Agreement and the Sustainable Development Goals, both of which emphasise nature-based solutions and sustainable land management (UNFCCC 2015; UN 2015). However, despite its alignment with international best practices, the Magude PLA's approach to adaptation is predominantly top-down and technocratic, raising questions about its ability to engage with local people's experiences and knowledge systems.

As of 2022, the district's water infrastructure included five dams, five excavated reservoirs, three lakes, and the permanent Incomati River. In addition, there were 116 operational boreholes, of which an estimated 26 were non-functional. On paper, these boreholes provided 63% water supply coverage for the entire district (GDM 2022). However, my own field observations suggest that access to water remains precarious and highly uneven. In many areas, households continue to walk long distances to fetch water, underlining the gap between statistical coverage and the lived experience of rural water scarcity. Where boreholes are absent or not working, families often resort to alternative sources, such as collecting rainwater, drawing from nearby lakes, or using the Incomati River. These practices provide only temporary relief and expose people to the risk of contamination and seasonal variability.

Significant investments have been made to instal multi-use boreholes equipped with drip irrigation systems and solar-powered pumps. Though technically advanced, these systems often fail to have a meaningful impact. Many have been installed in sparsely populated locations, where they serve a limited number of users and face chronic challenges related to faulty local

operation, maintenance, and management. A technician from the District Services of Planning and Infrastructure (SDPI) recounted one such case:

> I was called to resolve a conflict that had emerged in the community because the management committee created to run the system had set a fee of 75 Mt [USD 1.17] per month per family for water use, but not everyone was able to pay. The multi-use system operated on solar energy and was prone to breakdowns, and the community was not always able to cover the repair costs. Just one hydro-pump costs around 150,000 Mt [USD 2.344], which is far beyond the community's capacity.

This example highlights how "modern" interventions presented as efficient fail to align with community realities or expectations. The gap between centralised notions of resilience and adaptation and local residents' social patterns and economic relations is revealed. The technical and financial demands of operating such systems exceed what most rural households can sustain, creating tensions within communities and ultimately undermining the intended goals of resilience and inclusivity.

The critiques of Almazán-Casali et al. (2021) demonstrate how technocratic adaptation strategies frequently prioritise standardised, highly visible infrastructure over locally embedded processes. Although such interventions are often presented in official reports as cost-effective and scalable solutions, in practice they tend to sideline community engagement, limit flexibility, and ultimately undermine long-term resilience. A similar critique is presented in a seminal study by Ferguson (1994), which illustrates how development projects often present political and social decisions as technical solutions, thereby obscuring power dynamics and disconnecting interventions from local realities and knowledge systems.

The PLA uses participatory tools, such as the Climate Vulnerability and Capacity Analysis (CVCA), a methodology developed by CARE to assess how climate change affects communities, identify vulnerabilities, and strengthen adaptive capacity by integrating local knowledge with scientific information and community consultations. Its interventions, however, are predominantly shaped by external technical paradigms, which fail to consider how people in Magude envision, perceive, and respond to environmental change. For instance, the plan's promotion of drip irrigation and improved seed varieties as key agricultural measures has encountered significant resistance. As detailed in Chapter Four, many smallholder farmers reject drip irrigation because of the costs of equipment, the need for constant maintenance, and the perception that it is impractical for scattered household plots. Likewise, the introduction of improved seed varieties was widely

questioned. Interviews in areas such as Mapulanguene and Panjane reveal widespread scepticism regarding externally introduced crops, with farmers expressing concern about unfamiliar tastes, inconsistent yields, and the disruption of ancestral rhythms that have historically guided agriculture.

Taken together, these examples show that rural communities often experience interventions promoted as "modernisation" strategies as disruptive, clashing with the everyday realities of rural households. The mismatch between proposed infrastructures and practices, on the one hand, and the lived experiences and priorities of farmers, on the other, points to a broader epistemic gap between national adaptation planning and community responses to environmental change.

These tensions demonstrate that adaptation cannot be translated into implementation of technical innovations but should also be seen as a cultural and political process. In Magude, for example, agricultural systems are deeply embedded in cosmological frameworks and ecological knowledge, which influence land-use decisions, seasonal calendars, and risk management strategies. My content analysis of the Magude PLA (GDM 2015) suggests that although the plan acknowledges aspects of local knowledge, including local soil classifications (e.g. *Nhaca*, *Tlangassi*, and *Mananga*), seasonal calendars, and ritual practices invoked during droughts, such elements are only present in the diagnostic sections. Here, they mainly serve to identify vulnerabilities: soil categories distinguish between fertile and marginal areas, seasonal calendars illustrate the increasing unpredictability of rainfall, and rituals are described as cultural responses to drought.

However, these insights are not integrated into the design and implementation of adaptation measures, which remain dominated by external technical paradigms such as drip irrigation, improved seed varieties, and conservation agriculture. This results in a form of selective appropriation of community knowledge whereby community knowledge is recognised as a contextual factor but marginalised when solutions are formulated (Agrawal 1995; Agrawal 2002). This dynamic reflects broader critiques in the literature, which highlight that although local knowledge is often celebrated in adaptation planning, it is marginalised in practice (Bannister and Hardison 2006; Nadasdy 1999; Ensor and Berger 2009). Similar critiques have previously been addressed to development and poverty alleviation policies in which interventions tend to reframe or depoliticise local knowledge (Escobar 1995; Ferguson 1994; Li 2007; Mosse 2005). The limitations of the Magude PLA are also evident in its cursory treatment of natural resource issues on the ground. While the plan promotes reforestation and fire control, in practice charcoal production and bushfires remain widespread, largely driven by

poverty, insecure land tenure, and the lack of alternative livelihoods (see Chapter Seven). These structural drivers are insufficiently addressed. Instead, the plan relies heavily on behavioural change strategies, such as awareness campaigns, which do little to alter the conditions that sustain these practices. Such examples illustrate that the PLA, despite its participatory tools, ultimately reproduces a technocratic approach in which interventions are designed according to external policy frameworks rather than being grounded in the lived realities of rural households.

Moreover, the conceptualisation of climate change within the PLA is rooted in a linear, scientific narrative that emphasises emissions, global warming, and biophysical impacts. This framing contrasts sharply with local understandings, where climate variability is chiefly interpreted and discussed through moral, spiritual, and ancestral frameworks. Droughts and floods, for example, may be viewed as consequences of social disharmony, divine displeasure, or neglected ritual obligations (see the following section). The exclusion of such cosmologies from official adaptation planning undermines not only the cultural legitimacy of interventions but also their practical uptake and sustainability.

In summary, the Magude PLA is based on an approach to adaptation and resilience that is grounded in scientific rationality, technocratic planning, and quantifiable results, such as irrigation, improved seeds, and conservation agriculture, which align with global discussions on resilience. In contrast, adaptation practices that people in Magude invent or select draw on a relational epistemology that links ecological knowledge grounded in long term experience on the land with cosmology, morality, and social obligations. Soil classifications, seasonal calendars, and ritual practices are not peripheral details but rather fundamental to the ways in which people experience, interpret, and live with environmental uncertainty. The tension between these epistemologies explains why interventions that are celebrated as efficient and modern in national and donor agendas often seem foreign or unsustainable to farmers. This divergence reveals that the challenges of adaptation are not only technical but also epistemological – concerning whose knowledge is valued, which frameworks of meaning guide action, and how different ways of knowing are negotiated in practice. The next section therefore turns to traditional ecological knowledge and the cosmologies of Magude, examining how ancestral beliefs, ritual practices, and religious traditions shape community interpretations of and responses to climate-related disruptions.

Local Knowledge and Cosmologies of Magude

Local knowledge encompasses detailed, experiential understandings of weather patterns, seasonal cycles, ecological signals, and resource use that have been developed over generations through close interaction with the environment. Such accumulated expertise enables communities to detect even subtle changes and often anticipate climatic shifts before scientific data becomes available (Aswani et al. 2018). It helps communities not only to cope with environmental change but also to anticipate climate variability. Local ecological knowledge also plays a central role in seasonal forecasting. In rural areas, for instance, animal behaviours such as migration, mating cycles, or vocalisations are interpreted as indicators of rainfall or drought, while the flowering and physiological responses of plants similarly signal climatic changes (Berkes et al. 2001; Lemi 2019).

Unlike scientific frameworks, which typically regard the observer as separate from the environment (Barca 2020; Lövbrand et al. 2014), local knowledge is ingrained in cultural practices, spiritual beliefs, and daily life (Lemi 2019; Nadasdy 1999; Spear et al. 2019). This embeddedness makes it especially relevant for locally grounded adaptation strategies. For instance, the "frog marriage" ritual in Bangladesh is performed to invoke rain during droughts. The ritual is dismissed by outsiders as superstition, but it is better understood as a symbolic response to ecological uncertainty that is rooted in cosmological frameworks of coexistence with nature (Sillitoe and Alam 2022). Similarly, amongst the Matsigenka of the Peruvian Amazon, rain, thunder, wind, and sunshine are not viewed as mere meteorological events but rather as the actions of spirits or celestial beings. Rain, for example, is considered to be the urine of star spirits, while thunder is seen as a supernatural weapon (Rosengren 2022).

Research from other African contexts shows how traditional norms and religious worldviews influence farmers' decisions. Spear et al. (2019:33), in their study of semi-arid Botswana, emphasise that "the use of place-based and national meteorological forecast information is affected by traditional norms and religious beliefs" and that some farmers believe "rain is controlled by God" or that they must wait for the chief's permission before planting. Similarly, in Magude, belief systems play a central role in how people perceive and respond to climate variability. Next, I explore some of the main dimensions of traditional and religious belief in Magude, examining how cosmologies inform local interpretations of climate change and shape adaptive practices on the ground. They also premise local residents' perceptions, implementation, experience, and criticism of state-planned adaptation and resilience measures.

Traditional and Religious Beliefs in Magude

To explore the cosmological frameworks that shape environmental understanding in Magude, I draw on Mbiti's (2015:10–13) conceptualisation of African religion, which outlines five interrelated dimensions: beliefs; practices, ceremonies, and festivals; sacred objects and places; moral values and ethics; and religious leaders or officiants. These categories offer a valuable lens through which to examine how religion and spirituality inform local interpretations of the environment and guide community responses to climate variability.

Magude's long-standing cosmologies emphasise a sacred relationship with the land, maintained through ancestral reverence and ritual observance. For generations, agricultural cycles have been embedded within a spiritual framework that links ecological rhythms to human conduct. This relationship is made visible through traditional ceremonies that mark seasonal transitions and affirm communal ties to both the land and the ancestors.

One of the most significant of these rituals is *ku palha*, performed at the start of each agricultural season, usually in October or November, to invoke ancestral blessings for rain, fertility, and abundance. Historically, the central ceremony was held at the district headquarters in Magude, beside a sacred tree believed to have been planted by King Magutso. During the event, oxen were sacrificed, *canhu* (a traditional fermented beverage) was prepared and ritually shared, and participants engaged in singing and dancing accompanied by drumming. Such ceremonies were not merely symbolic; they were understood as vital acts of communication with the spiritual realm. These ritual gestures sought to restore harmony between human society and the natural world, thereby contributing to ecological balance and social well-being (Feliciano 1998).

According to the conversations I had with many Magude residents, this ceremony is no longer performed in its original form. Whereas it once took place beside the sacred tree at the district headquarters in Magude, it has since been incorporated into the official launch of the agricultural season, a government-led event that now rotates annually across different localities.

The first act of this public event remains the *ku palha* ritual, now led by the *régulo* (traditional leader) of the host community. The ceremony usually takes place under a local sacred tree. A traditional fermented drink, typically made from maize, is poured onto the ground, and snuff is scattered as an offering. The sacred tree represents the altar (*ganzelo*), the spiritual site through which communication with the ancestors is established (Feliciano 1998:373). It is usually a large, fruit-bearing tree located in a central area of the village or in a family's yard. As I observed during the ceremony in Mapulanguene, the

régulo, serving as spiritual intermediary, invokes the ancestors, asking for their blessings and protection to ensure a prosperous harvest. Although now institutionalised within a state-sponsored framework, the ritual continues to express deep-seated cosmological values, linking agriculture, spirituality, and communal life.

This ceremony is also performed at the community level throughout the district by local traditional leaders, who carry out similar rites. Immediately after the ritual at the local sacred tree, the farmers symbolically move to the *régulo'*s field to start hoeing and planting. It is only after this collective act that the agricultural season is officially considered to be open. A corresponding ritual marks the start of the harvest period. Before any crops can be harvested, the *régulo* must call upon the ancestors once again, this time to thank them for their protection and request continued abundance. According to tradition, a group of farmers must offer a portion of their harvest to the *régulo*, thereby acknowledging his dual role as spiritual intermediary and social leader. These rituals anchor the agricultural cycle in ancestral authority, reaffirming the community's moral and cosmological relationship to the land.

Such rituals have become increasingly rare in the more urbanised areas of the district, especially in the capital. As younger generations migrate, pursue formal education, or adopt new lifestyles, participation in these ceremonies has declined, and they have become less visible in public. Despite its urban decrease, ancestral rites remain important in many rural communities, where they continue to influence agricultural practices and foster a moral and spiritual connection to the land. This is achieved by reinforcing obligations of respect towards the ancestors, prescribing the correct ways to cultivate and care for the environment, and framing agricultural success or failure in moral terms, as a matter of honouring or neglecting these duties (Feliciano 1998). In this way, ancestral rites operate as both cultural traditions and enduring frameworks through which environmental change is interpreted and responded to. They provide explanations for climatic variability and guidance on appropriate collective action.

Another important communal ritual in Magude is linked to the consumption of *canhu*, a traditional beverage made from the fermented juice of the *canhoeiro* (*Sclerocarya birrea*) fruit. In southern Mozambique, especially in Magude, the *ukanyi* (*canhu* season) is celebrated annually, typically between February and March, when the fruit is ripe and plentiful. In Magude, *canhu* is far more than a seasonal refreshment; it is deeply woven into local cultural identity and historical memory. According to oral tradition, it was the aforementioned King Magutso who brought the original seed of the sacred

canhoeiro, the very same tree that now stands at the district headquarters. This origin story is so central to local heritage that Magude is often referred to as *Magude Nkanyine* – meaning "Magude, the land of *canhu*" (GDM 2015; MAE 2005).

Only after the *ku palha ukanyi* ceremony is the public consumption of the *canhu* beverage permitted. In February 2022, I attended the *ku palha ukanyi*. During the ritual, the *régulo* addresses the ancestors, offering thanks for their protection and requesting continued blessings for the community's well-being. While participating, I asked some community to explain the meanings of the ritual and the rules surrounding it. The *ukanyi* season is recognized as a festive and socially significant period, during which people come together to celebrate, share the drink, and reinforce communal ties. Notably, the sale of *canhu* is strictly forbidden during this time, emphasizing its status as a symbolic and cultural good rather than a market commodity. This prohibition reinforces the value placed on reciprocity, solidarity, and collective enjoyment over individual profit, and it reveals how communities frame resilience not only in terms of material adaptation but also through practices that strengthen social cohesion, moral order, and ancestral protection.

Local elders describe the *ukanyi* season as a period of social renewal and reconnection. During this time, families from different villages visit one another, and extended kin networks are reactivated. As one elder explained,

> *Ukanyi* creates and reinforces networks of solidarity among people of different means, and it plays a vital role in helping the community respond to crises, such as natural disasters, food shortages, or the loss of seed stocks for farming.

These gatherings serve as important spaces for the exchange of resources, knowledge, and emotional support, helping to rebuild trust and reaffirm collective identity. In this sense, both the ritual and the beverage sustain not only ancestral ties but also practical systems of mutual aid and resilience.

The *ku palha ukanyi* ritual is grounded in the belief that *canhu* nourishes not only the living but also the spirits of the ancestors. Offering the first fruits of the season is seen as a way of showing respect and joy and of inviting the ancestors to share in community life and ensuring their ongoing protection. In this cosmological framework the vitality of people and land is understood to depend on a reciprocal relationship with the spiritual realm that must be maintained through ritual care and collective observance.

These examples show that in Magude, resilience is based on more-than-human social ties, strengthened through rituals such as *ukanyi,* rather than on infrastructure. These practices foster solidarity, reciprocity, and mutual aid in

communities, all of which are vital for coping with crises such as droughts or food shortages, on individual, household, and collective levels. In contrast, state-led adaptation frameworks often hope to achieve resilience primarily through technical solutions such as improved irrigation systems, seeds, and early warning systems, overlooking the cultural and spiritual dimensions that sustain the collective capacity to endure and reorganise in the face of climate variability.

The belief in ancestral protection in Magude extends far beyond public rituals and collective ceremonies; it is deeply ingrained in the rhythms of everyday family life, particularly in agricultural and pastoral activities. Each household maintains a personal relationship with its lineage of ancestors, who are regarded not only as protectors of the family but also as custodians of the land. While the public *ku palha* ritual performed by the *régulo* marks the formal and communal opening of the agricultural season, many families also conduct private rituals to seek ancestral guidance and blessings. These household ceremonies are typically led by a *nyanga* (traditional healer), who acts as an intermediary between the living and the ancestral spirits, interpreting signs and communicating intentions on behalf of the family (Humbane 2009; Mahumane 2008).

At the beginning of each farming cycle, it is common for families in Magude to consult a *nyanga* to seek guidance and blessings for the agricultural season ahead. Through ritual and divination, the healer communicates with ancestral spirits to determine the most auspicious moment for planting. This household-level practice does not contradict or undermine the communal *ku palha* ceremony; rather, it reflects a layered cosmological system in which the authority of public ritual coexists with the intimacy of personal ancestral relationships. As one farmer noted, some families place greater trust in the guidance of their ancestral spirits, waiting for a specific sign or message before sowing maize, even if this means sowing at a different time than the officially declared planting date. This illustrates a temporal dimension of resilience: rather than adhering to fixed calendars imposed by the state, households cultivate flexibility by aligning their agricultural rhythms with spiritual cues. Such practices reflect an alternative temporality of adaptation, where resilience lies in adjusting to signs of ancestral approval and ecological variability rather than in conforming to uniform schedules.

Ancestral protection extends beyond the timing of agricultural activities; it is also invoked in response to specific threats, such as pests or other disturbances to production. As one resident recounted:

> Whenever snakes appeared in our fields, we would call the *nyanga* to intervene. For a long time, we stopped performing that ceremony, but

> recently the snakes started appearing more frequently again, so we had to call the healer to help us get rid of them.

In this cosmological framework, the appearance of snakes is not understood solely as a natural event but also as a sign of spiritual imbalance or moral transgression. Examples of such transgressions include neglecting ritual obligations, disrespecting elders, and failing to honour ancestral traditions. Such lapses are believed to disturb the harmony between the living and the ancestral world, with snakes acting as visible messengers of this rupture. Therefore, the appropriate response is not merely technical pest control, such as killing or driving the snakes away, but rather a ritual act of reconciliation that restores equilibrium between people, land, and spirits. While technical pest control treats snakes as an external problem to be eradicated, the ritual approach recognises them as signs of relational imbalance, prompting moral reflection, renewed obligations, and collective observance. This understanding reflects a relational ontology in which environmental disturbances are communicative events requiring both symbolic and spiritual engagement rather than purely mechanical solutions.

Ancestral guardianship in Magude also extends to livestock, particularly cattle, which carry both significant economic and symbolic value. Animals are believed to require spiritual protection, and families commonly turn to a *nyanga* for assistance in safeguarding them from threats such as theft, illness, or becoming lost while grazing. Specific rituals are performed to bless and secure the *kraal* (animal enclosure) and to ensure that the animals return safely from the pasture. Crucially, no animal may be slaughtered or sold without first informing the ancestors, a ritual that expresses reverence and secures their consent. According to this worldview, the well-being of livestock is closely linked to maintaining good relations with the ancestors, reinforcing the belief that prosperity and protection depend on moral and ritual obligations (Ainslie 2013; Coertze 1986).

It is important to note a key distinction in ritual authority in Magude: while communal ceremonies are typically led by the *régulo*, household-level rituals fall within the domain of the *nyanga*. Although the term *nyanga* is often used to refer broadly to traditional healers, it encompasses distinct figures with specialized roles (Honwana 2002). The *nyanga*'s primary focus is healing and protection. They offer treatments for illness, perform rituals to ward off misfortune, and maintain spiritual balance within the family. In contrast, the *nyamussoro* holds a broader ritual mandate: in addition to healing, this figure is responsible for divination, serving as a medium through which ancestral messages are conveyed and hidden causes of misfortune are revealed (Honwana 2002; Langa 1992). These practices demonstrate that resilience in

Magude is not conceived solely as the capacity to withstand shocks but also as a moral project rooted in maintaining ancestral approval, fulfilling ritual obligations, and restoring balance to the social and spiritual order.

In Magude, *nyangas* and *nyamussoros* are widely consulted, particularly at the household level. Families often have a trusted healer who provides ongoing support with a variety of issues, ranging from agricultural and pastoral rituals to health crises and interpersonal disputes. These ritual specialists are deeply embedded in local networks of trust and legitimacy, and their knowledge is regarded as essential for navigating both material hardships and spiritual uncertainty (Mahumane 2008).

Zionist prophets and pastors, locally referred to as Zion, play a significant role alongside traditional healers in spiritual healing and protection in Magude. The Zion Church, which is widespread across the district, blends Catholic theology with African spiritual cosmologies, and its leaders are believed to channel both divine power and healing force. In addition to conducting regular worship services, Zionist practitioners perform rituals intended to alleviate suffering, cure illness, and shield individuals from misfortune (Agadjanian 1999; Mahumane 2008).

Alongside the Roman Catholic Church, the Zion Church is one of the oldest and most well-established Christian denominations in the district, although Roman Catholicism tends to be more prevalent in urban areas. In recent years, newer Pentecostal movements, such as the Universal Church of the Kingdom of God and the Assembleia de Deus, have also established a presence in Magude, contributing to an increasingly diverse and vibrant religious landscape. These churches often debate the causes of poverty and hunger, providing a space for local interpretations of droughts, floods, and other misfortunes. Although climate change is not explicitly mentioned, such discussions shape how communities make sense of these events, influencing their broader perceptions of adaptation and resilience.

In Magude, the relationship between the living and the dead is not perceived as a rupture but as a continuous and reciprocal bond. There is a widespread belief in the active presence and influence of ancestral spirits, who are seen as integral to daily life. This interaction between the visible and invisible realms lies at the heart of local cosmologies. Ancestors are not regarded as distant memories but as powerful, sentient entities whose actions can affect the health, fortune, and well-being of both individuals and the broader community. They are viewed as guardians who offer protection against illness, misfortune, witchcraft, sorcery, and environmental threats. However, their protection is not unconditional; they may withdraw it or harm those who violate moral norms or social expectations (Honwana 2002).

One of the central rituals through which families in Magude reconnect with their ancestors is the *mhamba* ceremony. This ritual serves as a space for spiritual renewal and social repair, allowing the living to acknowledge, appease, and realign themselves with their lineage and the ancestral realm. Locally, this practice is also referred to as the Cult of the *Tinguluve* (Langa 1992) or the Cult of the Ancestors (Feliciano 1998). The term *tinguluve* designates the spirits of deceased family members, and *nguluve* is the local word for "ancestor." These terms underscore the intimate and embodied relationship that families maintain with those who have passed on, highlighting a worldview in which ancestral presence continues to shape earthly life.

The *mhamba* is regarded as a major familial event in Magude, mobilising not only the immediate household but also the extended kin network, including distant relatives. Typically lasting around three days, the ceremony involves singing, drumming, dancing, offerings of food and drink, and animal sacrifices. Its primary aim is to honour the ancestors, restore social and spiritual harmony, and remove obstacles that are believed to stem from a rupture in the ancestral relationship (Humbane 2009). Commonly cited motivations for organizing a *mhamba* include prolonged illness, persistent poor agricultural yields, frequent livestock losses, or a general sense of stagnation in the family's progress and well-being.

Crucially, the decision to perform the ritual is usually preceded by a consultation with a traditional healer, who diagnoses the situation through divination and determines whether ancestral displeasure is the underlying cause. In such cases, the *mhamba* becomes an act of cosmic communication, a means of re-establishing the balance between the living and the dead. As Langa (1992:76) succinctly notes, "The crisis is provoked by the Nguluve and is a way of calling attention to the living – it is their language."

More than a spiritual procedure, the *mhamba* functions as a moment of identity affirmation and cultural continuity. From the preparation of offerings to the organisation of the gathering, participants engage in practices that reinforce a shared sense of belonging and reaffirm their connection to a lineage, a family history, and a moral universe grounded in tradition (Humbane 2009). As such, the ritual not only resolves spiritual imbalance but also serves to reproduce social memory and cultural authority, transmitting values, obligations, and cosmological understandings across generations.

The spiritual landscape of Magude is marked by a plurality of healing systems, where ancestral authority, Christian belief, and local cosmologies coexist and often intersect. Communal ceremonies like *ku palha* are led by the *régulo*, while household rituals are conducted by *nyangas*, *nyamussoros*, or

Zionist pastors, depending on the nature of the issue and the family's spiritual orientation. This diversity reflects the syncretistic, adaptive, and layered nature of local religious practice, where different forms of knowledge are mobilized to address illness, misfortune, and environmental uncertainty. Here, healing is never solely physical; it is also moral, relational, and cosmological. These practices are part of a wider ecology of care and resilience, rooted in ancestral legitimacy and spiritual effectiveness.

Taken together, these practices and rituals reveal that the resilience of the people of Magude is rooted in a unique set of moral, temporal, and relational principles. Firstly, resilience is rooted in social relations; rituals such as *ku palha* and *ukanyi* foster solidarity, reciprocity and a sense of collective identity, thereby strengthening social cohesion in times of hardship. Secondly, resilience is grounded in a long-term temporal frame; ancestral guidance places agricultural decisions within long-term cosmological rhythms rather than short-term technical calendars, providing flexibility and continuity across generations. Thirdly, resilience is in morality; prosperity and protection depend on fulfilling ancestral obligations, showing respect, and maintaining balance between the living, the land, and the spiritual realm. These perspectives contrast with state and donor framings of resilience, which often reduce it to infrastructural investment or improved seeds. While institutional responses focus on technical solutions, local understandings emphasise resilience as a lived moral project, rooted in ancestral legitimacy, relational balance, and temporal continuity.

In the next section, I examine how these traditions and cosmologies influence local understandings of climate change and how people in Magude interpret environmental disruptions through spiritual and moral lenses.

Local Perceptions on Climate Change in Magude

Unlike scientific discourse centred on abstract concepts such as greenhouse gas emissions, or atmospheric modelling, many residents interpret environmental phenomena such as droughts, floods, and shifting seasons as manifestations of spiritual imbalance, ancestral displeasure, or moral transgression. These interpretations are integral to daily life, shaping how risks are assessed, causality is assigned, and appropriate responses are determined.

As evidenced by the traditions outlined earlier, many community members associate the disruption of seasonal cycles with the erosion of ancestral practices. For example, an elderly man lamented the cessation of a once-annual public ceremony at the district's sacred tree, highlighting a broader sentiment of cultural loss:

> Nobody gathers *canhu* to drink there anymore, and no ceremonies are held there [at the sacred tree]. Some administrators tried to revive the tradition, but the younger generation no longer wants to engage with it.

This testimony reflects a broader concern. The abandonment of ritual observances has undermined the community's spiritual reciprocity with nature. Historically, the start of the rainy season was marked by ritual invocations to seek the favour of the spirits, which were believed to underpin agricultural success. As Chongo, another elder, explains:

> In the past, there were rules, and customs were followed. Nowadays, we have the government with its laws, but they are out of step with the times we live in. People today do not know traditional customs. The *mbelele* ritual, which used to be performed, no longer has any effect because everything is reversed.

The *mbelele* brought up by Chongo is a reference to the *njelele* rainmaking ritual of the Matobo Hills in Zimbabwe, a ceremony once central to invoking rainfall and restoring harmony between people, ancestors, and the natural world (Bhebhe 2019). Chongo's reflection underscores the disjunction between state-led adaptation strategies, which prioritise scientific frameworks and technical interventions, and the community's spiritual and cultural interpretations of climate phenomena. This disconnect undermines the cultural legitimacy and practical effectiveness of local adaptation efforts.

A similar concern is voiced by Mario, a former farmer, who critiques the marginalisation of local ecological knowledge by government authorities:

> In the past, when there was a plague, we performed a ritual. The women would go out naked and insult the pests, and they would disappear. Today, when we suggest performing this ritual, government scientists dismiss it as nonsense. They tell us to buy chemicals and apply them to our fields. But that doesn't solve the problem because those products are too expensive.

Mario's account illustrates how official adaptation responses privilege external technical solutions over culturally embedded practices. As scholars have shown, such dismissals ignore the underlying logic and historical efficacy of local knowledge systems, which have supported agricultural livelihoods for generations (cf. Berkes 2008; Posey 1999). In Magude, climate change is thus not only interpreted through meteorological data but also through

the perceived breakdown of ancestral relationships, ritual obligations, and moral order.

This weakening of ritual life is further compounded by the perceived decline in the authority of traditional leaders, the *régulos*, who have historically served as custodians of spiritual and social equilibrium (Meneses and de Sousa 2009; Buur and Kyed 2005). Many residents view current *régulos* as lacking appropriate authorisation from the ancestral lineage of the former chiefs. This critique stems from the fact that the current *régulos* are state-sanctioned and thus viewed as politically appointed rather than having inherited their roles through proper ancestral succession. This perceived illegitimacy is seen to compromise the efficacy of rituals and to sever the community's connection to the spiritual realm, thereby fostering environmental imbalance.

Alongside these shifts, a system of strict prohibitions that once regulated conduct and maintained harmony between people and the environment has also eroded. These taboos functioned as vital social mechanisms, reinforcing ecological balance and sustaining sacred relationships with the land. An elder recalls:

> If it thundered or there was lightning, people were forbidden from going to the farm the next day. If someone had an abortion, they could not return to the fields. If there was a death in the community, weeding was prohibited, and if a woman gave birth to twins, she was not allowed to work the land.

Although many of these prohibitions are no longer widely observed, they once formed a normative framework that guided interactions with the environment and shaped collective responses to climatic fluctuations. Their decline, together with the weakening of ritual authority and ancestral practices, contributes to a broader sense of moral and ecological disorientation in the face of climate change.

The loss of spiritual and cultural order in Magude echoes similar dynamics observed elsewhere. Amongst the Marshall Islanders, for instance, climate change is not primarily framed as an environmental or scientific crisis but as a crisis of tradition. As Rudiak-Gould (2016) notes, for the Marshallese, the root cause of climate instability lies in the erosion of local knowledge systems and the spread of foreign, polluting technologies such as air conditioners and gas-fuelled motorboats. These technological intrusions disrupt ancestral practices that once maintained a delicate harmony with the natural world. From this perspective, climate change is not solely about rising sea levels or altered weather patterns; it represents the unravelling of cultural practices that

historically ensured ecological balance. This framing encourages a broader view of climate change, considering it not only a biophysical phenomenon but also a cultural and existential disruption. This highlights the need to revitalise traditional ways of living and relating to the environment.

In Magude, a similar interpretation emerges. The erosion of customary norms and ritual prohibitions is frequently described by elders as the root cause of contemporary environmental disturbances. Xuvuri, an elder, articulates this view with striking clarity:

> The climate has changed because there are no longer rules. Everyone wakes up and does whatever they feel like. In the past, there were rules. People were afraid. We respected things, and now we don't.

His words reflect the widespread belief that the loss of social discipline, which was once upheld through spiritual authority and moral obligations, has not only undermined cultural cohesion but also the environment's ability to function in balance. From this standpoint, climate change is perceived not merely as the result of external forces or global emissions but as a consequence of a profound moral rupture. It is a spiritual crisis rooted in the abandonment of ancestral responsibilities and the breakdown of reciprocal relations with the land.

This worldview is not unique to Magude. Across diverse African contexts, similar cosmologies link environmental well-being to the maintenance of ritual obligations and respect for the ancestors. Among the Mijikenda of coastal Kenya, the degradation of sacred *kayas* (forests) has been directly associated with climatic disturbances (Nyamweru et al. 2008). The Shona of Zimbabwe interpret deforestation as an affront to ancestral spirits, inviting misfortune (Mukamuri 1995), while the Dagara of Burkina Faso attribute erratic rainfall to spiritual neglect and failure to fulfil ritual duties (Somé 1994). In each case, ecological instability is understood not merely in material terms but as a manifestation of disrupted relationships between humans, nature, and the spiritual realm. These indigenous epistemologies present a profound challenge to the dominant logic of Western climate science, which often treats environmental change as a neutral, objective process, detached from cultural meaning and moral responsibility (Barca 2020).

Christian narratives have also become interwoven with traditional beliefs in Magude's understanding of climate change. Many residents, particularly those affiliated with the Pentecostal, Zionist, and Roman Catholic churches, interpret extreme weather events through the lens of biblical eschatology, drawing on scriptural passages that describe environmental catastrophes as signs of the end times. Within this framework, extreme weather events such

as droughts and floods are frequently interpreted as manifestations of divine punishment, triggered by moral decay and spiritual disobedience.

Hodjana, a fisherman, articulated this view in overtly theological terms:

> Everything has changed. In the past, people knew when to plant, they knew when it would rain, and in fact, it did rain at that time. Now, no one knows when it will rain; everyone is just waiting – it's not easy. God is angry; He wants to test us, to see what we will do. He must be thinking, "Now that they despise me (*zonda*), what will they do?" He wants to punish us so that we return to worshipping Him.

Similarly, Lamuli, a former farmer and cattle breeder, attributed climate unpredictability to divine retribution:

> What we are experiencing today is God's punishment. He is angry because of people's behaviour. Nowadays, people no longer care about God's commandments, and that's why He has become angry and withheld the rain.

These interpretations reinforce a moral reading of climate change in which environmental instability is understood as a spiritual crisis demanding repentance and renewed devotion to God. By doing so, they reflect traditional views that see ecological disruption as a result of moral or ritual violations, albeit with key differences. While ancestral frameworks emphasise restoring balance through ritual and re-establishing relationships with the spirits of the land, Christian teachings often promote repentance, prayer, and the abandonment of indigenous practices viewed as idolatrous.

This intersection of belief systems creates a layered and sometimes conflicting interpretive landscape. Elders may advocate for the revival of rainmaking ceremonies and ritual observances as necessary responses to climate change, while church leaders frequently condemn such practices, contributing to their decline. As a result, Christian moral narratives not only shape how climate change is perceived but also influence which forms of knowledge and response are legitimised or marginalised within the community. The coexistence of, and occasional tension between, these frameworks highlights the complex ways in which religious pluralism influences local perceptions of climate variability in Magude.

Sheridan's (2016) research in Tanzania further stresses the cultural dimension of climate change interpretations. According to the local elders with whom he spoke, rainfall was once governed by ancestral knowledge and sacred relationships with the natural world. These relationships have been disrupted by the adoption of foreign religious practices. The elders believe that

Christian and Muslim prayers for rain disturb God and that the ancestors, who are believed to dwell in sacred forests, are the rightful intermediaries for invoking rainfall. The erosion of these rituals represents not only a spiritual loss but also a disruption to the cosmological order believed to regulate ecological balance.

Similar interpretations are found in Magude, where divine explanations for climatic irregularities are closely tied to the decline of ancestral rituals. In the past, during a drought, the community would gather at the *régulo*'s house, pool their resources, and perform sacrificial ceremonies, often involving the slaughter of an ox, to appease the spirits. Such practices have disappeared today. As discussed earlier, they are now limited to a single ritual marking the start and finish of the agricultural season. Mutisse, an elderly resident, reflected on this change, expressing a sense of loss.

> Lately, we don't hold ceremonies to remember the ancestors. In the past, when the rain was delayed, we would go to the *régulo*'s house, contribute, sacrifice an ox, and perform the ceremony. Today, we don't do that anymore, and the rain no longer falls; it comes when it wants.

Ricotso, a resident of Magude-sede, echoed these concerns, linking the abandonment of customary rules to the disruption of ecological harmony:

> For example, when there was lightning, it was forbidden to go to the *machamba*[9] the next day. When someone in the community died, it was also prohibited to go to the fields. There were rules, and we respected tradition. But we have forgotten all of this. We abandoned our traditions, and now the ancestors are angry with us.

These local perspectives resonate with broader anthropological arguments that highlight the importance of indigenous knowledge in sustaining human–environment relations. Over generations, these systems have integrated ecological understanding with spiritual and moral principles. Today, however, they face mounting pressures from processes of modernisation and state intervention, which contribute to both cultural disintegration and ecological instability. The case of Magude illustrates that climate change is perceived not only as an environmental crisis but also as the erosion of culturally embedded ways of knowing and interacting with the natural world.

[9] *Machamba* is a local term commonly used in Mozambique to refer to a small family farm or cultivated field, usually worked by household members for subsistence or small-scale production.

Deforestation emerges as a critical element in Magude's local climatology, understood through both material and spiritual lenses. While residents acknowledge the tangible environmental consequences of tree loss, such as reduced rainfall, increased soil erosion, and rising temperatures, they also view deforestation as a violation of long-standing ecological taboos. Sacred groves, historically protected as spiritual buffers against environmental degradation, have increasingly been encroached upon for charcoal production, driven by economic necessity. The once-respected trees are now cut and burned indiscriminately, leading many to believe that this destruction has contributed directly to changing rainfall patterns. Zitha, a cattle breeder, voiced this concern:

> Today, people look at the rain ritual with disdain. They no longer respect the *régulo* and say that performing this ritual is madness. In the past, it was forbidden to cut trees, but today we cut them anyway, even burn them. Before, if you cut down a tree, you would be questioned about why you did it. *Canhu*, our traditional drink, is now sold, but it was always forbidden to sell it. Things have changed, and it's no wonder that the rain has changed too – it no longer falls as it used to.

This perspective reflects a broader anxiety that the erosion of cultural prohibitions has weakened social cohesion and, simultaneously, destabilised the natural world. Within traditional belief systems, trees were often considered dwelling places for spirits, and their destruction was believed to provoke spiritual unrest, which in turn was thought to disrupt ecological balance.

In sum, Magude's experience illustrates how economic pressures, ecological degradation, and spiritual worldviews intersect in shaping local understandings of climate change. Whereas scientific explanations emphasise carbon cycles and hydrological processes, residents weave moral and spiritual meanings into their interpretations of environmental shifts. Yet these perspectives are often marginalised in mainstream climate governance, where Western scientific frameworks tend to dismiss spiritual explanations as superstition and prioritise technocratic solutions. Such exclusion reflects a broader pattern in adaptation strategies that overlook local knowledge in favour of externally imposed interventions (Klenk et al 2017; Makondo and Thomas 2018; Naess 2013).

Magude's case therefore raises fundamental questions about the epistemological foundations of climate governance: should policies rely exclusively on Western science or also embrace diverse knowledge systems? The community's holistic framework, which integrates spiritual, moral, and

ecological dimensions, offers a compelling alternative to the reductionism of conventional climate science. Postcolonial scholars contend that incorporating marginalised perspectives broadens the conceptual tools available to confront environmental crises (Escobar 1999; Harding 2015). Crucially, this is not a call to substitute Western science with African religious worldviews as a new panacea. Rather, scholars such as Tarusarira (2017) and Escobar (1999) advocate a pluriversal approach rooted in decolonial thinking. Such an approach values the coexistence and dialogue of multiple epistemologies, including scientific, indigenous, and religious ways of knowing, and creates space for mutual recognition and integration across knowledge systems.

From this perspective, meaningful climate action in Africa must begin with an acknowledgement of the full spectrum of human experience, including spiritual resources. Recognising this relational epistemology and fostering dialogue between indigenous and scientific knowledge systems is essential for developing adaptation strategies that are not only effective but also ethical and culturally grounded (Aswani et al. 2018; Nadasdy 1999; Rosengren 2022).

Conclusion

This chapter has examined the complex interplay between official climate adaptation strategies and local cosmological frameworks in Magude. It has shown that Mozambique's climate governance is increasingly shaped by global agendas and technical planning instruments such as the ENAMMC, NAP, and PLAs. These policy frameworks translate adaptation into a language of infrastructure, scientific forecasting, and measurable outputs. In this framing, resilience is equated with irrigation coverage, the introduction of drought-tolerant seeds, or the establishment of disaster management committees. Such interventions are designed to be legible to donors and central government institutions, aligning with international benchmarks of efficiency and accountability.

In Magude, however, adaptation is not merely a technical exercise but a cultural, spiritual, and relational process. It is grounded in ancestral relationships, moral order, and ritual observance. Ceremonies such as *ku palha*, seasonal prohibitions, household rituals led by *nyangas*, and collective practices around *ukanyi* do not operate as peripheral elements of livelihood strategies; they constitute the moral and epistemological foundations through which environmental change is interpreted and acted upon. Here, resilience is expressed not in engineering terms but in the renewal of social ties, the maintenance of ancestral approval, and the observance of moral obligations toward land and community.

The gap between these two approaches is not simply a matter of emphasis; it is an epistemological rupture. While government plans imagine adaptation as a rational, linear process that can be implemented through technical fixes, local communities understand climate variability as inseparable from the erosion of ritual life, the decline of traditional authority, and the breakdown of ancestral obligations. For residents, droughts and floods are not just climatic anomalies; they are signs of spiritual imbalance and moral rupture. For the state, by contrast, they are problems to be solved through engineering and modernisation.

This disjuncture explains why official interventions, even when technically sound, often fail to resonate locally. Drip irrigation systems and improved seeds, celebrated in national reports, are met with scepticism because they disrupt ancestral rhythms, impose unsustainable costs, and disregard the cultural meanings of farming. Community testimonies emphasise that the loss of rituals or the contested legitimacy of *régulos* contributes directly to environmental disruption, perspectives that remain invisible in state planning, where knowledge is reduced to quantifiable indicators rather than moral and ancestral legitimacy.

Magude's experience demonstrates that resilience is a deeply contested notion. In policy frameworks, resilience is imported from global debates and reduced to the capacity to absorb climatic shocks, emphasising climate variables while neglecting the wider economic, cultural, historical, and spiritual dimensions of change (Reid 2013; Grove 2014). In contrast, communities in Magude experience resilience as a social process tied to extended kinship networks, rooted in spiritual worlds, and directed toward intergenerational continuity. This temporal dimension, in which ancestors, the living, and future generations are interconnected, reflects a radically different understanding of resilience that cannot be captured by donor indicators or short-term technical interventions.

By failing to address these broader intersections, government schemes of resilience are partial, superficial, and ultimately doomed to fail. They reproduce the limitations long identified in development and conservation policies, which celebrate local knowledge rhetorically but marginalise it in practice. The discrepancy between government plans and community practices reflects two incompatible approaches to understanding and managing environmental change. State-led frameworks prioritise technocratic visibility and institutional alignment, whereas local communities base their responses on moral, spiritual, and relational principles. This dissonance is embedded in the very architecture of Mozambique's climate governance,

where local knowledge is recognised during the diagnostic phase but then excluded from the design and implementation phases.

Consequently, while adaptation strategies appear comprehensive on paper, they remain fragile in practice. Magude's case study highlights that adaptation is less a neutral technical process than a contested arena of meaning, authority, and legitimacy, where global, national, and local epistemologies meet but rarely converge.

Chapter 4: Agriculture and Climate Change Adaptation in Magude

Agriculture is one of the most important productive sectors of the Mozambican economy, accounting for about 24% of GDP between 2009 and 2019, the highest share in the country (Abbas 2022). It is also a key source of employment, engaging over 80% of the economically active population over the past two decades (Aiuba 2023; Walker et al. 2006). The sector is dominated by small-scale producers who rely primarily on family labour and subsistence farming (Arndt et al 2011; Mosca 2024). Family farming in Mozambique is predominantly rural and depends heavily on rain-fed agriculture, making it highly vulnerable to climate variability (Abbas 2022; World Bank Group 2011).

This heavy reliance on rainfall makes agriculture one of the sectors most susceptible to climate change, particularly when compounded by factors such as poverty, poor communication infrastructure, and lack of electricity (Mather 2009; Matyas and Silva 2013; Silva et al. 2015). Poverty restricts access to financial and technological resources, making it difficult for farmers to adopt agricultural practices, such as crop diversification, irrigation systems, or drought-resistant seeds, that governmental programmes promote as resilient. Similarly, the absence of electricity limits the ability to store food through refrigeration and use electric irrigation systems. Inadequate communication infrastructure further hampers farmers' access to vital information, preventing them from taking timely preventive measures. Collectively, these challenges reduce the capacity of rural farmers to respond effectively to climate change.

Floods and specially droughts are the most significant climatic events affecting agriculture in Mozambique. Shifts in temperature and rainfall patterns have profound impacts on agricultural production, often leading to food insecurity (Abbas 2022:13; Arndt et al 2011). With much of the farmland reliant on rain, the erratic nature of rainfall, characterised by delayed onset and early cessation, has severely affected productivity. Additionally, Mozambique's vulnerability to floods is exacerbated by its geographical location. Many of its rivers are part of shared international basins, making the

country highly susceptible to flooding when upstream nations release water from their dams or experience heavy rainfall (MICOA 2012; MTA 2021; Zacarias 2013).

This chapter examines how agricultural production in Magude is situated within broader climate change discourses, adaptation frameworks, and local knowledge. It explores both externally driven interventions, such as government- and NGO-led programmes, and locally rooted coping strategies. Through an analysis of the interplay between environmental stressors, policy priorities, and community-level initiatives, the chapter demonstrates that adaptation is not a neutral or evenly distributed process but rather one that is shaped by social differentiation, institutional power, and historical inequalities.

Agriculture in Magude District

Farming Practices in Magude

In Magude, agriculture depends mainly on seasonal rainfall, but some cultivation also relies on irrigation. As discussed in the Farmers' Associations section of this chapter, motor pump systems operate on a limited scale, serving plots located close to rivers and other water sources. Rain-fed agriculture is primarily practised on small family farms, with labour provided mainly by household members. These farms rely on traditional tools, such as animal-drawn ploughs, hoes, axes, and scythes, as well as natural fertilisers, including animal manure, for preparing and maintaining the fields.

One of the most common methods for clearing land and preparing soil in Magude is slash-and-burn agriculture (swidden farming). This practice remains widespread among the rural population and is also employed for hunting, with fire traditionally used to encircle and trap animals, as well as for logging and pasture expansion. While often regarded as efficient by local farmers, the use of fire in land management is officially discouraged by the government, which frames it as an anthropogenic contributor to drought intensification (MICOA 2007). However, this narrative has increasingly been challenged by scholars who emphasise the ecological logic of fire-based systems and the importance of traditional ecological knowledge (Fairhead and Leach 1996, 2009). These debates contest reductionist views of environmental degradation by highlighting the adaptive and regenerative aspects of local fire management practices.

As in the rest of Mozambique, agricultural activities in Magude follow a seasonal cycle defined by two main periods: the rainy season and the dry season. The rainy season, considered the first agrarian season, begins in October and continues until March. Characterised by high temperatures and

regular rainfall, this period enables the cultivation of crops such as maize, peanuts, and *nhemba* beans. Maize, the district's staple crop, is typically cultivated on higher ground in medium- to large-sized plots. The dry season, from March to September, coincides with the second agricultural period, during which farmers focus their activities in low-lying areas near rivers, ponds, or wetlands. Vegetables, legumes, and tubers are cultivated during this period, particularly where residual moisture or irrigation is available.

Farming households often cultivate land in several different ecological zones to make the most of the seasonal conditions in each area. This spatial diversification maximises production opportunities and reduces vulnerability to climate variability. Furthermore, many smallholder farmers implement various agroecological strategies to maintain soil fertility and enhance resilience. One such strategy is intercropping, especially of cereals with legumes such as beans or groundnuts. Farmers also engage in seed interbreeding and participate in informal seed exchange networks to ensure genetic diversity and adaptation to local conditions. Crop diversity, including the cultivation of both indigenous and introduced species, is considered a safeguard against climatic shocks and crop failure (see the section on climate coping strategies in this chapter for further detail).

Another key strategy for maintaining soil health is fallow rotation, which allows natural vegetation to regenerate and nutrient levels to be replenished. In Magude, this rest period usually lasts from March to October, during the cooler season when households move from the uplands to farm in the lowlands. During this time, upland plots remain fallow and gradually revert to bushland. When the rains start in October, families return to their upland fields and start cultivating them again, while the lowlands are left to rest. The length of these cycles can vary depending on plot size, soil quality, and household labour capacity.

Fruit trees, both wild and domesticated, are commonly found in fields and on customary land surrounding them. Some species, such as mango, orange, and sugar apple, are deliberately planted by families, while others germinate naturally when discarded seeds sprout. Wild species, including *canhu* and *massala* (*Strychnos spinosa*, monkey orange), also grow spontaneously in the bush. Access to their fruit is generally determined by household control over the land where the trees are found. Trees planted in family fields belong to the respective households, whereas wild trees on communal land are more openly accessible, though local norms often regulate who can harvest them and when. These trees are highly valued for their nutritional benefits and as essential sources of food during droughts or poor harvest years; thus, the importance of communal land to resilience is huge. This has rarely been acknowledged in

national and global climate change programmes, as anthropological studies emphasize (Hara et al. 2009; Haller 2007, 2010).

Almost every household in Magude owns at least one agricultural plot, typically ranging from 0.5 to 5 hectares. According to the 2020 Integrated Agricultural Survey, this is typical for a smallholder farmer in the family sector in Mozambique (MADER 2021). The size of these plots varies by location, with families living in Magude-sede generally having smaller landholdings than those in other villages of the district. This difference is due to the greater demand for space in the district headquarters, where social infrastructure such as schools, hospitals, housing, shops, and markets is more concentrated. In Magude-sede, during the winter, families grow vegetables on small plots either in their own backyards or along the banks of the Inkomati River. In the summer, they cultivate cereals on larger plots situated farther from their homes. In contrast, families residing in more rural areas tend to have larger plots of land, usually located close to their residences.

The size of the cultivated area also depends on the size of the household. Smaller families usually work plots ranging from 0.5 to 1 hectare, while larger families, particularly polygamous households where a husband has two or three wives and multiple children, typically cultivate between 2 and 5 hectares. Although the number of people to feed is significant, the availability of family labour is also higher, allowing them to cultivate more land. Wealthier families, often those with large cattle herds exceeding 150 animals and whose head of household has additional sources of income, such as working as a miner in South Africa, also tend to farm on larger plots. Their financial stability enables them to purchase or rent tractors, making it easier to plough and cultivate extensive areas of land. As I show below, differences in affluence and household size predetermine not only the extent to which households are affected by unpredictable climate events but also require different adaptation strategies. Such diversity is poorly addressed in the government programme of adaptation to climate change and resilience.

Agricultural Cycles and Everyday Rhythms

To provide a more grounded perspective on this broader picture, I offer an example of the daily routines of the Nhantumbo and Bila families, whose agricultural activities reflect some of the seasonal patterns and adaptive practices in the district. Like many farming households in Magude, their routines shift significantly between the rainy and dry seasons, which influence how labour is allocated and how different members contribute to the household's food production.

The Nhantumbo family consists of eight members: the husband, his two wives, and five children. During the rainy season, which usually begins in October, work in the fields becomes more intense, and the family devotes more time and energy to farming. Early in the morning, the family divides into two main groups, each consisting of a wife and her children. The first wife has three children, two boys (16 and 9 years old) and a girl (13 years old). The second wife has two children, a boy and a girl (aged 11 and 7). One group goes to the fields to work while the other stays at home to take care of household duties. This division alternates weekly, so the group that works in the fields one week stays home the next, and vice versa. A third group, composed of the male children and an external worker, looks after the livestock. A schedule is created to ensure that all the boys take turns grazing the animals. Thus, not only is the workload fairly distributed but learning useful skills and experiences of herding is also secured for all male siblings.

The rainy season coincides with summer, so the family wakes up early, typically at 4 a.m. One of the groups joins the head of the family to go to the fields. In the field, ploughing and sowing are done by Mr Nhantumbo in conjunction with one of his wives and their children. Ploughing is done with cattle, and sowing is done by hand. Mr Nhantumbo manages the cattle and plough, while his wife and children handle the seeding. Weeding and harvesting involve the entire family, who then transport the maize to the barn built in the yard. Due to the intense heat during this time of year, activities in the field end around 9 a.m., and the group returns home to rest. While the fieldwork group is away, the other wife and children tidy up the house, fetch water, and cook. It is their responsibility to have breakfast ready for the others when they return. Breakfast typically consists of tea with cassava or sweet potatoes. This group also prepares lunch and dinner for the family. After resting, those who worked in the fields take care of other activities, such as grazing the animals or burning charcoal. The family's livestock is looked after by the three male children, who usually go to pasture around 10 a.m. and do not return until late in the afternoon, around 5 p.m.

The example of the Nhantumbo family reflects a typical structure of a polygamous household, where roles are divided based on family members and the seasonal nature of farming. However, in larger polygamous families, such as the Bila family, the division of labour can become even more complex. The Bila family live in Moine, and their household comprises approximately 30 members. In this case, the family structure is significantly larger, with Mr Bila having five wives, each of whom has her own plot of land within the expansive family plot. These plots are collectively cultivated by the wives and their children. Mr Bila plays a central role in the agricultural activities, especially

during critical times such as ploughing and sowing. His involvement is not limited to just one plot – it extends to assisting his wives' various farms, making him an essential part of the production process for the entire family. This model contrasts with that of smaller polygamous families or monogamous households, where the division of labour might be more straightforward. For the Bila family, the complexity of having multiple wives means that meals are also prepared separately. Each wife is responsible for producing and cooking food for herself and her children, which creates a sense of autonomy within the larger family structure, even though they all live under one roof. This separation in meal preparation and food production reflects the individualised responsibilities and roles within the family, despite their shared living space. The division of labour also extends to the farming activities, where each wife is in charge of her plot. Still, the overarching responsibility for the family's agricultural production rests with Mr Bila.

Generally, after the harvest, the women of the family take responsibility for sorting the maize. They carefully select the best cobs to store in the barn and set aside the best grain to use for the next planting season. To prevent spoilage, the grain is mixed with ash and stored in hermetically sealed glass jars or plastic barrels. This method ensures the maize stays fresh for a longer period. It's rare to find a house in Magude without a granary, usually built above the main house and often doubling as a kitchen. Storing maize in the barn above the kitchen serves two purposes: it prolongs the maize's shelf life and uses the smoke from cooking to deter pests. The smoke entering the granary scares away insects, helping to prevent infestation. However, if pests such as the larger grain borer (*Prostephanus truncatus*) manage to enter the barn, they can cause severe damage. In Massingir, another rural district in southern Mozambique, Milgroom and Giller (2013) found that 56% of stored maize ears showed signs of insect damage after 9–12 months, with the kernels in most cases being 75–100% destroyed. Such damage represents potential weight losses of up to 30%, prompting families to take great care to protect their stores because infestations can rapidly undermine food security.

To reduce losses, some families purchase insecticides to sprinkle on the maize before storage. Peanuts and beans are typically kept in bags in the kitchen, away from mice, ensuring preservation in a safe, dry place. Among families like the Bilas, where each wife manages her own harvest, such post-harvest routines of sorting, preserving, and storing food are essential for safeguarding household food security. The attention to storing maize and other crops reflects the careful planning and coordination needed in larger families, particularly in polygamous households, where food preservation must be managed on a larger scale. The shared responsibility for food security within

these families shows how agricultural practices and household management are deeply intertwined, with each member contributing to the success of the family's farming efforts from planting to harvest to storage. Family structure and roles are thus essential parts of resilience, and their transformations, whether due to migration, poverty, military conflicts, or food shortage, play a huge role not only in adaptation to climate change but also in shaping how climate events and vulnerability are experienced.

During the dry season, agricultural practices in Magude shift. Production takes place in smaller fields, primarily in low-lying areas near natural water sources. Magude is home to six rivers and an equal number of lakes. The Inkomati River, the largest in the district, flows for about 480 kilometres. It originates in the Mpumalanga Province of South Africa, crosses through Eswatini (formerly Swaziland), and enters Mozambique, where it eventually flows into the Indian Ocean. The river has several tributaries, with the Mozimuchope River being the largest and a significant contributor to the district's hydrographic network. During the dry season, farmers cultivate crops along these rivers and lagoons, which are typically filled with water from the previous rainy season.

In years with a good harvest, the granaries are usually full of maize by the time the dry season arrives, and farmers then focus on growing vegetables to supplement their food supplies. This work is typically undertaken by women, who cultivate crops such as cabbage, lettuce, cassava, and sweet potatoes in small plots of about 5x10 meters. Men are rarely involved in this type of farming, as it is traditionally seen as "women's work" within the community. The gendered division of labour highlights women's central role in sustaining food security during the dry season, when their cultivation of vegetables provides both dietary diversity and a crucial buffer against shortages.

Beyond the Household: Irrigation and Cash Crops

There is a clear preference for farming in areas near natural water sources, such as rivers and ponds, due to the availability of soil moisture and easy access to water. However, some farmers have recently expressed concerns, saying, "There has been little rain recently, and the rivers are dry." In areas where natural water sources have dried up or where there is no river or pond at all, women often turn to alternative sources of water. They flock to standpipes or dams constructed by the government and NGOs to meet their irrigation needs. For example, in Mahele, a group of women frequently farm in small plots near a borehole recently built by Helpcode. These women rely on water from hand-held watering cans to irrigate their crops, demonstrating

the adaptability and resilience of farmers in the face of changing climatic conditions and limited access to water resources.

Sugarcane, classified as a cash crop, is also an important agricultural product in Magude. It is cultivated on a large scale, primarily by the Açucareira de Xinavane (AdX) factory but also by small producers who are organised into agricultural associations.[10] AdX operates as an agro-industrial company, integrating both agricultural (sugarcane cultivation) and industrial (sugar production) activities. The AdX plantation is one of the largest employers in the district, and many households depend directly on it for wage labour. The sugar factory focuses on producing sugar and molasses for both domestic consumption and export, though it does not produce refined sugar or other sugarcane derivatives. The sugar estate generates both permanent and seasonal employment, with permanent workers engaged in industrial, service, and administrative tasks, while seasonal workers are primarily involved in agricultural operations (O'Laughlin and Ibraimo 2013).

The Xinavane Sugar Estate, operated by Tongaat Hulett,[11] spans the districts of Magude and Manhiça in Maputo Province, with most of its plantation area located on the southern bank of the Inkomati River in Magude. Its production areas include the Maholele expansion (west of Magude), the Western area (east of Magude and near Xinavane), and the Eastern area (further east of Xinavane) (Tongaat Hulett 2019). The sugarcane fields are irrigated using a system of pipes installed by AdX, drawing water from the Inkomati River. Additionally, pumps are deployed in various water sources, such as rivers, streams, and cisterns, across AdX plantation areas (Weng et al. 2013).

In 2008, following an extensive modernisation effort, Tongaat Hulett sought to expand its production through a combination of three production methods: directly cultivating its own land, working with small producer associations, and engaging independent private growers (O'Laughlin and Ibraimo 2013; Tongaat Hulett 2019). Smallholder farmers, organised into associations, supply sugarcane to AdX under an out-grower scheme, allowing them access to AdX's irrigation infrastructure in exchange for financial compensation. This system enables smallholders to participate in the

[10] See the farmer association section of this chapter for more details.

[11] Tongaat Hulett is a South African company that manufactures a range of products derived from sugarcane. The company operates in six countries in southern Africa, namely South Africa, Botswana, Namibia, Eswatini, Zimbabwe, and Mozambique. In 1998, Tongaat Hulett Sugar acquired a 49% stake and assumed management of the company. It later increased its stake to 88% in 2008. The Mozambican government is now a minority shareholder (O'Laughlin and Ibraimo 2013).

commercial sugarcane industry while benefiting from access to irrigation, technical support, and guaranteed buyers for their produce.

Although the programme initially seemed to create opportunities for smallholders, it also reveals deeper struggles over resource control. In Mozambique, large agro-industrial corporations such as Tongaat Hulett and its subsidiary AdX play a central role in shaping what counts as climate adaptation. Through their ownership of irrigation infrastructure and privileged access to land and water rights, they are positioned as key actors in promoting "modern" and "climate-resilient" agriculture. The expansion of AdX's irrigation infrastructure has largely prioritised industrial-scale production, sidelining subsistence farmers in the process. Access to vital resources such as water is now mediated through commercial interests, reinforcing longstanding patterns of inequality and marginalisation. Such dynamics expose the contradictions of corporate-led climate adaptation strategies and raise critical questions about both the fairness of resource distribution and the long-term viability of sugarcane production in Magude (see the farmer association section of this chapter).

The Climate is Changing

In recent years, Magude has experienced more frequent and prolonged droughts, higher temperatures, and unpredictable rainfall, which have put considerable strain on its rain-fed farming system. Farmers are reporting growing uncertainty about the onset of the rainy season, which complicates their decisions regarding planting and harvesting. Water scarcity has prompted some farmers to adjust their planting schedules, diversify their crops, or adopt irrigation techniques; however, these options are limited by insufficient funds and inadequate infrastructure. The following section explores the impact of these changing climatic patterns on agriculture in Magude and how local communities perceive them.

Too Little Rain

Drought is not a new phenomenon for local communities in Magude District. The region has historically experienced severe droughts, with significant events recorded in 1942, 1968, 1970, and 1983 (GDM 2015). However, as noted in the INGD report, the frequency and intensity of droughts have increased in recent years, resulting in longer dry spells and more unpredictable rainfall patterns that affect agricultural productivity (INGD 2017). This trend

is widely recognised by many residents of Magude, particularly the elderly, who have witnessed changes in their environment over the past few decades.

According to local accounts, the decline in food production is seen as a key indicator of the deterioration of agro-ecological conditions. While many elders recall a time when food insecurity was far less prevalent, these memories may romanticise the past. Periods of drought and crop failure also occurred in the 1980s. Nevertheless, many people feel that these challenges have intensified in recent decades. Chapo, an 89-year-old farmer and traditional healer, laments the increasing hunger in the district:

> In the old days, we didn't have famine here in Magude. It could happen from time to time because it didn't rain every year, but it wasn't that bad. Now there's hunger in Magude. A lot of hunger. In the past, we didn't eat government-provided food the way we do now; we grew our own food.

Chapo acknowledges that food shortages may have occurred in isolated villages in the past, but he insists that widespread hunger across the district, as seen today, was uncommon before. Chapo links food shortages directly to the lack of rain. His perception is supported by climate data indicating a significant decrease in annual rainfall over the past few decades (Tyson and Preston-Whyte 2000; Rouault and Richard 2003; Usman and Reason 2004; Pinto and Hewitson 2018). Lhongo, a 65-year-old farmer and widow, also reflects on the drastic changes in rainfall patterns. She recalls how, in the 1990s, she and her late husband relied on predictable seasonal rains to grow maize in their field in Mapulanguene:

> It used to rain well. We all knew it would rain from the 15th of September. Everyone got ready to plant in September. We celebrated Christmas and the end of the year by eating corn cobs. December was harvesting time, but nowadays it's very difficult. We often get to November before the rains come.

Lhongo's experience aligns with climate data showing a downward trend in rainfall since 2001 (Graph 4). Other studies indicate that Mozambique has experienced more frequent and severe droughts in recent decades, leading to decreased soil moisture, shorter growing seasons, and lower agricultural yields (Masih et al. 2014; Mabhaudhi et al. 2019). Research on climate variability in southern Africa confirms that shifting rainfall patterns, combined with rising temperatures, have disrupted traditional farming cycles, making it increasingly difficult for smallholder farmers to sustain their production (Tadross et al. 2005; Weng et al. 2013).

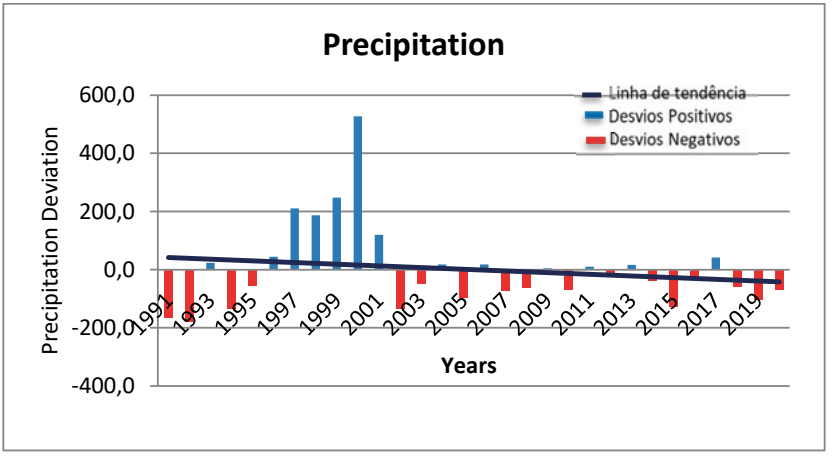

Figure 4. Magude precipitation from 1991–2020 (Source: Chirps Dataset)

Irregularity and Unpredictability of Rainfall

Elders whom I spoke to in Magude recall that rainy seasons used to begin in mid-September or early October, providing farmers with a reliable timeframe for preparing their fields. However, in recent years, the onset of rains has become increasingly unpredictable, making it difficult for farmers to determine the right time to plant. This shift in weather patterns has disrupted traditional agricultural cycles, leaving many reliant on uncertain and erratic rainfall. Mr Macambaco, an elder in the community, describes how weather prediction was once straightforward:

> My uncles and grandparents could tell when it was going to rain just by looking at the clouds. If they said it was going to rain, it would rain because rain had a calendar, and they knew it. They might not predict the exact day, but if they said it was going to rain this week, the week wouldn't end without rain.

Although this account may be slightly idealised, it accounts for a changing reality where farmers struggle to anticipate rainfall, making agricultural planning increasingly difficult. The perception among many Magude residents is that climate variability has intensified, and those who depend solely on rain-fed agriculture face greater challenges than ever before. One local farmer expressed his frustration:

> Today, things have changed for the worse. It no longer rains as it used to, and it has become difficult to plan production, especially for those who depend solely on rain. The rivers are low, and the lakes have no water. We used to fish in the river, but today it is difficult.

While there is no unanimous agreement on when these drastic changes began, many older farmers identify the year 2000 as a turning point. That year, Magude, along with the entire southern region of Mozambique, experienced catastrophic flooding, devastating agricultural production (MAE 2005). This was followed by prolonged drought conditions, as illustrated in Figure 4, which further impacted food security in the district. To mitigate the effects of recurring droughts, the district authorities, in collaboration with the Ministry of Agriculture and Rural Development (MADER), introduced a drought mitigation plan. This initiative involved the distribution of drought-resistant seeds, the promotion of climate-adaptive farming techniques, and the introduction of water-efficient agricultural technologies specifically designed for smallholder farmers (see the climate coping strategies section of this chapter). These interventions aimed to enhance resilience and sustain productivity despite changing weather patterns. However, while the state equates resilience with technical solutions and productivity, the people of Magude associate it with social cooperation, mobility, and ritual practice, highlighting different perspectives on resilience.

Figure 5 shows a clear downward trend in rainfall in Magude over the past 20 years. In 2002 and 2003, for example, precipitation fell well below the district's historical average of 75 mm, resulting in severe drought conditions. More recently, the agricultural seasons of 2021/22 and 2022/23 were also heavily impacted by drought, exacerbating food insecurity in the region. Those who see the year 2000 as a turning point recall that before that year, despite warm temperatures, rainfall was still sufficient for crop production. Since then, however, rainfall has grown increasingly scarce, and temperatures have risen sharply. As Muzimba, a local farmer, put it, "Before 2000, it was warm, but then it rained. Now it's just heat and more heat. The seeds are burning."

Other interlocutors point to 2015 as a critical year in the decline of rainfall. According to data from the 2016 Annual Balance of the Economic and Social Plan and District Budget (BAPESOD), 2015 recorded the lowest rainfall in 15 years. The 2015/16 agricultural season began with minimal and highly irregular rainfall, with March recording a mere 71 mm, significantly lower than the 247 mm recorded in December of the previous season (see Figure 5).

This prolonged dryness had a severe impact on agricultural production, resulting in widespread hunger. Many residents of Magude perceive that the trend of poor rainfall persisted in the years that followed. They vividly recall

2015–2016 as a period of severe famine. Sis Temba, for instance, a young woman from Magude, migrated to South Africa in 2019 in search of better economic opportunities after struggling with the hardships brought on by the drought. Today, she owns a house in South Africa and runs a small business selling various products in Mapulanguene, her hometown. Reflecting on the food crisis, she recalls:

> I have seen people go through the day without eating, without a meal, especially since 2015-16. In those years, it did not rain at all, and there was nothing to produce. The rains only returned in 2017, but even then, they weren't enough for us to produce as we used to.

At first glance, this appears to contradict migrant accounts, especially from those who experienced hardship in South Africa, and stresses that in Magude, one would never go days without eating, at least not before 2015. However, rather than being contradictory, this reveals an important nuance: food insecurity in Magude is intermittent, typically occurring in response to environmental shocks such as droughts. While these episodes of scarcity are severe, residents describe them as temporary and more manageable than the prolonged and systemic hardships often experienced by Magude migrants in South Africa. As Rodgers (2008) notes, many migrants in South Africa have no access to land on which to grow food, no cattle to sell in times of need, and no important fruit trees to supplement their diet – resources that remain available in Magude, even if they are under strain. This distinction helps to explain why, during consultations in Coutada 16 (now part of Limpopo National Park), returnees stated that their main motivation for returning home to Mozambique was the desire to grow their own food (RRP 2002). The sense of security tied to staying in Magude despite rainfall irregularity is thus rooted in familiarity, community support and a long-standing reliance on subsistence farming, what Sen (1982:45) describes as "food entitlements" – that is, people's ability to access food through land ownership, livestock, social networks, and knowledge of other locally available resources. For many Magude residents, these entitlements make life at home more bearable and less uncertain than the risks and instability often associated with migration.

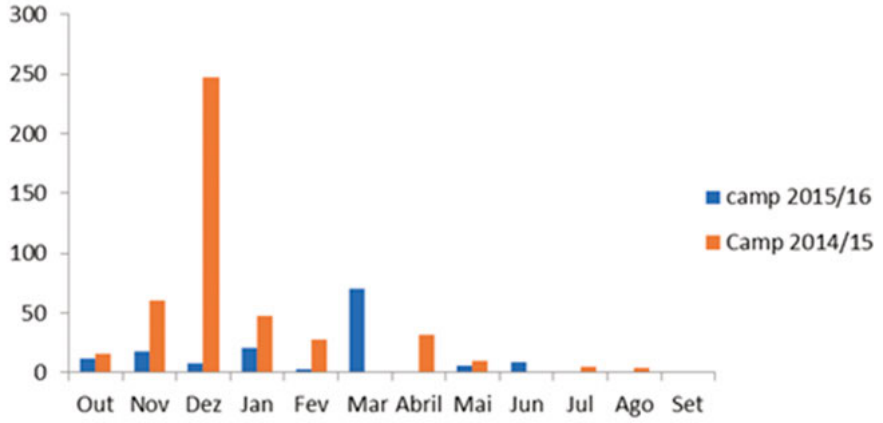

Figure 5: Precipitation of the 2015/16 agricultural campaign (Source: BAPESOD 2016)

The increasing unpredictability of rainfall has compelled farmers in Magude to develop new adaptive strategies, exemplifying a classic process of cultural adaptation to environmental change (as discussed in other contexts by Steward 1955; Oliver-Smith 2017). In the past, planting cycles followed a relatively stable environmental rhythm. However, today, the erratic onset of the rainy season (sometimes in October, other times delayed until November) requires farmers to constantly adjust their agricultural calendars. I will also discuss additional adaptations and innovations below.

Heat

The increasing intensity of heat, particularly in November and December, has become a growing challenge for farmers in Magude. In recent years, extreme temperatures have led to crop failures, further exacerbating food insecurity. Many farmers have shared their experiences of losing entire fields of crops to scorching heat, and I personally observed extensive areas of maize fields withered and desiccated under extreme temperatures between December 2021 and February 2022.

The low production of maize has dire consequences for household survival. Maize is the staple food in Magude, forming the basis of local diets. The first agricultural season, from October to March, is crucial because its yield determines whether families will have enough maize to last the year. When production is insufficient, barns empty before the next rainy season, leaving families vulnerable to hunger. In response to maize shortages, wealthier households resort to selling livestock to buy food. However, this strategy is

not suitable for families with fewer than 10 cattle, which can hardly sustain their livelihoods. Consequently, smaller-scale farmers face greater risks of food insecurity, having fewer assets to rely on during periods of drought and extreme heat.

Many local farmers closely link rising temperatures to perceived shifts in pest dynamics. From their perspective, the warmer weather creates more favourable conditions for pests, allowing them to reproduce rapidly and remain active for longer periods. As a result, crops are increasingly vulnerable to infestations. Although the exact link between temperature changes and pest behaviour cannot be determined without specific scientific data, farmers' accounts indicate a strong perception that rising heat is directly altering pest dynamics.

Increased Pest Contamination

Pest contamination and protection is an area of local knowledge that also exposes the gap between governmental resilience strategies and farmers' lived realities. The district has long experienced cyclical pest invasions, usually with low to moderate impacts on agricultural production. Common threats include field mice, which damage maize, cassava, and sweet potatoes; elegant grasshoppers, which attack maize and cowpeas; and various viral diseases affecting tomatoes. These challenges, though recurrent, were part of the familiar rhythm of farming. During the 2017/18 agricultural campaign, however, farmers faced an unprecedented outbreak of *Spodoptera frugiperda*, or fall armyworm[12] (GDM 2017; 2018).

The fall armyworm causes extensive damage to maize crops. Indeed, according to the District Services of Economic Activities (SDAE 2018), about 350 hectares of crops were affected by pests during the 2017/18 campaign, with the fall armyworm alone responsible for 245.8 hectares, or around 70% of the total. Its destructive capacity is particularly alarming: it attacks every part of the maize plant, including the leaves, stems, cobs, and inflorescences, often resulting in complete crop failure (MADER 2017). Farmers described the pest's sudden arrival in 2017 as mysterious, and the standard government-supplied pesticides proved largely ineffective in controlling it.

Many farmers sought alternative forms of intervention. Some turned to traditional beliefs and practices to combat the pest. In several instances, families attributed the outbreak to witchcraft and therefore conducted rituals

[12] The fall armyworm (*Spodoptera frugiperda*) is a lepidopteran pest that feeds in large numbers on the leaves and stems of more than 80 plant species, causing significant damage to maize, rice, sorghum, sugarcane, other vegetable crops, and cotton (CABI, Digital Library).

aimed at driving the fall armyworm away. These ceremonies, typically performed by older women, took place at night in the fields and involved ritualistic singing, cursing, and symbolic acts such as walking naked through the crops to ward off the infestation. Such practices reveal not only the cultural meanings attached to environmental crises but also the ways culture is mobilised as a practical tool for addressing them. As environmental anthropologists have noted elsewhere in Africa (Sheridan 2012; Roncoli et al. 2002), such rituals express culturally embedded understandings of ecological threats, framing pest invasions not merely as biophysical problems but as disturbances to the community's spiritual and moral order.

Despite deep-ranging cultural efforts, alongside modern pesticide efforts, the pest was not effectively managed until 2022. According to a government agricultural technician, containment of the fall armyworm was only achieved after local extension workers received training in more targeted, scientifically informed methods, including chemical spraying and the use of biopesticides. This shift prompted many farmers to abandon traditional practices in favour of chemical pest control. However, as studies elsewhere have shown, such reliance on chemical interventions carries significant risks, including exposure to toxins amongst agrarian workers, contamination of food with long-term health implications, loss of biodiversity, and pollution of soil and water, as documented by Dewan (2021) in the context of Bangladesh. When government interventions overlook local knowledge and fail to provide adequate education on the implications of chemical use, they risk undermining existing resilience strategies and eroding trust in state-led adaptation measures while also generating long-term socio-ecological consequences.

While government reports officially credited training and new pesticides with reducing the damage caused by the pest, the farmers themselves offered more varied interpretations. Some argued that the persistence of rituals had weakened the pest, while others maintained that the ultimate solution came from "the new medicines" distributed by the government. Still others suggested that a combination of spiritual, ecological, and technical efforts was necessary. These divergent views highlight the fact that local knowledge does not exist independently of governmental interventions but rather interacts with them in complex and sometimes contradictory ways, shaping how resilience is understood and practised.

Climate Coping Strategies

Farmers adopt diverse coping strategies to the perceived climate changes. Some of these are promoted by government programmes and development

agencies, while others emerge from farmers' own knowledge adaptive potential. This section examines both, moving beyond a simple catalogue to critically assess the adaptation framework advanced by the Government of Mozambique and its NGO partners. By prioritising the technical fixes mentioned earlier, these programmes often neglect the socio-economic and cultural factors that shape adaptation. The outcome is uneven improvements in yield, income, and food security, reinforcing inequalities and undervaluing locally rooted strategies that have long helped farmers navigate climatic uncertainty.

Changing Planting Dates

The changing of traditional planting dates has emerged as a key form of local adaptation in response to increasingly unpredictable rainfall patterns. Rather than relying on fixed seasonal calendars, farmers now engage in flexible, experimental planting cycles. This reflects an ongoing interaction between human practices and environmental variability, as discussed by Crate and Nuttall (2009). These adjustments demonstrate that the agricultural resilience of Magude is firmly grounded in local ecological knowledge. Similar approaches were observed by Milgroom and Giller (2013) in Massingir, where farmers planted after nearly every significant rainfall event, sometimes six or more times in a single season, to maximise their chances of success.

Traditionally, as already noted, the rainy season in Magude would begin between September and October, marking the start of the agricultural season. However, with rainfall patterns becoming more erratic, the rains now start, stop, and sometimes restart weeks later, disrupting the planting schedule. In response to this unpredictability, many farmers have stopped relying on the "first rains" as the official start of the planting season. Instead, they now wait for the second wave of rains, which often occurs in December or January. As one farmer explained:

> The rains deceive us sometimes. It might rain a little bit, and we go into the field and start sowing, expecting the rain to continue, but it doesn't. It's just hot, very hot. The seeds can't take it; they burn, and we don't produce anything. We prefer to wait a little longer to see if it starts to rain properly.

Milgroom and Giller (2013) found that in similarly dry areas, sowing too early often led to complete crop loss, as initial rains were followed by long dry spells. However, by staggering planting dates, farmers could take advantage of different rainfall windows. Their simulations showed that early plantings succeeded about 53% of the time, while subsequent plantings had success

rates of 46%, 42%, 28%, and 36%. Although the probability of success declined over the season, later plantings could occasionally benefit from higher crop water satisfaction, meaning that under certain conditions they produced better yields despite lower overall chances of success (Milgroom and Giller 2013:98).

An approach that minimises the risk of planting too early is not without its own uncertainties. Waiting for the second wave of rains offers no guarantees; dry spells or insufficient rainfall may still occur. To manage this uncertainty, some families in Magude diversify their planting by dividing fields into three plots: one sown when the rains begin in October, another in November, and the final one in December. By staggering planting dates in this way, they increase the likelihood that at least one plot will benefit from favourable rainfall and produce a reliable harvest. Milgroom and Giller (2013) observed a similar diversification in Massingir, in both timing and location, with crops being planted in several fields across different soils to capitalise on patchy rainfall and ensure that at least one field produced a sufficient harvest to keep the family out of starvation.

Farmers who use this strategy still face the challenge of managing their harvested crops. Depending on the rain and the timing of their sowing, crops are usually ready to be harvested between January and March. The harvested maize is then stored in the family's granaries, which are meant to last throughout the year. However, the long stretches between harvests, particularly if the next rainy season is delayed, place significant pressure on the stored food supplies. In my study, I found that this requires increased, careful management and cooperation within the family unit. Each family member has specific tasks to ensure the food lasts as long as possible. The younger family members are tasked with protecting the crops from rodents, particularly rats that are attracted to the maize and peanuts stored in the granary. The men, typically the heads of the family, are responsible for repairing any damage to the granary, ensuring that it remains structurally sound and well-sealed to protect the stored grain. Meanwhile, women, particularly the wives, play a key role in managing the stored food, ensuring that the maize and other grains are used efficiently and last until the next harvest.

This combination of shifting planting dates, splitting fields, and protecting stored grain demonstrates the importance of local ecological knowledge in enabling farmers to cope with unpredictable rainfall. Unlike standardised recommendations often promoted by government or international experts, these practices are deeply grounded in farmers' accumulated experience of local conditions and family roles. On the one hand, they draw on intimate

knowledge of soil variation, micro-climates, and historical memory of droughts and are reinforced through culturally embedded practices of seed selection and grain storage (Berkes et al. 2000; Lemi 2019). One such method I observed is storing maize cobs with the husks intact and, as noted earlier, by placing granaries above kitchens so that daily cooking smoke permeates the stored grain. Farmers explained that the husks and the smoke both deter insects and slow spoilage, enabling maize to be kept safely for up to two years. On the other hand, the culturally specific associations of family members' roles to specific tasks of food production and preservation secure efficiency, transmission of knowledge, and familial integration and solidarity. By adjusting their planting times and locations, and by applying proven storage techniques, farmers actively reduce the risk of total crop loss and extend the lifespan of their harvests. By familial solidarity and labour management, they increase food security, efficient distribution of human resources, and intergenerational learning.

Growing Drought-Resistant Crops

The 2015 Magude PLA identified a set of strategies for addressing the effects of extreme weather events, including droughts, floods, and erosion. Among the most prominent is the promotion of drought-resistant crops, particularly cassava and orange-fleshed sweet potatoes, both of which are resilient to water scarcity and high temperatures. While these crops were not unfamiliar to farmers in Magude, the initiative aimed to expand their cultivation by distributing improved seed varieties, with the dual objectives of securing a household food supply and generating income from surplus sales.

Comparable strategies have been implemented in other districts facing similar climatic pressures. In Chicualacuala District, Gaza Province, southern Mozambique, for instance, farmers have adopted drought-tolerant varieties of sorghum, millet, and cowpea. Over half of the households there now grow drought-resistant sorghum, while others cultivate longer-cycle cowpea and millet varieties to better exploit intermittent rainfall or higher-yielding cowpea strains that can also serve as livestock fodder (Dixon 2013). In both Magude and Chicualacuala, the rationale behind promoting such varieties is to ensure a harvest during adverse years. However, the implementation of these agronomic adaptations has been constrained by two persistent challenges: limited access to improved seeds and the absence of consistent markets for surplus production.

A farmer in Magude captured local frustration:

> We used to produce maize, but the government started distributing cassava seeds, telling us it resists drought well. Then they sent agricultural technicians to teach us how to produce it, but they didn't give us a place to sell. We were many producers with many products at home.

Even if the 2015/16 drought led to a significant increase in cassava and sweet potato production (see Table 3), without parallel investment in market infrastructure, processing facilities, and storage capacity, much of this surplus remained unsold. This pattern is also evident in other parts of southern Africa. In Malawi, for instance, several NGOs have championed cassava as a climate-resilient crop, hailing it as the "super crop" of the 21st century (Droppelmann et al. 2018). Although cassava has long been cultivated in the region as a famine reserve crop, Kocke (2019) notes that its wider adoption has been hindered by environmental and social factors as well as by decades of agricultural policies that overwhelmingly favour maize.

	2015/16		**2016/17**		**2017/18**		**2018/19**		**2019/20**		**2020/21**		**2021/22**	
	ha	**Ton**	**ha**	**Ton**	**ha**	**Ton**	**ha**	**Ton**	**ha**	**Ton**	**ha**	**Ton**	**ha**	**Ton**
Sweet Potatoes	315	5805	360	6480	365	6840	418	7136	424	2950	466	3397	471	3452
Cassava	70	1047	28	1210	52	1636	128	1636	131	299	142	318	145	331

Table 3: Drought-resistant crop production (Source: SDAE 2015–2022)

The Malawian historical experience further illustrates these barriers. For example, the 1948/49 famine led colonial authorities to mandate the cultivation of cassava, but this initiative failed when mosaic virus-infected cuttings were distributed, which reduced yields and undermined farmer confidence. When adequate rainfall returned in the 1950s, maize yields recovered, and cassava cultivation was confined to small household plots for emergency use. Since then, maize surpluses and entrenched policy bias have reinforced its dominance, with maize currently occupying around 75% of agricultural land (Chipeta and Bokosi 2013; FAO 2015). One possible contributing factor in Malawi is that cassava was long stigmatised as a "poor man's crop" and often dismissed due to its lower perceived nutritional value and potential toxicity if not processed correctly (Nweke et al. 2001). Even in contemporary Malawi, the expansion of cassava production has not necessarily improved food security, as much of the crop is diverted to the biofuel industry rather than used for household consumption (Kocke 2019).

A similar disconnect exists between production incentives and local consumption patterns in Magude. While cassava and sweet potatoes form part of the local diet, they are not staple foods for most households. Farmers tend to prioritise sales over consumption, but without an organized market, many are left with unsold produce. Markets cannot simply be created through government programmes; they require steady consumer demand, which depends on cultural acceptance and dietary integration. The perception of these crops as secondary or "fallback" foods has thus stifled the development of a viable market.

These interventions are further complicated by farmer preferences. For example, although the government promotes the more nutritious, orange-fleshed sweet potato, many farmers, including Mr Muzimba from Mapulanguene, prefer the traditional white variety:

> The basis of our diet is maize, but sometimes we eat cassava or white sweet potatoes. The seed that the SDAE gives us to grow is the orange-fleshed sweet potato, and we don't like it very much, so we prefer to sell it.

Such preferences are not trivial; they demonstrate the influence of dietary choices, cultural valuation of crops, and culinary traditions on the success or failure of adaptation measures. In the Chicualacuala district, the adoption of new drought-tolerant crop varieties has also depended on their alignment with local food cultures and farming priorities (Dixon 2013). Failing to consider these factors can lead to the paradox observed in both Magude and Malawi (Kocke 2019), in which increased production does not translate into commensurate gains in food security.

The problem is not that promoting drought-resistant crops is misguided but rather that these measures are often implemented in isolation from the broader socio-economic and cultural context. They tend to focus narrowly on production, neglecting the interconnected systems of market access, infrastructure, storage, processing capacity, and consumer preferences that determine whether increased yields actually lead to resilience. Without such alignment, adaptation policies risk becoming technocratic exercises that generate short-term production spikes but fail to embed lasting change in local livelihoods (Reid 2013; Crane et al. 2011).

Nevertheless, these crops continue to play a vital role as strategic reserves. During severe droughts or food shortages, households turn to cassava and orange-fleshed sweet potatoes because of their storability and reliability as emergency foods. Yet the government promotion of these crops reflects a narrow vision of resilience, reducing it to the capacity to maintain production

under stress. Such "imagined resilience" (cf. Reid, 2013) often tends to prove unsustainable because it overlooks the social and cultural factors shaping adoption. From the perspective of local knowledge, cassava and sweet potatoes are not replacements for maize but complementary fallback foods mobilised within broader livelihood strategies. Long-term resilience, therefore, depends less on distributing new varieties than on aligning interventions with farmers' practices, preferences, and ecological knowledge. Failing to do so risks reinforcing existing inequalities: those whose strategies do not align with official models are left more vulnerable, raising broader questions of environmental justice in adaptation policy.

Use of Improved Seeds

The distribution of improved seeds is one of the government's main strategies for mitigating the impact of climate change on agriculture. These are crop varieties that have been selectively bred, outperforming traditional types and offering higher yields, better drought tolerance, and greater resistance to pests, diseases, and erratic rainfall. In Magude, the government and some NGOs have provided local farmers with improved seeds for maize, beans, groundnuts, and various vegetables. These seeds should secure production in adverse seasons and enhance household food security and income.

Seed distribution has a long history in Mozambique. FEWS NET (2003) noted that households in drought-affected areas often faced shortages, either due to poor harvests or the need to replant after crop failure. To respond, the government and NGOs distributed free seed kits, usually imported from abroad. These distributions, however, frequently arrived late and included varieties poorly adapted to local conditions. Dependence on free seeds also raised concerns about undermining local markets and fostering reliance on external aid. In 2003, the government sought to address these problems by introducing a new model in which farmers received vouchers instead of direct donations. These vouchers could be exchanged for seeds and other inputs at government- and NGO-organised fairs, with vendors reimbursed afterwards. The approach gave farmers greater choice and helped stimulate local seed markets (FEWS NET 2003).

Seed distribution in Magude remains common, though it primarily targets agrarian associations. NGOs such as KULIMA[13] and Helpcode[14] have been central, often organising agricultural fairs where seeds are provided free or at subsidised prices. In 2012, the Provincial Directorate of Agriculture, with NGO financing, delivered five tonnes of Matuba maize, four tonnes of PAN 128 beans, and 100 tonnes of BP 1 potatoes (GDM 2012). ATAP and KULIMA also distributed five tonnes of orange-fleshed sweet potato to 17 associations and four private farmers, benefiting 769 households. More recently, in 2020/21, the district government distributed 1.2 tonnes of Matuba maize and 200 kg of PAN 53 maize, plus additional contributions through INGD of maize, beans, cassava cuttings, and 5,000 pineapple seedlings (SDAE 2021). These initiatives were designed to strengthen short-term adaptation capacity and food security.

Nonetheless, adoption challenges persist. Despite the free distribution of improved seeds, many farmers remain reluctant to adopt them, particularly hybrid and genetically modified varieties. According to the farmers I talked to, the reason for this reluctance is that these seeds demand more water and inorganic fertilisers – a serious challenge in areas where access to water is limited and most farmers cannot afford pesticides. Farmers also perceive these varieties as less flavourful, making them less desirable for family consumption. Crucially, hybrid seeds cannot be saved for replanting due to their low germination rates, leaving farmers dependent on external suppliers for each planting season.

This reveals a clear misalignment. While government and NGO programmes promote improved seeds as being climate-resilient due to their higher yields and potential drought tolerance, local experience often shows the opposite. Under conditions of irregular rainfall, high temperatures, and limited access to fertilisers and irrigation, these seeds tend to perform poorly compared to traditional varieties. As one local farmer explained:

> Our seeds are different from improved seeds. The improved ones require a lot of water. They produce larger cobs but cannot withstand long periods without rainfall. In contrast, our traditional seeds can

[13] An NGO dedicated to the well-being of underprivileged communities by promoting integrated activities aimed at promoting productivity in agriculture and the commercialisation of products as well as rural micro-finance programmes, sustainable use of water, environmental sanitation, and health and education for all. The term KULIMA is common across Bantu languages, meaning "to cultivate the land." (KULIMA 2022).

[14] Helpcode is an international NGO founded in Genoa, Italy, in 1988. It works to protect the rights and well-being of children, their families, and communities through education, health, gender equality, and sustainable development initiatives. Active in countries such as Mozambique, Nepal, Cambodia, and Italy, Helpcode promotes transparency, social justice, and local empowerment in all its interventions (Helpcode, 2023).

> survive for a long time even without rain. They are well-suited to highland areas far from rivers. Even if there is no rain for one or two weeks, they remain strong, whereas certified seeds struggle in the heat and dry conditions, often wilting and failing to grow properly.

The contradiction highlights the misalignment between national adaptation policies and local ecological conditions and knowledge, leading to outcomes that diverge sharply from the intended goals.

Although seed distribution is intended to strengthen community resilience, it often proves unsustainable in the long run because it fosters dependency rather than self-sufficiency. Farmers who rely on distributed seeds are unable to build their own seed stocks and must purchase replacements at high market prices, a cost beyond the reach of many. The disconnect between the seed programmes and the preferred seed and crop choices by farmers reveals a fundamental difference in how resilience is understood. Government programmes tend to equate it with short-term access to resources, while farmers view resilience as rooted in the ability to produce seeds locally and safeguard them through kinship networks and social exchange. From this perspective, self-sufficiency is not an individual achievement but a collective strategy central to local ways of adapting to food insecurity. The tension between immediate support and long-term autonomy thus exposes the structural limits of the current approach. Moreover, in worst-case scenarios, misdirected support in a year of crisis might force farmers to switch to hybrid seeds, which in turn can create long-term vulnerability.

Many farmers prefer the Matuba maize variety, an improved seed neither hybrid nor genetically modified. Matuba retains qualities associated with traditional maize, such as its familiar taste and strong germination under local conditions, making it more suitable for household consumption and cultivation. Its main limitation, however, is that it cannot be effectively replanted, requiring farmers to purchase new seeds each season. This dependence undermines efforts toward seed autonomy, even though Matuba offers advantages over other improved varieties. Some informants explained to me that when replanting is not possible, families sometimes prefer to consume the seeds they receive instead of sowing them, reflecting the precarious balance between immediate food needs and farmers choices in terms of long-term production.

These practices should not be understood solely as acts of desperation but also as forms of resistance to externally imposed models. By eating rather than planting government-distributed seeds, farmers ensure the long-term resilience of the household; the Matoba seed, although popular, erodes their capacity to save and reproduce seed. Eating the Matoba seed rather than

planting it can also be seen as a form of resistance. Local knowledge places strong emphasis on maintaining seed stocks across seasons through saving, exchange, and kinship-based circulation. Replanting, in this view, is not just an agronomic technique but a cornerstone of resilience that enables households to remain autonomous and less dependent on irregular and unreliable outside provision. Consuming non-replantable seeds thus reflects both the immediate priority of feeding the household and a rejection of short-term state-led measures that conflict with long-term strategies of self-sufficiency.

The dilemma surrounding Matuba illustrates a broader temporal tension in adaptation policy. Government and NGO programmes work within a short-term timeframe, emphasising the distribution of improved seeds to secure production for the next season. Local knowledge, by contrast, prioritises continuity across years through practices of saving, exchanging, and collectively reproducing seeds, agricultural knowledge, and skills. From this perspective, resilience depends not on one-off distributions but on the capacity to maintain seed stocks independently over time. Matuba embodies this disjuncture: while it provides short-term gains in yield and taste, its incompatibility with seed-saving and the social relations it depends on and maintains undermines the long-term adaptive capacity that farmers regard as essential for resilience.

The problem is compounded by distributional inequities. Farmers who are not part of an association or producer group – and who are often those already most vulnerable – struggle to access improved seeds since membership is frequently a prerequisite. Excluded households must either purchase seeds at high market prices or rely on cheaper, non-certified varieties, which offer no guarantee of yields and increase vulnerability to pests and diseases. In practice, this exclusion reinforces existing inequalities, as better-connected farmers secure access to subsidised seeds while poorer or more remote households remain trapped in cycles of low productivity and heightened exposure to climate risks. As one family farmer explains:

> The seeds KULIMA gives us are good, the maize grows fast, but now they're hard to get. The SDAE used to give it to us, but now they don't. They say we must buy it. How are we going to buy it and with what money? They're very expensive! We can even use our own seeds [grain] to grow maize, but to grow lettuce or tomatoes, we have no choice, we must buy seeds, but the cheapest ones possible.

The reluctance to adopt certified seeds is not solely a matter of agronomic performance; it is rooted in broader socio-cultural and political-economic

concerns. As Vasavi (1994) observed in South India, hybrid seeds often become powerful cultural metaphors for broader transformations in rural life. They are seen as delicate, dependent, and disease-prone, requiring costly external inputs, and their adoption shifts agriculture from a context-sensitive, locally adapted practice towards a standardised, externally dictated system. In Bijapur, farmers called this new era *hibred kala* ("hybrid times") and themselves *hibred mandi* ("hybrid people"), capturing the sense that, like the seeds they plant, they have become more fragile, less autonomous, and increasingly reliant on outside support.

A similar dynamic is evident in Magude, where the loss of seed-saving capacity undermines farmers' autonomy and weakens the mutually reinforcing relationship between land, seeds, people, and social groups. The ethos of self-reliance, once grounded in the ability to select, store, and replant seeds, is giving way to dependency on external agencies and markets that increasingly control the foundations of production. Farmers are not simply resisting "modernisation"; they are defending a system in which seeds are embedded in social relations, ecological knowledge, and local taste preferences rather than being reduced to market commodities.

Seen in this light, resistance to improved seeds is an active negotiation between short-term productivity gains and the long-term preservation of sovereignty over agricultural resources, knowledge, and communities. It highlights the tension between the enduring value of locally adapted, culturally meaningful crops and state-led modernisation – between a farming system rooted in ecological balance and social relations that sustain resilience and one that risks leaving farmers economically and ecologically dependent on more powerful groups and central state institutions.

Farmers' Associations

In Magude, farmers' associations have become an important way for rural households to organise in the face of climate uncertainty. While promoted by government and NGOs as vehicles for resource distribution, they also function to enhance local coping strategies, allowing families to pool labour, share risks, and support one another. These associations illustrate how resilience is often pursued through social ties and networks, even when the structures are shaped, and at times constrained, by external agendas.

While associations embody both state agendas and local strategies of resilience, their formation on the ground follows simple and pragmatic logics. Farmers whose fields are close to each other get together and form a farmers' association. It can also happen that farmers from a particular area apply to the local authorities for a common area for farming and form a rural association.

In both cases, plots must be close to a water source (river or pond) and have productive soil.[15] Usually over one hectare in size, the land is divided into three parts, following a standard rule that is always applied. The largest portion is subdivided into small plots of equal size for each member, where they grow crops of their choice. The second portion, smaller, is cultivated collectively by all members. The third, much smaller plot is used for demonstrations of improved farming techniques led by a government agricultural technician (*extensionista*).

There are about 25 agricultural associations in the district. None are legally registered, but they are recognised by local authorities and receive state support.[16] Women make up the majority of members (see Table 4), reflecting the gendered division of labour in rural Magude, where men are more often engaged in charcoal production, small businesses, wage labour at the AdX plantation, or migrant work in South Africa. Despite being fewer in number, however, men frequently occupy leadership roles within agricultural associations. The Komane Switiya association, for example, has 15 members, only four of whom are men, yet one of these men serves as president. As the *extensionista* responsible, herself a woman, explained:

> If there is only one man, he inevitably becomes president. We try to make women aware that they are equal to men, but it's not easy. In Magude, men are superior to women, and women are subservient to them.

This gender imbalance, confirmed by many other interlocutors, highlights how patriarchal household dynamics can extend into community organisations, even those numerically dominated by women. Such gender disproportions are important in the context of climate change because women, who often have less access to capital, markets, and decision-making power, bear the brunt of agricultural losses yet seem to have less control over the resources and benefits generated by adaptation initiatives. Gender inequality in Africa has been increasingly highlighted in global frameworks such as the Sustainable Development Goals. However, post-colonial and African feminist scholarship cautions against treating women's empowerment as a universal or linear process. Scholars argue that mainstream feminist and development discourses often ignore the complex social patterns through which women negotiate authority as well as the enduring legacies of colonial structures that shape present-day inequalities and exclusions (Adefarakan 2011; Msila 2021;

[15] Clayey or loamy soils.
[16] With the assistance of Helpcode, three associations (Xipene, Zamazana, and Isaura Nyusse) are in the process of becoming legal.

Oyěwùmí 2005; Wane 2011). Addressing these dynamics requires more attention to local understandings of resilience that are grounded in social relations, kinship ties, and indigenous ways of knowing, where women's roles remain central but are differently valued and expressed.

Within the associations, labour is organised between individual and collective responsibilities, with alternating days allocated for working on personal plots and the communal field. Demonstrations of cultivation techniques, such as sowing, weeding, and irrigation, take place on either type of plot depending on the technician's schedule. The aim of these sessions is to improve farmers' skills in using specific seed varieties, in the hope that the techniques will be replicated in both collective and individual production. The techniques introduced are not mandatory, but they are government-approved and form part of the official policy to modernise agricultural production. Extension workers, often in collaboration with NGOs, actively encourage farmers to adopt these methods, though in practice farmers tend to resist or adapt them according to their own priorities and knowledge.

Nr.	Nome	Location	Nr. of members		Legalization		year of foundation
			M	W	Yes	No	
1	Associação Kanimambo	Matchabe	3	19		x	1987
2	Associacao Wafecula	Matchabe	19	69		X	2002
3	Associação Chobela	Matchabe	5	25		x	2009
4	Associação Facassiza	Matchabe	1	15		x	1997
5	Associação Bongane	Matchabe	3	23		x	2012
6	Associação Sekeleka Macubulane	Macubulane	6	3		x	
7	Associaçã Catolica Tlemo	Macubulane	4	21		x	2019
8	Associação Movane	Macubulane					
9	Associação Mais Velhos Unidos	Moine	8	85		x	2012
10	Associação Macuvulane	Maguiguane	4	27		x	2021
12	Associação Cabe	Maguiguane	11	29		x	2015
13	Associação Graça machel	Inhogane	2	52		x	2019
14	Associação Isaura Nhusi	Inhogane	3	59		x	2019
15	Associação Chichanduco	Chichuco	7	33		x	2019
16	Associação Chipene	Chichuco	6	7		x	2018
17	Associação Zama-Zama	Mulelemane	6	44		x	2002
18	Associação Komane Switiya	Mulelemane	4	15		x	2010
19	Associação Nwatsecula	Mulelemane	6	69		x	2020

Table 4: Agrarian associations in Magude-sede (Source: SDAE 2022)

One reason that farmers join associations is because government agencies and NGOs prioritise organised groups when allocating support (FAO 2014). Membership increases access to seeds, irrigation equipment, and technical assistance. At the same time, the creation of associations reflects the political ecology of aid distribution (Baer and Singer 2018; Robbins 2011). Access to

resources is mediated by bureaucratic recognition and proximity to fertile land and water, leaving farmers in more remote or less productive areas at a disadvantage. For many, therefore, joining an association is a politically conditioned survival strategy within unequal systems of resource allocation.

Maria, a member of the Joaquim Chissano Association in Mapulanguene, highlighted both the gains and limitations of such participation:

> Our association has 15 members, and in the past, we relied on manual watering cans to water the fields. It was difficult, but this year we received a motor pump from KULIMA. Now we manage to have surpluses, and we are no longer hungry. The only problem is that we have nowhere to sell what we produce. Cabbage, for example, goes to waste. I hope this association will never die and will continue to help us.

Maria is happy to be in an association, and for her, it has been positive in many ways. However, this model also reinforces state oversight. All associations are recorded in the local government database, assigned a government technician, and channelled resources through state mediation. In 2020/21, for instance, the government and KULIMA distributed 2.85 kg of vegetable seeds to seven associations, UNAC supplied 2.2 kg to four associations, and Helpcode in conjunction with KULIMA provided 13 motor pumps to nine associations[17] in partnership with the government (SDAE 2021).

These examples highlight the dual role of associations. On the one hand, they promote resilience through practical action by pooling labour, fostering social cohesion, and improving food security. On the other, they embody resilience in governance terms by being incorporated into state structures and subjected to bureaucratic oversight. They are also used as vehicles for technocratic interventions that foster dependency on external resources, which also extend state control and risk marginalising local knowledge. At the same time, gender hierarchies and the exclusion of farmers in remote areas from this support reproduce existing social inequalities.

The distribution processes are far from transparent. Requests for resources such as boreholes or motor pumps are frequently met with indefinite delays, pending the arrival of funds or an NGO partner willing to finance. Even when NGOs are willing to help, it is the government that decides which association will receive support. Moreover, the emphasis is largely on provision of inputs such as seeds, motor pumps, fertilisers, and basic tools as well as on

[17] Khuphukane, Muginge, Ntlemo, Movane, Agropecuária, AMODEFA, Nwatsekula, Chipene e Associação de criadores de Movane

infrastructure. Investment in post-harvest support such as storage, processing, and market access is limited.

While there are about 25 associations in the district, many farmers remain outside these structures. One major barrier is geographic: proximity to rivers is essential for irrigated agriculture, and many families live far from water sources. Farmers explained that joining an association would mean travelling long distances to reach the plots, which they considered impractical given their daily labour demands. An agricultural technician offered another explanation:

> Families that do not participate in the association are generally those that have another source of income. It is very likely that the head of the household works in other businesses and has an alternative source of income to support the family. These are families that are not entirely dependent on agriculture for their survival. For this reason, the people who join the associations are usually elderly people who have no one to look after them, abandoned women, and/or women without children. They are vulnerable people who join an association because they want to be supported.

This account does not contradict the problem of geographic distance from rivers or other water sources but rather complements it, showing that multiple factors such as location, household income strategies, and social vulnerability shape participation in associations. The gendered dimension is particularly evident, as women without male support are often among the most vulnerable and therefore rely more heavily on associations to secure access to agricultural resources. For these women, associations are not only a practical means to obtain land, seeds, or irrigation but also vital arenas of solidarity and recognition. They provide networks of support that operate much like kinship ties, offering protection and companionship in contexts where family structures may be fragile or absent. In this way, associations contribute to resilience not just through material inputs but through the social bonds they cultivate, reinforcing the broader argument that in Magude, adaptive capacity is deeply embedded in social relations rather than in technical measures alone.

In contrast, households with livestock or diversified income sources are less dependent on farming since they can purchase resources directly and maintain greater autonomy from state and NGO support structures. Such families often include male household heads engaged in wage labour, trade, or cross-border migration, whose remittances cushion the household against agricultural risks. Livestock in particular functions as a form of insurance. Cattle can be sold to cover expenses for food, school fees, or agricultural inputs, reducing the need to rely on associations or government programmes.

These households thus navigate climate uncertainty from a more secure position.

Another reason why some farmers choose not to join associations was pointed out by Ramos, a local farmer. He and his wife cultivate a few hectares of maize and vegetables, and in good seasons they produce enough for both consumption and sale. Ramos is not a member of any associations and sees no advantage to joining, as he explained:

> Being part of an association isn't always a good thing. The government plays with people. What bothers me is that they come and teach us how to produce, and we follow their advice. People produce well, and there's plenty of harvest, but then there's nowhere to sell it. Isn't that just playing with people? In South Africa, where I was for a long time, if you grow, you already have a buyer before the product is ripe. You produce it knowing where you are going to sell it. It's not like that here.

As Barrett (2008:300–303, 307–309) notes for eastern and southern Africa more broadly, weak infrastructure and high transaction costs, especially during the rainy season, significantly constrain smallholders' ability to engage in markets. In Magude, this means that, without secure buyers, both association and non-association farmers encounter similar challenges. Members often expect the collective fields to generate income for seeds and other agricultural resources, while their individual plots provide additional revenue for non-farm purchases. However, when markets fail, this economic logic collapses, and farmers, particularly in women-headed households, are left highly exposed to climate-related production shocks without reliable income buffers.

Despite these constraints, agricultural associations remain a vital means of adaptation for many farmers in Magude. By providing irrigation systems, distributing improved seeds, and offering technical training, the associations reduce farmers' dependence on increasingly erratic rainfall and extreme heat. Their collective organisation also fosters social cohesion, mutual assistance, and integration, which are important forms of resilience in uncertain contexts. At the same time, structural gender inequalities, weak market integration, and political control of resources limit their transformative potential. Even though they provide short-term solutions, they sometimes perpetuate existing vulnerabilities. Associations strengthen farmers' capacity to cope with climate stress through social ties and pooled resources, yet they also operate within and sometimes reinforce unequal systems of governance that constrain long-term autonomy.

Growing Sugarcane

The cultivation of sugarcane in Magude illustrates how adaptation strategies, shaped under the influence of local knowledge, come under the control of corporate power in addition to state policy. As a cash crop, sugarcane is seen as more profitable because it is supported by a stable and reliable market, which has encouraged many smallholder farmers to form associations and cultivate it on a larger scale. Farmers turn to sugarcane associations to mitigate the effects of climate stress and diversify their livelihoods, yet this strategy also reveals ambivalence. While collective organisation creates opportunities for coping and income generation, reliance on corporate structures simultaneously reproduces vulnerabilities and reinforces inequalities.

The president of the Graça Machel Association, a group of 88 small farmers who produce sugarcane on 68 hectares exclusively for sugarcane production, told me the following:

> We decided to get together and discuss our situation. We realised that the drought was really affecting us, and we couldn't produce anything. So we decided it would be worthwhile to grow sugarcane using the irrigation system. It was better because sugarcane is in great demand, and we would have a guaranteed buyer – the sugar factory would take all our production.

The members of the Maria da Luz Guebuza Association, which was founded in 2008 and manages 99 hectares, recalled how they shifted to sugarcane:

> In 2008, we couldn't produce anything; we didn't have water, and our yields were always low. We planted maize, but it burned because the rains weren't good… With sugarcane, it's different – we have water, we use the Xinavane irrigation system, and we earn money.

In the past, according to some farmers, the factory covered the entire operation's costs. More recently, however, it has cited a lack of resources, forcing producer groups to seek funding from banks.

> Since the company told us they didn't have any money, we had to ask ABC Bank for a loan. Our request was presented as a feasibility study prepared by the company and accepted by the bank. We weren't as lucky as some associations that had their entire package financed by the European Union. They don't need to repay debts like we do.

The Açucareira de Xinavane (AdX) sugar factory, located in the village of Xinavane about 5 km from Magude, began expanding its operations in 2005 by including small local producers (O'Laughlin and Ibraimo 2013). By 2018,

AdX had subcontracted 2,599 small producers, of whom 2,547 were organised in associations and 52 operated individually (Joaquim et al. 2022).

Today, Magude has around 16 sugarcane associations (see Table 5) covering a total of 2,537.65 hectares. The earliest was established in 1998 and the most recent in 2015. Membership is solely premised on land ownership within the designated planting area. Individual plots range from 0.5 to 3 hectares. Once the area has been identified, along with the number of members and the size of each farmer's plot, the group contacts the factory to express its interest in starting production. They receive an initial loan to clear the land, plough the fields, install irrigation systems, purchase sugarcane seedlings, establish the plantations, and legalise the association. Production is coordinated and managed by the AdX company, which also hires and trains the workforce. Farmers contribute their land against monetary compensation, but they may also choose to work on the plantations as paid employees.

At the end of each growing cycle, typically lasting 12 months, AdX harvests the cane, calculates total production, and distributes the profits. As one local producer explained:

> In distribution, the first beneficiary is the company, then the bank, and then us. The company gets the biggest share because, as they say, they invest in production and pay salaries. Of the rest, 40% goes to the bank and 60% to us.

This arrangement has generated growing dissatisfaction among local producers, who accuse AdX of lacking transparency in its operations. Many say they do not understand how the company calculates revenues or determines the amounts paid to them, which they consider too low.

> There are a lot of things they deduct from our profits. We don't get paid based on the tonnage of cane; we get paid based on the tonnage of sucrose, which is measured in their lab. It's their lab, and we don't know what happens there. They just tell us the quantities, and we never know if they're true. For example, they say they pay ARASUL for water, but we don't know the procedure or the basis of the calculation, since the water comes from the river. They also say they pay for the electricity we use, but how do they calculate our consumption when there are no meters in our stations?

Another producer added:

> Sometimes we are told that the production is 40 or 50 million, but we don't get half of that. Once we made 40 million and only got 3

> million. We're not technicians, but we can see that something is wrong with these calculations.

The agreements with AdX illustrate how globalised agro-industrial systems reproduce structural inequalities (Nixon 2011; Roberts and Parks 2007). Framed as partnerships, these arrangements mask asymmetrical power relations in which smallholder farmers bear the bulk of production risks while corporate actors consolidate control over land, water, and the terms of exchange. In this context, climate resilience initiatives tied to commercial agriculture intersect with existing hierarchies of power, sometimes deepening the socio-economic vulnerabilities they claim to address.

Nr.	Name	Localization	No. of members		Legalisation		Year founded	Area (ha)	
			M	w	Yes	No		Total	Explor.
1	Associação Chichanduco	Chichuco	28	35	x		2014	57	57
2	Associação Chichuco	Chichuco	17	88	x		2009	138,8	138,8
3	Associação Chipene	Chichuco	42	48	x		2011	55,98	55,98
4	Associação Eduardo Mondlane de Magude	Maguiguane							
5	Associação Graça machel	Chichuco	25	65	x		2003	68	68
6	Associação Heróis Moçambicanos	Chichuco	43	55	x		2015	96,9	96,9
7	Associação Macuvulane I	Maguiguane	101	86	x		2011	200	200
8	Associação Macuvulane II	Maguiguane	46	58	x		2009	73.67	73.67
9	Associação Maguiguane	Maguiguane	8	58	x		2005	89,1	89,1
10	Associação Maria da Luz Guebuza	Maguiguane	242	201	x		2009	263,07	263,07
12	Assocação Mulemane Massintoto	Mulelemane	30	59			2015	193	193
13	Associação Olhar de Esperança	Matchabe	155	159	x		2009	107	107
14	Associação Samora Machel de Magude	Maguiguane							
15	Associação Seis de Janeiro	Chichuco	40	53	x		2009	74,6	74,6
16	Associação Sociedade Tchovane	Chichuco	17	18	x	x	2009	33	33

Table 5: Magude sugarcane associations (Source: SDAE 2022)

Local producers, who enter these arrangements with expectations of profit-sharing and rural development, face a system where decision-making, cost calculations, and profit distribution remain opaque. Although allegations of fraud cannot be substantiated without access to AdX's internal data, the persistence and consistency of complaints suggest structural and communicative asymmetries rather than isolated misunderstandings. Even when framed as efforts to reduce vulnerability to climate variability, the lack of transparency in sucrose measurement, water and electricity billing, and revenue reporting reinforces producers' marginal position. This mistrust illustrates how corporate-led adaptation models can entrench dependency and curtail local agency

Producers derive income from the venture through annual compensations proportional to plot sizes; nevertheless, payments fluctuate significantly from

year to year. Some attribute the variation to currency exchange rates – "when the rand is high we get good, when it's low we get bad" – while others suspect deliberate manipulation: "The money we get is very little and we only get it once a year; if we divide it by 12 months it doesn't even reach the minimum wage."

Earnings are also shaped by debt obligations. Associations without bank loans typically distribute between 50,000 and 100,000 Mt (USD 781–1.563) per member annually, while those repaying debts receive between 20,000 and 50,000 Mt (USD 313–781). For some members, the lump-sum payment remains attractive despite the uncertainty, as it allows them to purchase items such as cement houses, freezers, and televisions that were previously unattainable when their livelihoods depended solely on selling small amounts of maize.

In addition to land-based earnings, family members of association members may be employed as wage workers on the plantations. They perform a variety of roles related to irrigation, security, and seasonal weeding and clearing. Recruitment and payment are managed by AdX, which also provides training, equipment, and uniforms (O'Laughlin and Ibraimo 2013:36). In this way, the venture can supplement household income through both land rents and wages, although the overall dependence on a single corporate buyer leaves producers exposed to decisions made far beyond their control.

Despite ongoing grievances about the terms of their engagement with the company, leasing land for intensive sugarcane cultivation remains one of the few avenues through which many smallholders can generate substantial monetary income. However, this opportunity is largely confined to farmers in the town of Magude, whose proximity to the factory makes participation feasible. The spatial restriction creates new forms of stratification, as those with access to the scheme accumulate assets and diversify livelihoods, while others in more remote areas remain dependent on increasingly precarious rain-fed agriculture. These disparities have direct implications for climate change adaptation: farmers benefiting from sugarcane contracts are better placed to invest in housing improvements, irrigation, and alternative income sources, while those excluded face greater vulnerability. Over time, the uneven distribution of elements that can enhance adaptive capacity risks deepening socio-economic divides and reinforcing the very inequalities that climate resilience policies claim to address.

The case of sugarcane in Magude illustrates how resilience is shaped simultaneously by opportunities and constraints. On the one hand, associations create income streams, enable investment in assets, and foster collective responses to climate stress. On the other hand, dependence on a

single corporate buyer, lack of transparency in profit distribution, and uneven access to the scheme weaken long-term security and reproduce local inequalities. What emerges is a form of resilience that is not rooted in the crop itself but in farmers' efforts to cooperate, negotiate, and adapt within unequal corporate and state frameworks. This dynamic highlights the ambivalence of resilience: while it can provide short-term relief and opportunities for accumulation, it also embeds farmers in systems of dependency that limit autonomy and perpetuate structural vulnerability.

Conclusion

The analysis of agriculture in Magude shows that adaptation is not a simple technical adjustment to climate variability but a contested, socially embedded process. Farmers respond to erratic rainfall, extreme heat, pests, and shifting markets by altering planting calendars, saving and exchanging seeds, diversifying crops, forming associations, and pursuing alternative income activities. These strategies reveal adaptation as a lived negotiation shaped by ecological knowledge, household labour, gender relations, and long-standing histories of marginalisation. By contrast, government and NGO interventions often frame adaptation in narrow technical terms, privileging improved seeds, irrigation schemes, or associations as instruments of improving short-term productivity. This contrast exposes a temporal dissonance: while official framings treat resilience as securing the next harvest, local strategies emphasise continuity across years through seed saving, kinship networks, intergenerational transmission of local knowledge, and ecological balance.

Resilience is therefore a site of ongoing negotiation between local practices and external agendas. Farmers' associations and sugarcane schemes illustrate this ambivalence. Collective organisation fosters social cohesion, improves access to inputs, and creates openings for participation in wider markets. At the same time, reliance on state mediation and corporate structures reproduces inequalities of gender, class, and geography, excluding poorer households and those distant from water sources. The dissonance between state-designed and locally grounded forms of climate change adaptation highlights the limits of climate governance, where resilience is measured through outputs such as irrigated hectares or quantities of improved seeds distributed. Agriculturalists in Magude express resilience by navigating climate vulnerability within unequal systems of resource access and power.

This ethnographic study demonstrates the centrality of local knowledge in shaping adaptive practices. Farmers draw on live experience, accumulated knowledge, and intergenerational skills to decide when to plant, how to rotate

between highlands and lowlands, and which varieties to cultivate in changing climate conditions. Rituals and moral frameworks, such as ceremonies conducted during pest outbreaks, illustrate that resilience in local people's practice is not only material but also cultural and spiritual. However, state and NGO programmes often neglect such practices. For instance, practices such as soil classification or planting calendars may be acknowledged in diagnostic reports but are often disregarded in the actual design of interventions. This reflects epistemic hierarchies in which expert-driven models are privileged and local understandings reduced to fragments that can be absorbed into technical systems. Farmers' resistance to non-replantable seeds and their scepticism toward sugarcane profit-sharing demonstrate that knowledge is defended not only as information but as a practice of autonomy, cultural meaning, and justice (Nadasdy 1999).

Seen through the lens of climate justice, these dissonances take on a sharper political meaning. The burdens of climate stress and the shortcomings of state adaptation policies fall most heavily on poorer households, women, and those living far from rivers or outside associations. Benefits, meanwhile, are concentrated among landowners with access to water, credit, or corporate schemes. This uneven terrain reflects the differing views on how to tackle climate change. While the government sees it as a purely environmental issue that can be solved with technology, people in Magude experience it as a component of wider struggles over land, labour, and inequality. The temporal dissonance between short-term policy horizons and long-term local strategies, combined with these scalar mismatches, reveals why official frameworks often fail to address the root causes of vulnerability.

Agricultural adaptation in Magude thus cannot be evaluated solely in terms of increased yields or hectares under irrigation. It must be understood as a field where competing knowledges and power relations converge. Adaptation strategies that are based on local knowledge and social cooperation demonstrate how resilience is thought, practised, and taught at a local level. However, these strategies are undermined by state and corporate interventions that prioritise technical solutions. Agriculture in Magude exposes some of the contradictions between climate governance in Mozambique and local people's adaptation and resilience practices.

Chapter 5: Livestock: Magude, "The King of Cows"

Historical and archaeological studies show that livestock husbandry has long been central to the Tsonga-Changana (Ekblom 2018; Junod 1996; Newitt 1997). Large herds historically played vital social, economic, and symbolic roles (Direito 2020, 2022). Economically, cattle were a key form of wealth, providing trade, food security, and agricultural labour, particularly ploughing in the fertile Save basin[18] (Rita-Ferreira 1982). They also served as a form of payment in local transactions (Liesegang 1996). Socially, cattle were indispensable for *lobola*, enabling marriage and household formation, as I discussed in detail in Chapter Two, while ownership conferred prestige and authority (Newitt 1995). Cattle rearing remains a dominant livelihood in southern Mozambique, supported by favourable ecology and low tsetse fly prevalence (Rocha et al. 1991). The region hosts the country's largest cattle population (about 890,918 head), with Magude leading at 101,370 (MADER 2020). Beyond their economic value, cattle remain woven into daily life, structuring social relations, cultural practices, and community identities.

Because of this enduring importance, climate change poses profound challenges to livestock livelihoods (Shemsanga et al. 2010; Berhe and Butera 2012). In Magude, recurrent droughts, rising temperatures, and shifting rainfall patterns have reduced water and pasture, weakened cattle, and facilitated disease. These pressures not only undermine economic returns but also threaten the cultural significance of cattle as stores of wealth and symbols of continuity.

This chapter examines how recurrent droughts and related changes have undermined the viability of cattle rearing in Magude and the implications this has for the continuity, cultural significance, and economic importance of this way of life. It considers the organisation of livestock within households, also paying attention to gender and generational divisions of labour, including how

[18] The Save basin, spanning parts of Zimbabwe and central-southern Mozambique, is characterised by fertile alluvial soils and seasonal floodplains that historically sustained mixed farming systems. In this region, cattle provided ploughing power, food security, and trade value, making it one of the agricultural heartlands of southern Mozambique (Rita-Ferreira 1982; Liesegang 1983).

women and young people are reshaping traditional roles. The chapter also analyses the multiple meanings of cattle, such as their function as a "living bank," their role in rituals and kinship, and their status as symbols, while tracing how smallholders negotiate relations with commercial ranchers and the state amid land enclosures, grazing conflicts, and market inequality. Ultimately, the chapter demonstrates how ecological knowledge and everyday adaptive practices interact with structural vulnerabilities, rendering cattle rearing not merely an economic pursuit but also a domain where institutional approaches to and understandings of adaptation, resilience, and justice are contested. It highlights how local conceptualisations of adaptation and resilience, described in the previous chapters, are enacted and reproduced in local practices and ideas.

Livestock Husbandry and Gender Roles

Although largely absent from institutional framings of climate adaptation, gender is central to livestock husbandry in Magude. Government and donor programmes, including Local Adaptation Plans (PLAs), treat cattle management mainly as a male domain and prioritise technical fixes such as improved breeds or veterinary campaigns. They seldom acknowledge that men and women face different risks, nor do they recognise the adaptive practices of women. Nevertheless, gender influences labour, decision-making, inheritance, and daily herd care. When men are absent due to labour migration, illness, or death, women often take charge of the cattle, drawing on their local knowledge of livestock behaviour, household organisation, and social networks to sustain the herds. Attention to these gendered practices shows how resilience is enacted locally and challenges institutional assumptions that privilege male authority. Below I will raise an individual example of cattle owning families that illustrate why gender-specific risks and practices are crucial for understanding adaptation in Magude.

The Matavel family illustrates how many households in Magude engage in cattle rearing. Mr Matavel is a 63-year-old farmer and cattle breeder who lives in Moine on a large plot of land surrounded by cornfields, watermelons, and pumpkins. He has two wives and 23 children. Some live in the Magude-sede, while others have immigrated to South Africa. Six live with him in the Moine Village. Livestock is one of the family's most important activities and involves all family members, especially the men. As head of the family, Mr Matavel is responsible for building and maintaining the family corral. Together with his sons, he regularly cleans the corral and moves the 84 head of cattle to dry areas when it rains heavily. The cattle graze during the day and

are tied up at night. Under his supervision, the two youngest boys in the family (aged 12 and 14) are responsible for grazing. In the morning, while one goes to school, the other takes the cattle to pasture. He is later replaced by his brother when he returns from school. Meanwhile, the women of the house help control the cattle and feed the calves, which are usually left in the corral at home.

The Matavel family approach not only reflects common livestock husbandry practices but also highlights the prominent role men play in the livestock sector, as emphasised in other studies on the African continent (Ainslie 2013; Herskovits 1929; Yurco 2023). Ainslie (2013) in particular highlights this gendered division of labour in cattle management, showing that men typically take on primary responsibilities such as herding, decision-making, and conducting market transactions.

The example of the Matavel family's relation to its cattle herd illustrate how cultural norms and economic factors shape gender roles within livestock-rearing communities. According to local customs, boys are expected to take the cattle to pasture, assuming responsibility for tending to the family's livestock from the age of 10. Even in the rare cases where a family does not own cattle, boys are still required to herd livestock for a neighbour or close relative. One informant described this as a "ritual that every boy must go through," emphasising its role as an essential rite of passage to adult masculinity.

Boys take on the responsibility of herding cattle from an early age, a duty that continues until they are eventually replaced by younger boys within the family, a cycle that reinforces the gendered division of labour in livestock-rearing communities. One young man shared with me his personal experience of cattle herding, saying: I started herding cattle when I was six years old. My father's first child was male, and the rest were female. He was desperate for a son.

His account illustrates how cultural expectations surrounding masculinity and lineage influence the assignment of responsibilities, with sons often being seen as the heirs to family traditions and economic roles. This early involvement not only prepares boys for adult responsibilities but also reinforces their identity and status within the community. His father was desperate for more sons because his eldest son had migrated to South Africa, leaving no one to look after the cattle. Boys are needed because their daily tasks include taking the cattle to pasture, ensuring they graze, and finding water. They are familiar with the common grazing areas and the best spots for watering the herd. Typically, boys leave with the cattle in the morning and return at the end of the day. Upon their return, the father checks the herd to

ensure all the animals are present, a task that has become even more crucial due to increasing reports of cattle rustling.

Many families also rely on paid labour, hiring boys to work as cattle herders, either because they lack male children or because they prioritise sending their sons to school. These hired workers may come from neighbouring rural households, but they are often from other districts. Lazaro, for example, is a 16-year-old youth who came from the neighbouring district of Massingir in 2020 to work as a cowherd. Although he no longer works in the pastures, he recalls his former duties, which included milking the cows in the morning and taking the cattle out to graze. He typically left with the herd at 10 a.m. and returned at 5 p.m. Lazaro remembers that the most challenging part of his job was managing the cattle during the rain, standing in the downpour to keep them from wandering into nearby fields and eating the maize. Lazaro's experience is a typical herd boy story, one of many, which together reflect how economic needs and educational priorities shape labour practices within Magude communities.

Some herders agree that the work becomes especially challenging when it rains, particularly during thunderstorms, because the cattle can become agitated and difficult to control. As one former herder explained, younger boys often need help during rainstorms:

> When it rains and thunders, the younger boys may struggle to manage the herd. The cattle become restless and unpredictable, often moving in the opposite direction of the rain to avoid water in their eyes. On those days, the older boys have to step in and help; otherwise, the younger ones might not be able to bring all the cattle back home.

If some cattle go missing, the herders must search the bush until they find them. If they fail to locate them, they are required to compensate the farmer out of their wages, making it crucial for the herders to ensure the entire herd returns home before nightfall. The herders are paid in two ways: either with a monthly cash payment or annually in cattle. Lazaro, for instance, was paid in cattle for every year he worked:

> I worked for two years and received two cattle, a cow in the first year and an ox in the second. Now I have three cattle because my cow gave birth to another one. All three are in the boss's corral, and I hope my cattle will continue to grow in the future.

Typically, it is the herder who chooses the type of payment, and local herders tend to prefer payment in cattle because they can easily transport them to their

family pens. By contrast, migrant herders prefer a monthly salary in cash, which they can send back to their families. Herder salaries range from 2,000 to 3,000 Mt (USD 31–47) per month, with some herders receiving payment at the end of each month, while others are paid an accumulated amount at the end of the year. Parents do not pay their children for herding, which has led to some dissatisfaction among the younger generation, prompting them to seek work as herders in other families. This shift in demands from youth is a relatively new development in Magude and can be seen as part of the broader trend of the commodification of family livestock practices. Traditionally, herding was viewed as a family responsibility, with children expected to contribute to the household without financial compensation. However, as economic pressures increase and aspirations for material rewards grow, many young people are now willing to work for other families in exchange for payment. A 15-year-old boy shared his story with me when we were discussing his family's cattle:

> I was often told that my father's cattle were also mine, but over time, I realised I had no autonomy over them. When he sells the cattle, he doesn't even give me 100 Mt [USD 1.56]. I grazed them for a long time, but my father never gave me any money from the sales. My salary is food. That's why many young people in my area prefer to flee to South Africa.

This statement highlights the shifting dynamics of labour within livestock rearing, where the line between familial obligations and wage labour is increasingly blurred. It also reflects broader societal changes, as younger generations seek more tangible economic rewards for their work. This desire for greater autonomy and financial independence challenges traditional family roles and norms, pushing many young people to seek opportunities outside their communities.

In Magude, farmers have a deeply ingrained and quite specific sense of ownership over their livestock. They know their cattle well, with some even going as far as naming them, reflecting the close bond between farmers and their herds. The cattle are considered the property of the head of the family, and it is he who holds full authority over all decisions related to the herd. This includes decisions about the management, sale, and even distribution of the cattle among his children. The head of the family determines who will receive cattle, often as part of a traditional inheritance or as a means of supporting a child's future. The centralisation of power in the hands of the father highlights the patriarchal nature of livestock ownership within the community. In such a context, cattle are not only valuable assets but also symbols of wealth, status,

and control, reinforcing economic and social roles within both the family and the wider community (Ainslie 2005, 2013; Herskovits 1926).

A good example is Lamuli, a 75-year-old cattle breeder. He owns a herd of 89 cattle and is the head of a family with seven children. Lamuli explained that the cattle belong to him, and he feels under no obligation to share them with his children, arguing that no one gave them to him:

> I bred my own cattle; nobody gave them to me; I bought them myself. My children also have to work to buy their own cattle. They can put their cattle in my corral; there's no problem. I made them study, I fed them, I did a lot for them with my cattle. Let them buy their own cattle; my duty as a father is already done.

Lamuli's stance reflects a broader cultural logic in Magude, where livestock serve as a status symbol and a reserve for family security. By retaining sole authority, the patriarch protects the herd as an asset that can be utilised in times of crisis to ensure the household's economic resilience. In this context, it is understandable why Lamuli believes he does not need to give his children any livestock, having already fulfilled his paternal duties by feeding and educating them.

Studies from other parts of the world show that livestock management and related decision-making are generally considered a male domain (Njuki et al. 2011; Kariuki et al. 2018; Galiè et al. 2019). However, in a study of Massai communities in Kenya, Yurco (2024) argues that women's traditional activities, such as milking and tending to animals within the household, are crucial for herd health and food security, yet they are often undervalued compared to men's tasks, which are more visible. Yurco emphasises that women's contributions are not merely supportive but are integral to the overall sustainability of livestock rearing. Their roles ensure the daily well-being of the animals, influencing milk production and calf survival rates.

My observations in Magude reveal dynamics similar to Yurco's findings. Although livestock management is clearly seen as a male responsibility, women play significant but underappreciated roles in terms of cattle management. Traditionally, girls are allowed to graze cattle only if there are no boys in the family or if the family cannot afford to hire a boy for herding. Female participation is generally viewed as an exception, but it is crucial to note that women, particularly wives, take on active roles in livestock. Women's contributions go beyond assisting with daily chores; they are essential to the overall functioning of the livestock system. It is typically the mother who prepares food for the herder to take to the pasture, ensuring the herder's well-being throughout the day. Additionally, women are involved in

monitoring the cattle's whereabouts and safety. As one man noted, "If a head is lost and the children aren't here, my wives go into the bush to search for it."

Evidence from the Kenyan pastoralist context illustrates how women exercise substantial control over milk production and marketing, where, despite male oversight, decisions concerning household consumption and sales typically rest with wives (McPeak and Doss 2006). Such control gives women a degree of financial autonomy and establishes them as key economic players within pastoral households. However, as McPeak and Doss (2006:526) point out, this may provoke opposition from men, who could perceive women's access to independent income as undermining their authority.

Petitt's (2016:203) study of Botswana contributes to this discussion by demonstrating that women's involvement with livestock goes far beyond activities such as milking. Through ownership, inheritance, and decision-making, women assert their claims to cattle in ways that complicate the notion of livestock as exclusively male property. While men continue to dominate the symbolic and political dimensions of cattle as markers of wealth and prestige, women actively assert their own claims to cattle, especially with new market opportunities, thereby challenging the idea that cattle are exclusively the preserve of men. Women's involvement shows that livestock are not only economic assets but also arenas where gendered property relations are negotiated, contested, and redefined.

The same dynamics are visible in Magude, where women assume control over livestock management in the absence of male household heads, whether due to male labour migration to South Africa or the death of their husbands. The experience of Ana, the fifth wife in a polygamous marriage, illustrates this process. When the other wives abandoned the household during their husband's illness, Ana remained and assumed responsibility for managing around 150 cattle with the help of her daughters. Although local inheritance norms dictate that the first wife's son should inherit the herd, Ana's continued labour and presence positioned her as the de facto manager. This situation complicated established succession practices and later led to a legal dispute, with the other wives and their children also claiming ownership of the cattle and other assets. The ensuing dispute among the wives and children over ownership highlights how women's practical control over cattle can diverge from customary rights, making livestock management a site of both empowerment and conflict.

Ana's story highlights the complex gender dynamics and inheritance issues surrounding livestock ownership in Magude. It demonstrates how women can assume leadership roles in herd management, particularly in the absence of

male authority, thereby challenging traditional norms of property rights and gender roles. Her case is not merely a social exception but an adaptive response to structural and environmental pressures such as male migration, drought, and herd vulnerability. These conditions have necessitated a reorganisation of responsibilities, reflecting the community's capacity to adjust traditional practices in order to sustain livestock production. Similar patterns have been documented elsewhere in African pastoralist societies, where women's increasing involvement in animal care and decision-making emerges as a strategic response to climate variability and socio-economic instability (Yurco 2023; Galvin 2009). Such shifts highlight that adaptation is not only technical or environmental but also grounded in local knowledge, with women drawing on situated understandings of cattle behaviour, inheritance rules, and household negotiations of gender, authority, and survival (Oliver-Smith 2017). In this context, household resilience refers less to technical adaptation than to the capacity to sustain livelihoods and household continuity amid illness, migration, and contested inheritance. As Sen (2023) argues in relation to everyday adaptation, such resilience emerges through routine negotiations of uncertainty.

In cases where the household head is absent, women may also hire a man to assist with livestock care. These helpers are often trusted relatives, such as cousins, but in their absence, community members are recruited. Joel is one such figure. A former mine worker in South Africa, Joel now lives in Mahel, where he manages his own herd while assisting community members, including widowed women, with theirs. Known locally for his knowledge of cattle management, which many in the community lack, Joel has become a trusted helper. His responsibilities extend beyond basic herding: he also diagnoses and treats diseases, liaises with veterinarians, and purchases and administers vaccines. Such an arrangement reflects both adaptations to changing family structures and the persistence of gendered hierarchies in livestock management. Even when women assume primary responsibility for their herds, bringing in a male helper often reinstates male authority over crucial tasks, while at the same time serving as a pragmatic way to navigate social expectations and practical constraints. In some cases, a male intermediary like Joel is necessary to negotiate with veterinary officers, engage with other men in the community, or perform tasks that require physical strength or access to male-dominated networks. Joel's background as a mine worker and his experience as a breeder lend him technical expertise and social legitimacy, qualities which other men may lack. For widowed women, employing a trusted male "front" is thus a way of ensuring the best possible care for their livestock.

This duality highlights the complexity of gender relations in pastoral communities: adaptation can simultaneously challenge and reinforce existing power structures. As Robbins (2011) observes, environmental change always produces winners and losers, making resource management inseparable from questions of power and legitimacy. In Magude, women may sometimes take responsibility for the cattle, but their authority is often mediated through male helpers, reflecting the enduring influence of patriarchal norms. These dynamics resonate with Goldman and Turner's (2011:5–6) point that environmental management is shaped by "knowledge politics," where some forms of authority are privileged over others.

These tensions illustrate that adaptation in Magude is not only about ecological adjustment but also about negotiating justice and authority in unequal social landscapes. Local practices reveal flexible and shifting gender roles in livestock management, but such dynamics remain largely absent from institutional frameworks of resilience. Government and donor programmes, including Local Adaptation Plans (PLAs), tend to prioritise technical solutions, such as veterinary campaigns, tick-bath infrastructure, or breed improvement, and define resilience in terms of productivity and measurable outputs. In contrast, the cases of Ana and Joel show that resilience is forged through household reorganisation, gendered responsibilities, and networks of reciprocity. These practices contradict official agendas that presume male authority over cattle. This reveals a discrepancy between the institutional framing of adaptation and the lived realities through which resilience is achieved in Magude.

The Multifaceted Role of Cattle in Magude

Cattle occupy a central place in the culture and society of Magude. They are productive assets that provide milk, meat, labour, and financial security. However, their significance extends well beyond their material value. Across Africa, cattle have long been embedded in systems of wealth, prestige, and identity, serving as symbols of prosperity and facilitating the maintenance of social relationships (Coertze 1986). In Magude, cattle are used to secure alliances through *lobola*, underpin ritual obligations, and provide collateral in transactions, thereby mediating relations of trust and reciprocity (Ainslie 2005, 2013). To own cattle is therefore far from only an economic achievement. It is also a claim to social recognition, lineage continuity, and ancestral legitimacy.

Cattle, in the terminology of Mauss (1990 [1925]), are a "total social fact," a concept that encompasses economic, social, and spiritual dimensions. This

section explores the various roles of cattle in Magude, from providing everyday nutrition and contributing to ritual life to being used for agricultural labour and in marriage practices and functioning as a form of "living bank." Through this lens, it becomes clear that cattle sustain livelihoods while embodying broader moral and social orders. However, the ethnographic material also reveals the fragility of these practices in the face of drought and economic insecurity, highlighting the tension between short-term survival and long-term resilience. Institutional approaches to adaptation in cattle and other livestock rearing, such as Local Adaptation Plans, tend to translate resilience into technical indicators, such as herd size, vaccination rates, and access to veterinary services, while overlooking the cultural and relational dimensions through which cattle support households. Programmes that emphasise commercialisation or improved breeds, for example, miss how cattle mediate *lobola*, ritual sacrifice, and inter-household loans. Local knowledge, expressed through reading pastures, rotating grazing, or observing animal behaviour, sustains herds for reasons of both productivity and social continuity.

Nutrition and Everyday Meanings

The practical role of cattle in Magude centres on milk rather than meat. Milk plays an essential role in the daily diet of families. It is collected first thing in the morning by the herdsman responsible for the cattle and is consumed throughout the day by all family members. Milk is also a symbol of hospitality and is customarily offered to visitors as a gesture of respect and goodwill. The consumption of milk varies according to personal preference and local customs. Some families prefer to boil the milk and drink it hot, while others enjoy it fresh immediately after milking. Additionally, fermented milk, typically left to mature for one or two days, is also popular. This fermentation process not only enhances the flavour but also improves its digestibility and nutritional value. Many people in Magude drink milk before heading to the fields or engaging in other daily activities because it is perceived as a vital source of energy and strength. Beyond its nutritional value, milk symbolises prosperity and well-being, reinforcing social bonds within the community.

Cattle are also a source of meat, but they are rarely slaughtered for regular consumption. Instead, they are reserved for special occasions, reflecting their high value and the difficulties involved in raising them. As Santos, a local farmer, explained:

> I usually slaughter an ox when I'm happy, when all my children come to visit me. But that doesn't happen all the time because cattle are

> hard to raise. I may only slaughter one ox a year if there's a situation that justifies it.

Santos owns a herd of about 100 cattle, but as he explains here, he only consumes his livestock on rare and significant occasions. Typically, he slaughters an ox when his relatives, particularly those working in South Africa, come to visit. Such visits usually occur in December, during Christmas and end-of-year festivities. At these gatherings, the head of the family is expected to provide meat for everyone, reinforcing his status and role within the family. On regular days, meat consumption is met through more readily available sources such as goats, chickens, and small game. The infrequent slaughter of cattle is also influenced by practical considerations, such as the lack of electricity in many rural communities, which makes it challenging to store large quantities of meat.

Ritual and Collective Life

Cattle hold a central place in ritual and ceremonial life, especially during traditional ceremonies (*mhamba*), weddings, and funerals. These events are deeply rooted in cultural practices and often involve the gathering of extended families and the broader community. *Mhamba* is a traditional ceremony held in memory of deceased ancestors, typically attracting the entire extended family (Humbane 2008; see also Chapter Three of this thesis). During this ceremony, an ox is often slaughtered, not only to provide food for the gathered relatives but also as part of the ritual performed to honour the ancestors. The use of cattle in this context stresses their cultural and spiritual significance as a bridge between the living and the ancestral world (Feliciano 1998).

Weddings are another occasion for which cattle are indispensable. While conducting fieldwork in Magude, I observed how weddings were celebrated as major social events, bringing together neighbours, friends, and relatives from both near and far. These gatherings were marked by communal feasting, where the presence of ox meat was considered essential. Offering cattle for slaughter at a wedding was not only understood as a gesture of generosity but also as a visible marker of social status, reflecting the family's wealth and reinforcing its standing within the community.

In the context of death, particularly during the funerals of respected or influential individuals, the slaughter of an ox is regarded as a social obligation. Funerals draw large numbers of mourners, and it is customary for the bereaved family to provide food for all who attend. At the few funerals I observed, and in accounts shared by local residents, the slaughter of an ox provided sufficient meat to feed the assembled guests. The practice illustrates how cattle operate

on two levels at once: as material resources that sustain communal solidarity in times of loss, and as symbolic markers of respect and continuity in honouring the deceased.

Such rituals reveal that cattle in Magude are valued far beyond their economic utility. They act as vehicles of social exchange, markers of prestige, and anchors of cultural identity. In these gatherings, the slaughter of cattle reaffirms bonds of reciprocity, reinforces collective belonging, and demonstrates the multifaceted role of livestock in sustaining both the social and symbolic fabric of community life. Local knowledge gives form to these values, guiding decisions about which animal is slaughtered, the timing of ceremonies, and the conduct of rituals. Rooted in ancestral norms and embodied understandings transmitted across generations, this knowledge frames cattle not merely as productive assets but as bearers of memory, legitimacy, and moral order within the community.

Labour, Transport, and the Local Economy

The economic utility of cattle in Magude is equally significant. Oxen provide essential labour for both agriculture and transport, and they are commonly castrated to make them docile and reliable for ploughing and cart-pulling. Ownership of oxen is highly valued, as it allows households to cultivate their fields independently and thereby increase productivity. However, ownership is unevenly distributed. Many families must hire oxen from wealthier neighbours, paying either in cash or through reciprocal services. This exchange generates a modest but important local economy centred on animal labour.

Such arrangements reveal broader dynamics of dependence and inequality, while at the same time fostering interdependence within the community and between humans and animals. Households that keep only cows often prefer to rent oxen for traction, preserving their cows for breeding and milk production. Herd composition and labour decisions, therefore, reflect strategic calculations about reproduction, productivity, and survival, all embedded in networks of reciprocity and obligation. Through these multifunctional roles, cattle become indispensable assets in Magude, generating income, enabling cultivation, and sustaining household livelihoods. Their role in resilience lies in the flexibility and security they provide. Oxen lessen reliance on uncertain labour markets, reciprocal arrangements help poorer households absorb shocks, and herds function as reserves that can be drawn upon in times of crisis. Resilience thus emerges not only from material productivity but also from the social ties and obligations that cattle continually sustain.

Lobola and Changing Marriage Practices

Among the Tsonga in Magude, *lobola* remains a cornerstone of marriage practices. Historically, bride compensation ranged from 10 to 15 cattle, affirming inter-family alliances and respect for ancestral lines. Xivure, who owns more than 80 cattle, expressed the *lobola* practices bluntly when speaking about agreements with the family of potential wives: "It's tradition. I won't take less than 15 cattle for each of them." His stance illustrates how *lobola* remains a pathway for expanding herds and consolidating family wealth. Yet environmental pressures have begun to reshape this institution. The devastating drought of 2015/16 drastically reduced herd sizes, compelling families to accept fewer cattle. Xavier, for instance, explained that five cows and some money would suffice, adding:

> It depends on the family, of course, but for me, five cows and a bit of money are enough. According to tradition, one ox is slaughtered on the day of the ceremony for everyone to eat, another is sent to the bride's maternal grandparents, and the remaining three are kept in my corral. If something happens to my daughter and she has to come back home, I'll have to return the five cattle.

The reduction in *lobola* payments and the increasing tendency of young couples to cohabit before formalising marriage demonstrate how drought and economic scarcity reconfigure long-standing cultural practices. As discussed in Chapter Two, the shifts also generate tension; postponing or reducing *lobola* is often interpreted as a failure to uphold social norms, reflecting broader transformations in kinship and moral economies under ecological stress.

Cattle as a "Living Bank"

Perhaps the most widely invoked metaphor in Magude is that of cattle as a "bank." They are regarded as a form of financial security. Such reliance illustrates how livestock function as a form of savings and economic security, a pattern widely observed across African pastoralist societies (Ainslie 2013; Shipton 2007).

In the Mozambican context, Ekblom (2018) highlights how cattle serve as a form of "living savings," particularly in rural contexts such as the communities in Limpopo National Park, where access to formal banking is limited. In a complementary analysis, Levy et al. (2012) explore the analogy of cattle as a "bank" in Mabomo and Mungaze, in Mabalane District, in a more detailed manner, integrating economic, cultural, and social dimensions from

rural communities. They argue that cattle function as a versatile asset that parallels a financial institution in several ways: they serve as a store of value when sold during crises, such as droughts, to purchase food or cover urgent expenses like healthcare and education; they act as a means of production when used for animal traction, essential in farming activities; and they function as social capital, strengthening family and community ties through practices such as *lobola*.

The notion of cattle as a "living bank" was also eloquently expressed by one local farmer:

> Cattle are our bank. If we're starving and there's no money, I take an ox out of the corral and sell it to buy food, pay the herders, and cover other expenses. When there's food in the house, the cattle stay in the corral and wait for an emergency. The cattle are our bank.

This account highlights the strategic role of livestock in household economies, operating as both a buffer against economic shocks and a readily available source of liquidity in times of need. In Magude, cattle are frequently sold to meet a wide range of expenses, from school fees and medical bills to community obligations such as funeral contributions and ceremonial costs. Similar dynamics are observed in other African contexts, where livestock sales provide a critical mechanism for managing financial pressures while also enabling households to fulfil social responsibilities (Kristjanson et al. 2014; Little et al. 2001).

The role of cattle as a form of savings is particularly significant in rural areas where access to formal banking systems is limited. Livestock provide a flexible and culturally embedded means of storing wealth, allowing households to respond to financial needs without relying on external credit. As Ainslie (2013) observes, livestock are especially valuable economic assets due to their mobility and ability to reproduce, making them a self-sustaining form of capital. Unlike many other forms of wealth, livestock can gain value over time, since herds grow naturally through reproduction rather than requiring constant financial investment

This financial function also influences decision-making around herd management. Farmers strategically manage their herds, balancing the need to maintain sufficient numbers for social status and cultural obligations and with the necessity of selling cattle to meet immediate cash demands. However, this strategy of using cattle as a "bank" is not always sustainable. Periods of drought and crop failure have forced many families to depend more heavily on selling their livestock for survival. As one farmer explained:

> With no rain and no crops, cattle are the solution for many families who end up selling their cattle almost every month. And when this happens, the sustainability of these families is threatened, and their cattle don't reproduce. Some would rather keep just three cows and a bull than starve to death.

From the perspective of herd viability, however, keeping only three cows and a bull is not a long-term solution. A reduced herd limits reproductive potential, provides little economic security, and leaves families vulnerable to further shocks. In many cases, households are unable to maintain even this minimal number, reflecting both the precariousness of rural livelihoods and the fragility of cattle-based coping strategies under conditions of environmental stress.

Reliance on cattle during periods of food scarcity also highlights the difficult trade-off between short-term survival and long-term sustainability. When crop failures coincide with drought, families often have little choice but to sell livestock to meet urgent needs. In extreme situations, entire herds may be liquidated, undermining reproduction and severely weakening future resilience. Levy et al. (2012) note that such crisis-driven sales compromise the capacity to rebuild herds and erode the basis of long-term economic stability.

Grazing Conflicts

As previously noted, Magude's livestock sector encompasses both smallholder farmers and large-scale producers. While smallholder farmers typically raise livestock as part of a broader livelihood strategy rooted in household savings, social security, and cultural obligations, the latter operate within the private sector and are primarily driven by commercial objectives, focusing on maximising profits through market-oriented cattle production for both local and regional markets. Large-scale operations rely on extensive grazing systems and hired labour.

Magude's long history of large-scale cattle production further highlights these distinctions. Dating back to the colonial era, the district saw the development of significant infrastructure to support the livestock industry, much of which was later inherited by the state following Mozambique's independence in 1975. Over time, through public tenders and privatisation initiatives, many of these assets were transferred to private breeders, who expanded their operations and modernised the existing infrastructure (Bowen 2000; Norfolk and Tanner 2007). The district's favourable ecological conditions, including abundant grazing land and access to water sources, have continued to attract both local and foreign investors (Direito 2022). However,

this expansion has faced mounting challenges, as increasingly unpredictable rainfall patterns and prolonged droughts have undermined the sustainability of large-scale livestock production, putting pressure on pastures and water availability.

To establish large-scale herding or ranching operations, as explained in Chapter Three, producers must first apply to the state for land allocation. Under Mozambique's Land Act (Lei de Terras), enacted in 1997, land is state-owned but can be leased for up to 50 years through a *Direito de Uso e Aproveitamento da Terra* (DUAT). This process requires consultation with local communities to ensure their interests are considered, although conflicts often arise due to competing land uses and limited transparency in the allocation process (Norfolk and Tanner 2007; Tanner 2002). Once granted, the land is used for cattle production, with the size of the allocated area ranging from 100 to 10,000 hectares, depending on the scale of the operation and the number of cattle to be reared. These allocated areas, known locally as *cercados,* are enclosed with wooden poles and barbed wire to prevent cattle from straying and to demarcate the boundaries of the grazing land. Producers typically employ about three to six workers and the ranches are equipped with essential infrastructure to support large-scale cattle farming. This includes herdsmen's dwellings, tick-dipping ponds, handling pens, and cattle corridors, which facilitate the management and movement of livestock. These facilities reflect the commercial nature of the operations and the need for efficient livestock management practices.

Today, Magude is home to some of the largest cattle ranches in the country, with several owning over 1,000 head of cattle. Many of the ranch-owners are not locals but come from urban centres such as Maputo or from neighbouring South Africa. However, the increase in large-scale cattle farming in Magude has not been without controversy. Several informants noted that some of the district's most prominent cattle ranchers had previously been deeply involved in the illegal rhinoceros horn trade, which flourished between 2010 and 2015. During this period, Magude became a major recruitment ground for poachers operating in Kruger National Park. Magude town was described as a vital stop in a global supply chain that connected impoverished Mozambican youths with Asian markets willing to pay more than gold for rhino horn (Massé and Lunstrum 2016; Russell 2015; UNODC 2016).

At the time, young men were drawn into a trade that simultaneously devastated rhino populations and reshaped Magude's local economy (UNODC 2016). The profits were extraordinary: a single horn could earn a poacher the equivalent of several years' worth of agricultural wages, and many families suddenly displayed conspicuous wealth in the form of new houses,

cars, and consumer goods (Russell 2015; UNODC 2016; Valoi 2017). According to local accounts, it was often this illicit capital that enabled many individuals to transition from poaching to cattle ranching, thereby consolidating their position as 'great entrepreneurs' in the district. Although this connection is rarely discussed openly, it is widely acknowledged that the visible prosperity of some ranchers is inseparable from a period marked by violence, funerals, and the erosion of community trust.

From another perspective, rhino hunting can be understood as a form of resilience: a high-risk but highly profitable response to economic precarity that enabled some families to transform illicit earnings into longer-term security through cattle herds. This strategy depended heavily on local knowledge, including skills in reading animal tracks, navigating bush terrain, and mobilising cross-border networks of trust. At the same time, the very practices that secured individual households contributed to the erosion of collective resilience, fostering social divisions and long-lasting distrust within the community. Despite these controversies, large-scale cattle producers are often portrayed as key contributors to the local economy, providing employment opportunities and investing in infrastructure. However, as several scholars of land grabbing have noted, portraying the purchase of landholdings as success is part and parcel of the narratives of modernisation and development which mask the significant social costs of large-scale land appropriation (Borras and Franco 2012; Hall 2011). In Magude, the growing dominance of commercial ranchers has intensified tensions with smallholder farmers, particularly over access to land and grazing resources. For generations, resilience among smallholders has depended on local knowledge of seasonal mobility, communal grazing norms, and reciprocal arrangements for sharing pasture. The spread of private enclosures undermines these practices, narrowing the scope for cooperation and reducing the flexibility that has long sustained herds through periods of scarcity.

The number of cattle ranchers is steadily increasing, leading to a corresponding rise in the number of privately enclosed areas (i.e. the *cercados*). Much like large-scale land acquisitions elsewhere in Africa, this expansion represents not only a material threat to communal grazing lands but also a restructuring of power and control over resources (Peters 2013; Batterbury and Ndi 2018). What is lost in this process is the embedded system of social rules and ecological knowledge through which smallholders collectively maintained access to grazing, a system that has historically enabled households to cope with droughts and shifting rainfall.

Government allocation policies perpetuate such a process by granting land to private breeders based on a ratio of one cow per hectare. Designed to

support commercial livestock production, this system privileges those with significant capital and large herds, thereby reproducing inequalities and accelerating the enclosure of land. Smallholder farmers perceive these policies as a form of dispossession, akin to the "investor rush" documented across Southern Africa (Hall 2011). As one farmer warned, "If our communal grazing land is also given to the private sector, there will be serious problems in the future." Such concerns echo broader critiques that large-scale enclosures deepen land scarcity, fuel competition, and risk escalating into open conflict (UNAC 2013; Nhantumbo and Salomão 2010). These developments also highlight the short-sighted nature of government policies that present enclosures as a means of achieving economic and social prosperity while disregarding local land use norms and the knowledge that communities use to collectively manage grazing.

The case of Motaze, the district's second-largest agricultural and livestock-producing area, illustrates these dynamics clearly: the expansion of *cercados* is not only displacing smallholder herders but also encroaching on arable land, thereby constraining food production. This dual pressure reflects what Peters (2013:546) describes as the making of "surplus people": farmers and herders who are being forced out of viable livelihoods. This is even more acute as communal grazing lands are not just economic assets; they are also sites of ancestral connection, cultural reproduction, and collective identity. Their loss represents a rupture in the spiritual and social fabric of rural life, underscoring the clash between privatisation and communal worldviews (Batterbury and Ndi 2018). These communal systems rest on local knowledge of pastures, access rules, and shared use, which have long enabled households to sustain herds and cope with scarcity. What is being eroded, therefore, is not only land but also the knowledge that makes it productive and meaningful.

Private ranchers justify fencing as a means of securing exclusive grazing rights and protecting their herds from the perceived risks associated with smallholder cattle, which are often stigmatised as poorly managed and disease-prone. However, this logic mirrors the reconfiguration of agrarian relations associated with large-scale land grabs in Africa and otherwhere in the Global South, where millions of hectares have been leased to private investors for food, biofuel, and livestock production. As Borras and Franco (2012:37, 49, 52–54) show, these processes consolidate land and livestock under capital-intensive models promoted in the name of efficiency and modernisation but are exclusionary in practice.

An incident in Mahel during my fieldwork captures the cultural and material stakes of these processes. When a Brahman bull owned by a private investor mated with a cow from a local Landim herd, a dispute broke out over

the ownership of the calf. For the investor, the superior genetics of his bull justified his claim to ownership of the calf; for the smallholder, lineage and custodianship of the mother cow secured his right. The conflict represents more than just a disagreement over livestock; it reflects two competing visions for the future of agriculture in Magude. One of these visions prioritises private, commercial models of livestock production, while the other is based on communal tenure, reciprocity, and local autonomy.

The dispute was eventually brought before local authorities, who ruled in favour of allowing some smallholder farmers to retain Brahman-crossed calves in their herds. While the private rancher regarded the incident as a financial and genetic loss, for smallholder farmers it represented a rare opportunity to improve the quality of their livestock. The Landim breed, the most widespread in Magude and across Mozambique, remains highly valued by smallholders for its adaptability and resilience (Ekblom 2018). It is estimated that Landim cattle account for over 70% of the national herd. They are prized for their high calving rates, their suitability for meat production, and their remarkable capacity to withstand hot climates, tolerate humidity, and survive prolonged droughts. They also demonstrate significant resistance to foot-and-mouth disease (Bessa et al. 2009; Maciel 2000). From the perspective of local knowledge, these qualities are not understood in technical terms but through daily observation and embodied practice. Farmers know which animals withstand water scarcity, recognise early signs of illness, and select breeding stock based on proven endurance. This situated expertise has long guided adaptation strategies, enabling herds to remain viable under unpredictable climatic conditions.

Against this backdrop, the arrival of Brahman-crossed calves was interpreted as both a challenge and an opportunity. While Brahman cattle are valued for their size and marketability, their resilience in Magude's ecological conditions is uncertain. Smallholders, therefore, sought to combine the strength and stature of Brahman bloodlines with the hardiness of the Landim, integrating new genetic resources into locally established management systems. In this way, resilience was not a fixed trait of a breed but the outcome of negotiated practice in which external inputs are adapted through inherited knowledge to secure livelihoods and preserve cultural continuity.

This episode encapsulates the complex and unequal interactions between large-scale and smallholder producers in Magude. As Hall (2011) and Borras and Franco (2012) argue, investor-driven enclosures are often justified in the language of modernisation and efficiency, even as they intensify rural inequalities and restrict opportunities for smallholders. In Magude, fencing is defended by private ranchers as a way to avoid disputes and protect

commercial herds, but in practice, it highlights the asymmetries of power, access, and breeding opportunities between smallholders and commercial producers.

These tensions are compounded by the structural imbalance of resources between the two groups. Large private breeders possess the financial means to acquire and control extensive tracts of grazing land, while smallholders confront diminishing access to pastures. This is aggravated by prolonged heatwaves and increasingly erratic rainfall, climatic shifts that have become more frequent in recent years (IPCC 2021). Such dynamics resonate with Batterbury and Ndi's (2018) observation that land grabbing is inseparable from broader ecological stresses; enclosures not only dispossess but also exacerbate vulnerability in the face of climate change. For smallholder farmers in Magude, the result is a chronic struggle to secure adequate feed for their cattle. This leads to poor animal health and lower weights, which directly undermine their profitability at the point of sale.

The economic divide between large-scale and smallholder producers is stark. While private breeders can buffer climatic shocks through investments in supplementary feed, veterinary care, and infrastructure, smallholder farmers often lack such options. This disparity not only determines immediate herd health but also perpetuates cycles of marginalisation and poverty, given that livestock remain a primary source of household income. Low cattle weights reduce market value, eroding livelihoods in an already unequal playing field. In this sense, Magude reflects the broader patterns documented across Africa: land and resource enclosures that, despite their developmental rhetoric, entrench structural inequalities and privilege large-scale commercial producers over rural communities (Batterbury and Ndi 2018; Borras and Franco 2012; Hall 2011; Peters 2013).

From the perspective of environmental justice, these dynamics raise questions about who benefits and who bears the costs of climate change and adaptation. Large-scale producers are better positioned to access state resources, secure DUATs, and integrate into markets, while smallholders are left with shrinking pastures, declining herd health, and limited opportunities for advancement. Environmental burdens – such as exposure to drought, loss of communal grazing lands, and declining livestock value – fall disproportionately on poorer households, while the benefits of "modernisation" accrue to those with capital and political connections.

Seen through this lens, resilience in Magude is not merely a technical matter of adapting herds to climatic shocks but a deeply political process in which access to land, knowledge, and state support is unequally distributed. The injustices embedded in these processes show that adaptation measures

cannot be understood apart from broader struggles over equity, recognition, and rights.

Drought and Its Impact on Livestock Rearing

Southern Mozambique has historically been affected by cyclical droughts, with the 2016 drought being one of the most severe recorded in southern Africa. Driven by an exceptionally intense El Niño, it disrupted rainfall patterns over two years, leading to prolonged dry spells and soaring temperatures (OCHA 2016). The consequences were catastrophic for local communities, producing acute water shortages, the widespread loss of grazing land, and mass livestock deaths (Club of Mozambique 2016; Ekblom 2018). In Magude, cattle owners vividly recalled the devastation: no rain, unbearable heat, and the disappearance of pasture and water sources. Dams, ponds, and rivers dried up, forcing livestock to travel long distances in search of water. One cattle owner recounted:

> That year, many cattle died because of the lack of pasture and the excessive heat. When the cattle went looking for water to drink, they would collapse and die along the way. Everything stank because of the dead cattle. Everything was dry, and people were cutting down leaves to feed their cattle. I had 17 cattle, and they all died.

Another remembered:

> It didn't rain all year, and there was no grass. Large ranchers took their cattle to Manhiça and Macia, and others bought grass to feed their cattle. Our cattle died here; we had nowhere to take them. We were miserable, it was terrible! I had 29 cattle at the time, and they almost all died. I was left with just three. I managed to recover to 11, but last year they were ravaged by disease, and they all died.

These individual accounts highlight the material devastation caused by drought, but they also point to a deeper cultural rupture not often directly addressed. While informants often focused on the immediate loss of cattle, the underlying significance of these losses reaches into the moral and social order of Magude. As previously discussed, cattle are not merely economic assets. They embody social identity through their role in marking household status, ancestral legacy through their centrality in *lobola* and inheritance, and spiritual equilibrium through ritual obligations such as *mhamba*, during which cattle are offered to honour ancestors. The mass death of herds, therefore, has consequences that extend beyond material survival. It fractures the continuity

of lineage, interrupts obligations to the ancestral realm, and destabilises the bonds of reciprocity that hold communities together. In this sense, climate-induced livestock loss is experienced both as an existential threat to livelihoods and a disruption of the cultural and spiritual foundations of community life.

According to government reports, approximately 10,083 cattle died in Magude during the 2016 drought. Around 10,000 cattle were relocated to less severely affected districts such as Bilene, Chókwè, and Xai-Xai (GDM 2016). However, this option was only available to wealthy ranchers who had the resources and logistical means to move their herds. Such strategies were unattainable for smallholders. Exposed to the full force of the disaster, they suffered catastrophic herd losses. Milgroom and Giller (2013) similarly note that in semi-arid regions such as Massingir District in Gaza Province, livestock functions simultaneously as a productive asset and a safety net in times of food shortage. However, when drought strikes, families are compelled to sell animals under distress conditions at low prices, reducing herd size without ensuring long-term food security.

Similarly, in Magude, the drought not only directly impoverished households materially but also eroded their adaptive capacity, leaving them more vulnerable to future shocks (cf. Nhantumbo and Salomão 2010). State accounts of climate change impacts tend to reduce such crises to statistics of animal deaths, hectares of pasture lost, or quantities of relief distributed. The cultural and social damage associated with herd collapse, such as the loss of ancestral legitimacy, the interruption of ritual obligations, and the weakening of inter-household reciprocity, remains largely absent from official reports. No measures were introduced to address this cultural trauma or to support social forms of resilience. However, even amid severe constraints, smallholders in Magude have not been entirely passive in the face of climatic adversity. Although they suffered the highest livestock losses during the drought, some managed to minimise the damage through remarkably innovative and adaptive strategies. Zimba, for example, chose to graze his cattle at night to reduce the impact of extreme daytime heat:

> During the day, I left the cattle at home, in the shade. At night, when it was cool, I would take them out into the bush. They would graze and then head to the river to drink water before returning home. I didn't lose any cattle. Many people lost theirs because they were taken out to graze during the day, when the heat was intense. When cattle are too hot, they don't obey the cowherd's commands – they just sit down. They only got up to drink water, and many didn't even reach the river; they died on the way.

By shifting grazing to night hours, Zimba demonstrated how adaptation is grounded in practical adjustments that integrate environmental knowledge with livestock behaviour. Sambo employed another strategy based on his ecological knowledge:

> Here in Xivonguene, there is a tree called fufu that cattle eat. During droughts, the cattle survive by eating the leaves of this tree. My livestock didn't die because I knew about this tree and fed it to them.

His use of the drought-resistant fufu tree exemplifies indigenous ecological knowledge. Such practices align with the observations documented by Bollig and Schulte (1999) among the Kenyan Pokot and Namibian Himba herders, whose survival strategies as pastoralists are closely tied to their intimate relationships with plants and herds. Similarly, Fernández-Giménez (2000) and Oba (2012) describe how herders in Mongolia and in African countries such as Kenya, Ethiopia, and Uganda use ecological indicators, including vegetation, soil, and animal condition, to inform their grazing decisions. Zimba's and Sambo's strategies are therefore not isolated improvisations but part of a wider pastoral repertoire of resilience, rooted in local knowledge and flexible adaptation.

Some opted for relocation. Xavier recounted his decision to move cattle to Motaze after attempts to transport grass from Manhiça became unsustainable:

> I used to drive my older brother's truck to Manhiça to collect grass and bring it back to feed the cattle. The cattle had gotten used to it – as soon as they saw the vehicle, they would run toward it, hoping for food. But I had to stop because Manhiça was too far, and I couldn't make the trip every day. So, I decided to take the cattle to Motaze. I went there because there was no grass here; the land was as bare as a road. Some cattle died there, but I managed to save others. At that time, I had 68 cattle and lost 17.

For others, selling off their cattle was the only option. However, as many people reported, drought caused cattle prices to collapse, falling from 15,000 Mt (USD 235) to as little as 4,000 Mt (USD 62). This reflected both an oversupply of weakened animals and reduced demand amid widespread hardship. As Notelid and Ekblom (2021) point out, such sales are acts of desperation rather than strategic marketing. Farmers exchanged critical assets for minimal returns, undermining long-term recovery.

This phenomenon of "distress selling" is widely documented in drought contexts (Milgroom and Giller 2013; Morton, 2007). The sale of breeding animals in particular compromises herd regeneration, diminishing resilience

for years to come. In Magude, distress sales expose a temporal paradox: they secure short-term relief in the form of cash or food but simultaneously erode the herd base that sustains long-term community survival. The collapse in cattle prices intensifies this dilemma, as wealthier breeders can delay sales or relocate herds, while poorer households sell rapidly and cheaply, becoming locked into cycles of precarity. Beyond economic loss, the depletion of herds also weakens the cultural and social functions of cattle, undermining status, marriage prospects, and ritual obligations. Such dynamics exemplify the climate justice dimensions of drought where resilience is stratified by class and capital, and those least responsible for climate change face the greatest burdens with the fewest means to buffer them.

The crisis also revealed the absence of institutional mechanisms to stabilise markets. Historically, cattle in Mozambique served as a relatively stable store of value compared to volatile currencies (Ekblom 2018) except in periods of severe drought. During the 2015/16 drought, this stabilising role collapsed. Without any state-backed interventions, such as emergency purchases, subsidies, or restocking, farmers were left entirely exposed to volatile local markets. As in other parts of southern Africa, the absence of such protective measures demonstrates that vulnerability is not only ecological but also the result of political and institutional neglect. It also reflects the government's tendency to frame climate change primarily as an environmental phenomenon while failing to anticipate its entanglement with economic processes such as market stability, cattle prices, and the institutional conditions that shape adaptation. By overlooking these interconnections, state actors not only missed the destabilising effects of the 2015/16 drought on markets but also failed to recognise its longer-term consequences for cattle health and productivity, issues that extend beyond the immediate loss of animals.

At the same time, Mozambique's young state has historically provided few protective mechanisms for rural producers, raising the question of whether inaction during drought reflects a failure of climate governance or simply the limited role the state has played in supporting pastoral livelihoods. Since independence, rural interventions have been uneven and shaped by socialist collectivisation, the civil war, and neoliberal reforms of the 1990s, which left agricultural support fragmented and underfunded (Covane 2001). In districts like Magude, state presence has often been more symbolic than substantive, with little capacity beyond sporadic veterinary campaigns or land allocations. The absence of market-stabilising measures during the 2015/16 drought thus reflects both a narrow environmental framing of climate change and a longer history in which rural producers have rarely been shielded from economic shocks.

Beyond starvation and dehydration, the drought precipitated a surge in cattle diseases, notably theileriosis[19] (Ekblom 2018; Mofya-Mukuka et al. 2020). Introduced in Mozambique in the early 1900s (FAO 2022), the disease resurged with particular force after 2016. Farmers attributed increased susceptibility to weakened immune systems from heat stress and malnutrition (Ekblom 2018; Spinage 2012). Carimo, whose account I presented in Chapter One, described how the subsequent rains in 2017 compounded the crisis. He recounted how the heavy rains, which followed the prolonged dry period, may have exacerbated the crisis. According to Carimo, the rainfall washed cattle carcasses into the rivers, which then flooded grazing areas and contaminated vital resources. He explained that surviving cattle became ill when they drank from these polluted waters or grazed on vegetation growing in these areas.

This account reveals how alternating drought and flood generate a vicious cycle of degradation and infection, compounding risks for herds and households. Theileriosis, spread by ticks that proliferate after rains, exemplifies how climate variability reshapes disease ecologies. More than 25,000 cattle deaths were attributed to the combined effects of drought and disease in Mozambique (FAO 2022).

These experiences show that climate extremes intensify both ecological and epidemiological risks, leaving farmers trapped in cycles of loss. They also highlight the limitations of veterinary governance, as farmers express frustration with weak support while officials emphasise preventive measures (FAO 2022; Mavhura 2020). The resulting tension illustrates how adaptation is shaped not only by ecological crises but also by institutional failures and contested authority.

To sum up, the 2015/16 drought in Magude demonstrates that climate shocks cannot be reduced to rainfall deficits or livestock deaths. Their effects extended across economic, social, and cultural domains, destabilising markets, decimating herds, and undermining the ritual and moral foundations of community life. Local strategies, such as night grazing or feeding drought-tolerant plants, highlight farmers' ecological knowledge, but they also expose a temporal paradox: short-term coping, including distress sales, secures survival but erodes herd regeneration and cultural continuity. State framings of climate change as a technical problem ignore both this temporal dimension and the cultural trauma of herd collapse, including the loss of ancestral legitimacy, ritual obligations, and reciprocal bonds that constitute resilience. By reducing drought to statistics, official programmes overlook the social

[19] Theileriosis is a tropical parasitic disease caused by the protozoan *Theileria annulata* and transmitted by vectors of the genus *Hyalomma*. The disease manifests with symptoms such as fever, enlarged lymph nodes, and anaemia, often leading to high mortality rates if not promptly treated (CFSPH 2023).

worlds of adaptation. The 2015/16 crisis revealed not only the vulnerability of herds but also the fragility of governance, leaving smallholders exposed in unequal political economies. The next section examines how these dynamics further unfold in the nexus of climate stress, livestock health, and inadequate veterinary infrastructure.

Livestock Health, Farmers, and Vets

The outbreak of theileriosis in Magude significantly reduced cattle weight gain and increased costs due to the need for acaricides and other treatments. For many cattle owners, the outbreak was unexpected and alarming. While ticks have always been present in the region, the mortality rate had never been as high as it was after 2016. As one farmer noted, "Ticks have always been here, but we've never seen so many cattle die from them before."

As discussed, the outbreak sparked debate among farmers and veterinary authorities. Some cattle owners attributed the surge in tick-borne diseases to excessive heat and prolonged drought, which they believed weakened cattle's immune systems and created favourable conditions for tick proliferation. Others, however, expressed scepticism, suggesting that veterinarians may have exaggerated the problem to profit from the sale of acaricides and treatments. In practice, veterinary services in Magude are primarily provided by state livestock extension workers, who are public sector employees responsible for supporting cattle producers. As they are attached to the District Services for Economic Activities, their work is closely aligned with government priorities, positioning them less as independent specialists and more as agents of state policy. This institutional affiliation influences both the authority they exercise and the scepticism with which their interventions are sometimes met by farmers.

Meanwhile, the veterinary authorities argued that the outbreak was linked to the movement of cattle between districts during the drought. As herds were relocated to areas with better grazing conditions, they came into contact with cattle from other regions, facilitating the spread of theileriosis. A senior government veterinarian explained the origins and spread of the disease in Magude:

> This disease appeared in 2017, right after the drought. At the time, there was no pasture in the district, and some farmers moved their cattle to neighbouring areas such as Manhiça and Macia. These areas have historically been areas where theileriosis has spread. The cattle became infected, and when they returned, they infected each other. In addition, during the drought, local cattle came into contact with

> wildlife, particularly buffalo, which also crossed with cattle in search of food and water. The buffalo are asymptomatic for theileriosis and end up infecting the cattle.

Ticks are the primary vector for theileriosis, and veterinary authorities advised farmers to vaccinate their cattle and bathe them regularly to control infestations. The higher the tick count on an animal, the greater the risk of illness and death. To combat the disease, the local government implemented a plan to intensify tick control measures, including sprinkling (showering) and immersion baths. Immersion baths, where cattle are fully submerged in a large tank filled with a mixture of water and acaricide, are considered the most effective method. However, they require specialised facilities, which many smallholder farmers lack. To address this challenge, the government rehabilitated several old tick tanks originally built during the colonial era but later abandoned or destroyed during the civil war. These facilities were placed under the management of local farmers' associations. This initiative aimed to improve access to effective tick control measures, particularly for smallholders unable to build or maintain their own facilities (FAO 2018).

Small-scale breeders in Magude organised themselves into associations to better manage tick baths and promote regular dipping. By pooling labour and resources, these associations not only strengthened resilience by reducing disease risks but also built networks of trust and mutual support that protected households against future shocks. As one farmer explained:

> Here in Magude, we have what we call livestock zones, which include a tick tank and other infrastructure for cattle. The breeders in these areas came together and formed cattle associations to seek government support for medicines and to make it easier for veterinarians to treat the cattle. It also simplifies communication for the government because they don't have to contact each breeder individually. The associations are responsible for summoning all members with their cattle on agreed-upon days for treatment.

To strengthen these efforts, new associations were created and existing ones revitalised. To ensure sustainability and improve outcomes, the government encouraged members to finance acaricides and other medications themselves. This shift from state-subsidised to self-financed treatments reflected broader processes of decentralisation and the transfer of responsibility from the state to rural producers. Such dynamics resonate with resilience discourses, in which local actors are expected to manage risks independently. Cattle needed to be bathed weekly, and farmers were required to cover the costs of the medications. To address this, some associations introduced a fee system,

charging 10 Mt (USD 0.16) per head of cattle. Each farmer contributed to the collective purchase of acaricides, ensuring regular treatment. While the community-driven approach was intended to enhance ownership and responsibility, in practice, it revealed underlying tensions around trust, accountability, and the difficulties of sustaining collective action.

The shift posed significant challenges for smallholder farmers with limited financial resources. As one tank manager explained, the fee system was contested:

> When we got this tank, I told the farmers that we should contribute 10 Mt [USD 0.16] for each head of cattle. I encouraged them to come and bathe their cattle, and initially, they did. But some refused to contribute. Now, I use the tank myself, as no one comes anymore. They stay at home and bathe their cattle in their own way. They think the money is for me, that I'm making a profit.

This situation highlights the broader issue of mistrust among smallholders, which undermines efforts at adaptation. Reports of misappropriated contributions by tank managers eroded confidence, revealing how adaptation processes are mediated by local power dynamics and histories of suspicion toward institutions. Distrust of individuals or organisations linked to the government is common in Magude. For example, in 2018, Xavier participated in training under the PROSUL project,[20] aimed at equipping livestock farmers with veterinary skills. He was expected to disseminate this knowledge in his community but struggled to gain trust, as he himself explained:

> It's the SDAE's [District Services for Economic Activities] fault because after the training, they didn't come here with me to introduce me to the community I was supposed to serve. They just told me, "From now on, you're a community promoter – get to work." But the community doesn't believe what I tell them… Many admire that my cattle don't die, but they forget that I treat my cattle the way I was trained to.

Despite his efforts, Xavier's initiative to organise communal baths with contributions failed due to misunderstandings and mistrust, echoing what Dewan (2021) calls "climate reductive translations": attributing problems solely to climate without recognising the political and institutional histories

[20] Funded by the International Fund for Agricultural Development (IFAD), the overall objective of PROSUL is to support small producers by strengthening value chains in irrigated horticulture, cassava, and livestock, thereby enabling them to improve production and productivity, access markets, and consolidate producer organisations. In the livestock sector, the project aimed to improve livestock production, including strengthening producer organisations and promoting technical and financial assistance and animal health services (MAE 2012).

that mediate trust and governance. Xavier tried to organise communal bathing sessions with a fee system, but this collapsed amid suspicions:

> I got 1 litre of the medicine to bathe the cattle after the training. Each farmer had to contribute 10 Mt [USD 0.16]. For example, if 250 cows were bathed, that would total 2,500 Mt [USD 39], 500 Mt [USD 8] for me and 2,000 Mt [USD 31] to buy an extra litre of medicine. The breeders didn't understand this, and now nobody goes to the tank. I only treat my cattle there.

Xavier's account highlights how adaptation efforts, while promoted as community-driven, are contested and fragile when local legitimacy and recognition are lacking. It illustrates how resilience is shaped not just by ecological conditions but by histories of institutional disengagement and community mistrust.

Alongside tick control measures, the government has intensified vaccination campaigns since 2017 to prevent theileriosis and other diseases. Ideally, cattle should be vaccinated every three months. However, due to limited resources, the government shifted responsibility to farmers, organising only one annual campaign, as explained by one local farmer:

> The government vets are supposed to work with us, but they haven't been doing so effectively lately. Since they arrived in April last year, they haven't come to check on our situation. Now we have to rely on vaccinating our cattle ourselves. Each of us buys vaccines from the pharmacy, but the government-provided medicine is better than what we get from the pharmacy. If someone doesn't know which medicine to buy, they can call the vet for help, but sometimes they aren't available

Another farmer elaborated on the seasonal mismatch:

> They used to vaccinate in April and November, but now they only vaccinate in April. We often ask them to vaccinate the cattle in February because March and April are the dangerous months. If they vaccinated in February, we could protect the cattle better, but the government says they can't because the medicine is only available in April. By April, it's often too late, many cattle have already died. The government is still waiting for April, but the climate has changed. Temperatures now reach 42°C, and April, which used to be cool, is now hot and conducive to infections.

This mismatch highlights the rigidity of veterinary governance, which often adheres to bureaucratic calendars rather than adapting to ecological changes. Farmers themselves have noted that the timing of vaccinations no longer

corresponds to the current climate, with April (traditionally a cooler month) now becoming hotter due to climate change. The disjuncture highlights the inflexibility of institutional responses and the failure to align veterinary policy with local knowledge of seasonal patterns.

Reliance on government inputs has also created a culture of dependency. Veterinarians have encouraged farmers to sell one head of cattle to finance medicines for the rest of the herd, framing adaptation as a matter of individual responsibility and entrepreneurial initiative. As one veterinarian told me:

> When we go to meetings, we try to sensitise farmers about the importance of investing in their herds. We tell them that selling one head of cattle can provide the funds needed to buy medicines and ensure the health of the rest of the herd. For example, if you have eight females, sell one to ensure that the remaining seven can breed and thrive. Unfortunately, very few people take this advice.

However, as suggested by resilience critiques (Béné et al. 2012; Reid 2013), such framings shift the burden of risk management onto smallholders, obscuring the structural inequalities that constrain their options. These inequalities include limited access to affordable medicines, underfunded services, and historical neglect.

For some, the reluctance to invest reflects expectations that the state should bear responsibility for livestock health. For others, it is a matter of affordability. Either way, the result is vulnerability and loss. Some farmers criticised this dependency directly:

> We're asleep, and the government has to wake us up. We need to realise that we have to act because the cattle belong to us and only to us. We shouldn't wait for someone else to reach into their pocket to help us live well. We are the ones who need to take initiative.

The divide within the smallholder community further illustrates how adaptation is stratified (Finan and Rahman 2016). While some farmers are willing to invest, others remain dependent on government support, exposing their herds to higher losses. These tensions raise questions of climate justice: whose vulnerability is prioritised, whose practices are legitimised, and how state interventions reproduce unequal capacities to protect livestock. For some farmers, stricter enforcement of the Cattle Law[21] is seen as necessary, while

[21] The farmers refer to the *Regulamento de Sanidade Pecuária* (Decree No. 26/2009 of 17 August), which establishes the legal framework for the surveillance, prevention, and control of animal diseases in Mozambique. It defines the responsibilities of veterinary authorities, sets procedures for animal movement, vaccination, quarantine, and hygiene control, and regulates

others point to corruption and the high cost of medicines as barriers to compliance. Complaints about veterinarians charging illegal fees or misusing authority reinforced mistrust, revealing how veterinary governance itself can be implicated in power struggles and accusations of injustice.

Overall, the management of livestock health in Magude demonstrates that adaptation occurs at the intersection of ecological stress, institutional fragility, and social mistrust. Technical measures such as tick baths and vaccines are inextricably linked to disputes over authority and legitimacy, given that veterinary expertise operates as both knowledge and state power. While farmers' local knowledge of seasonal changes, disease symptoms, and animal behaviour remain central to resilience, it is often overlooked by rigid bureaucratic schedules and donor-driven agendas. Here, resilience is more about navigating short-term survival and long-term herd continuity under unequal access to resources and state support than about recovery. These dynamics reveal the climate justice dimensions of livestock health, as wealthier breeders are better positioned to buffer risks while poorer smallholders bear disproportionate losses. Livestock health governance in Magude thus reflects the core tensions of political ecology, where adaptation is simultaneously ecological, cultural, and political, and resilience emerges through contested negotiations of knowledge, power, and justice.

Cattle Rustling and Justice

Livestock theft poses a significant challenge to smallholder farmers in Magude, with some estimating that approximately 6,000 cattle were stolen between 2010 and 2015. Frustrated by persistent thefts and perceived inaction from police authorities, cattle breeders convened with government officials in 2015 to address the issue. One victim recounted in 2022:

> In 2015, we met with the government and the police because when we found a thief, we handed him over to the police, and the thief paid the police and got away with it. We realised that we were wasting time and would never get our cattle back. So, we demanded that we, and not the police, solve the cases. The government agreed and told us to organise ourselves into cattle associations.

activities such as cattle dipping, slaughtering, and the trade of animal products to protect both public and animal health.

This narrative reveals more than a struggle against crime; it reflects deeper tensions between rural communities and state institutions, where mistrust of law enforcement drives communities to develop autonomous strategies of justice rooted in local knowledge and custom. Similar dynamics are found elsewhere in Africa. In South Africa, livestock theft has caused severe economic losses in recent years (Mdoda et al. 2025). In Nigeria's northwest, rustling has fuelled violent conflict and displacement (Okoli and Okpaleke 2014). Responses vary across contexts. In Kenya, security arrangements in pastoralist regions have combined state security agencies, such as the Anti-Stock Theft Unit, with local National Police Reservists, reflecting efforts to address livestock theft within broader dynamics of conflict and governance (Mkutu 2019). In Zimbabwe, financial innovations such as the TN Livestock Trust scheme[22] allow farmers to "bank" cattle as collateral for loans (Hungwe 2013). These comparisons show that livestock theft is not only a local crime but also embedded in broader political economies of insecurity, mobility, and rural governance. In Magude, the response to theft was the establishment of cattle associations, originally intended for livestock health management but repurposed to curb rustling. Associations later united into a federation explicitly aimed at preventing cattle theft. The Magude Livestock Federation, governed by elected leaders from the 24 pastoralist associations, became central for security and coordination. As its spokesperson explained:

> The Federation oversees all the associations. Its decisions are implemented at the association level. If a theft occurs, the concerned association informs the Federation, which then takes the necessary steps to identify the thieves and recover the stolen cattle. At the end of our first year of operation, we reviewed the outcomes and reported to the community that out of 34 theft cases, we successfully recovered the stolen cattle in 31 cases.

The Federation's approach reflects how resilience is enacted through collective organisation and rapid mobilisation. Rather than passively relying on state institutions, breeders devised their own governance structures, linking everyday adaptation to broader struggles over authority and power. As one member of an association put it:

[22] Under this system, farmers deposit their animals in specialised farms where they are managed and improved through cross-breeding and disease control, while ownership is retained. Farmers receive a "cow certificate" that can be used as collateral to access credit, enabling smallholders to unlock the value of their herds without selling them and to invest in their livelihoods with greater financial security (Hungwe 2013).

> In many cases, we call in the Federation because the thief is often from the community, and it's difficult to catch them until they confess. So we inform the Federation, and they immediately get to work, closing off all access to the district, informing the abattoirs and the police. The search begins, and all leads are followed until the cattle are recovered.

This process highlights how local knowledge and social networks become central to security. Information spreads quickly, enabling coordinated action that contrasts with the slow bureaucratic procedures of the state. According to breeders:

> If a farmer raises the alarm, everyone knows within 15 minutes that place X has been robbed, and we immediately close all entrances and exits and begin the hunt. The Federation follows every lead, sometimes using a little force to get the thief to confess and return the stolen cattle.

These strategies reveal resilience as proactive, situated, and at times coercive, blurring the boundaries between justice and vigilantism. To enforce order, the Federation imposed sanctions of three cattle for every stolen one: two returned to the victim and one allocated to the association or Federation. Beyond restitution, these penalties served multiple purposes: funding investigations, supporting new breeders through the sale of calves at subsidised prices, and reaffirming collective justice. The sanction system thus operated simultaneously as a deterrent and a redistributive mechanism, reinforcing solidarity and demonstrating how communities establish governance structures in the face of weak institutions.

Still, the use of force drew government intervention. Accusations of torture to extract confessions prompted a public ban in 2021 on community-led punishment of suspected thieves, with authorities threatening imprisonment for violent practices. For many breeders, this intervention undermined their effectiveness and emboldened thieves:

> When the judiciary cracked down on the Federation, we sat back and waited to see what the government would do. But the government did nothing. This year alone (2023), 300 cattle have been stolen. I myself had two large cows stolen, and another gentleman next door lost 11 – he had 16 and now only has 5 left. And many other cases.

Others lamented that the announcement was made publicly, in front of potential thieves. For these members, the visibility of the decision not only

undermined the Federation's authority but also emboldened the thieves, who felt encouraged to continue their raids. Many herders voiced disagreement with the government's stance, arguing that without swift and decisive action, the recovery of stolen cattle becomes nearly impossible:

> What the government wants is that if someone is robbed and has clues, instead of pursuing the thief, they should report it to the prosecutor, who then has to ask the judge for permission to sign a warrant and only then go after the thief. In the meantime, the thief has already fled. We don't do it that way. At the first sign, we go after the thief. We call everyone and close everything down. It doesn't matter what time it is or how far away he is, we go after him.

Such accounts reveal the tension between bureaucratic notions of justice and community-based approaches, which are rooted in speed, reciprocity, and territorial control. While the state seeks to enforce formal law, communities perceive this as ineffective, reinforcing mistrust in state institutions. As one farmer complained:

> When we ask the police to investigate a theft, they always say they don't have the resources. Even now, when I call the police to come and arrest thieves, they say they don't have cars or fuel. Some police even ask if we have the money to pay them. Are they the ones who want to fight theft?

Cattle smallholders thus view the police not only as inefficient but sometimes complicit. A notorious case in Manhiça, where villagers buried alive four police officers accused of rustling, is often invoked to illustrate these tensions (VOA Português 2022).

These dynamics reveal a deeper struggle over legitimacy and justice. For many breeders, adapting to insecurity means taking justice into their own hands, reflects both resilience and a form of political resistance as they contest the authority and effectiveness of state institutions. At the same time, such practices blur the boundary between community security and vigilantism, exposing tensions between local moral orders and formal law. From a political ecology perspective, these conflicts demonstrate how weak or absent state institutions compel smallholders to absorb risks that should be collectively managed. However, such practices also raise important questions about climate justice and political ecology. Why are smallholders forced to bear the risk of theft when state institutions fail to protect them? Whose security is prioritised, and whose vulnerabilities are ignored? The Magude case illustrates that responses to cattle rustling are shaped by community initiatives, structural

neglect, corruption, and the uneven distribution of state power. They show that resilience in contexts of insecurity cannot be understood apart from broader struggles over authority, recognition, and justice.

Cattle Trade

Cattle trading is a vital economic activity in Magude, providing local breeders with one of their main sources of cash income. Livestock sales finance household expenses such as school fees, healthcare, and food, while professional dealers purchase cattle for resale in urban markets. Transactions are typically mediated by *marchantes*, who visit farmers' corrals to negotiate prices. In the absence of weighing scales, negotiations rely on visual assessments of the animal's size and physical condition. This practice reflects local knowledge and exposes structural vulnerabilities, with dealers often downplaying the animal's value and producers in urgent need of cash feeling compelled to accept low offers. Such dynamics became particularly acute during the 2015/16 drought, when widespread distress selling drove prices down dramatically, stripping farmers of their main assets at precisely the moment they most needed them (Morton 2007; Notelid and Ekblom 2021). This illustrates how adaptation to climate shocks is constrained by unequal market structures, where smallholders' resilience is undermined by exploitative trading relations.

Older farmers recall that transactions were once based on weight using communal scales, which ensured greater transparency. As one reflected:

> When we had scales, it was good because nobody cheated anyone. Both the buyer and the seller relied on the weight of the cattle. Nowadays, we negotiate based on the size and appearance of the bull, and we often get cheated, especially when we're selling, because we have a problem to solve.

The disappearance of weighing infrastructure reflects broader challenges facing smallholders across southern Mozambique. Weak market infrastructure and the absence of reliable measurement systems not only hinder fair trade but also facilitate the exploitation of small-scale producers (Chingala et al. 2022). While government initiatives, such as the construction of cattle fattening centres in Maputo, Gaza, and Inhambane, seek to modernise beef production, informal and opaque pricing practices persist. The lack of accountability in cattle trading underscores how institutional neglect and infrastructural decline perpetuate power asymmetries, leaving producers structurally disadvantaged.

In Magude, cattle trading is dominated by *marchantes*, most residing in the district, though some come from neighbouring areas. Their business strategy is straightforward: purchase cattle at the lowest possible price and resell them by weight to urban buyers waiting at slaughterhouses. Farmers are acutely aware of this asymmetry and often complain that, despite being the producers, they receive the smallest share of the profits in the value chain: "We do all the hard work, but the profit goes to the middlemen." This grievance aligns with findings from other pastoral economies in Africa and elsewhere, where intermediaries capture a disproportionate share of the value from the livestock trade. Bollig and Schulte (1999) describe how traders in Namibia benefit from distress sales by Herero pastoralists during droughts, and Morton (2007) shows that across the Sahel, intermediaries often act as "shock absorbers" who profit from producers' vulnerability. Fernández-Giménez (2000) makes similar observations in Mongolia. Such cases demonstrate that Magude's situation is not exceptional but part of a wider political ecology of livestock economies in which structural inequalities are reproduced through market interactions.

From the perspective of *marchantes*, however, their margins are justified by operational costs: hiring licensed transporters, paying administrative fees (150 Mt [USD 2.35] at the local administrative post and 200 Mt [USD 3.10] for a trading license from the breeders' association, per head of cattle), and covering veterinary inspection charges at slaughterhouses (250 Mt [USD 3.10]). Cattle associations also regulate sales, requiring that all cattle be loaded in the seller's yard and accompanied by detailed declarations specifying owner, buyer, vehicle registration, destination, and purpose (sale or breeding). While designed primarily to prevent cattle theft, these controls add layers of bureaucracy that often reinforce the influence of intermediaries, limiting direct access of smallholders to markets.

Once animals reach the abattoir, they are weighed and sold at fixed prices – typically around 170 Mt/kg (USD 2.65), with fluctuations between 150 Mt/kg (USD 2.35) in times of oversupply or disease outbreaks and 200 Mt/kg (USD 3.10) during high-demand periods such as December festivities. Veterinary services charge 300 Mt (USD 4.70) per head for inspection plus an additional 5 Mt/kg (USD 0.08) of meat. While veterinary technicians emphasise procedures such as resting cattle before slaughter and refrigerating meat for eight hours, these practices are inconsistently applied, illustrating again how institutional capacity is uneven in practice.

Profit margins vary. One *marchante* explained that cattle buying is a risky business, sometimes yielding losses when fees exceed the resale value. Another, however, highlighted its profitability with a concrete example:

> I bought a heifer for 17,000 Mt [USD 265], paid 3,000 Mt [USD 47] for transport and 1,360 Mt [USD 21] for taxes. The steer weighed 170 kg and I managed to sell it for 28,900 Mt [USD 452]. I made 7,540 Mt [USD 118] on this sale.

Although such profit may seem substantial, traders emphasise that outcomes can vary from sale to sale depending on negotiations with breeders and changes in demand. Some months result in losses, while others generate only modest returns. In recent years, the *marchantes* themselves have noted a fall in sales volumes, with fewer buyers in local markets. This further tightens margins and reinforces smallholders' sense of structural disadvantage.

Resilience for traders lies in spreading risk through multiple transactions and adjusting to volatile prices. However, for smallholders, resilience is undermined by distress sales, limited bargaining power, and declining buyer interest, all of which weaken their capacity to recover from climate shocks and maintain their herds. Therefore, the contested profits of *marchantes* illustrate not only how market asymmetries occur but also how resilience in Magude's cattle economy is stratified, secured by intermediaries while eroded for cattle breeders. Most of the meat is transported to Maputo and Matola in refrigerated trucks, as required by veterinary regulations. At least four such trucks leave Magude daily, each carrying meat from several head of cattle. Some meat is also sold to local butchers, who purchase it at 170 Mt/kg (USD 2.65) and resell it at 220 Mt/kg (USD 3.45). Local residents frequently complain that, despite Magude being a major cattle-producing district, meat prices are comparable to those in urban centres. This paradox underscores the uneven outcomes of the cattle economy: producers sell at low prices under duress, while consumers face high retail prices, with intermediaries capturing the majority of the added value. Such dynamics echo climate justice debates about rural producers disproportionately bearing risks but reaping minimal benefits, while urban consumers and intermediaries benefit from the system.

These processes can be better understood in light of Ekblom's (2018) concept of the "cattle economy." Historically, cattle have served as a relatively stable store of value in Mozambique, being less volatile than cash during periods of currency fluctuation. However, this alternative logic, which is based on the long-term accumulation and reproduction of herds, conflicts with the capitalist logic of immediate profit extraction and speculation. During drought years, when animals lose condition and prices collapse, the protective function of cattle as a store of wealth breaks down, exposing smallholders to exploitation by better-capitalised intermediaries. What emerges is a dual system: on one side, cattle as savings and social security within rural

households; on the other, cattle as commodities within a commercial chain dominated by dealers, transporters, and urban buyers. The tension between these two logics lies at the heart of the inequalities of cattle trade in Magude, where smallholders' adaptation strategies clash with the demands of market integration.

Moreover, dealers and butchers report that the cattle trade has declined in recent years. A meat transporter explained:

> People don't have any money now. I used to take meat from 12 cattle a day, every day. Nowadays, I can't go to Maputo every day, and I take at most four cattle. There's no money now.

The contraction of purchasing power, combined with limited sales from the family sector, points to a narrowing of the local cattle economy. Trade is increasingly dominated by private ranches and commercial operators, which reinforce a dualism that already marginalises smallholder producers, who are constrained by weak infrastructure, mistrust in institutions and unfavourable terms of trade. Therefore, adaptation and resilience in Magude's cattle economy emerge not only from local ingenuity but also from structural inequalities and shifting market conditions that privilege capitalised actors over family-based producers.

Conclusion

In Magude, cattle remain at the heart of social, cultural, and economic life. They provide food and milk as well as draught power, and they also embody wealth, status, and ritual obligations. They are integral to practices such as *lobola* and ancestor ceremonies, and they serve as "living banks" that secure livelihoods. However, this centrality is becoming increasingly precarious. Recurrent droughts, disease outbreaks, land enclosures, and volatile markets destabilise not only the herds but also the moral order that they uphold. The result is an indispensable and profoundly vulnerable cattle economy.

These pressures show that adaptation is neither uniform nor neutral. Households draw on ecological knowledge by cultivating drought-tolerant forage, rotating pastures, and adjusting grazing times while also balancing family labour, inheritance, and ritual obligations. Such practices reveal resilience as part of everyday life, but they also expose its fragility when markets collapse, water becomes scarce, or diseases spread. Distress sales exemplify this temporal tension. They secure immediate food or cash but weaken herd recovery, disrupt ritual continuity, and erode long-term

resilience. Adaptation in this setting is therefore inseparable from time, as short-term survival frequently undermines future stability.

Political ecology helps illuminate the winners and losers of these transformations. Better-capitalised breeders can buy feed, relocate animals, or wait out market downturns, while smallholders are compelled to sell rapidly and cheaply. Climate shocks thus deepen existing inequalities. This resonates with Peters' (2013) notion of "surplus people" and with Nixon's (2011) idea of slow violence, where harm accumulates incrementally through drought, price collapse, and disease. What looks like discrete events is, for farmers, a drawn-out unravelling that erodes both herds and social bonds.

Knowledge politics further complicate the picture. While state veterinary calendars, breed improvement programmes, and technical metrics dominate official framings, local expertise in areas such as reading pastures, interpreting seasonal change, and linking herd management to ritual obligations remains marginal. This asymmetry reflects the prioritisation of institutional authority over local legitimacy. Consequently, resilience is assessed based on herd numbers, vaccination rates, or tick-bath coverage, while the cultural significance of cattle in terms of lineage continuity and ancestral legitimacy is overlooked.

Gendered dynamics also shape resilience. While men dominate herding, decision-making, and marketing, women take charge of daily cattle care, milk production, and calf feeding. In the absence of men due to migration or death, women assume leadership, as seen in Ana's management of a large herd. Such cases illustrate how adaptation unfolds through reconfigured gender roles and household organisation. Nevertheless, patriarchal norms persist, and women often require male intermediaries to liaise with veterinarians or negotiate markets. Institutional programmes, such as PLAs, rarely acknowledge these dynamics, assuming male control of herds. Therefore, resilience is relational, shaped by negotiations of gender, labour, and authority.

Market structures intensify vulnerability. In the absence of weighing infrastructure, transactions rely on visual assessments, a practice open to manipulation by *marchantes* who profit from producers' urgent needs. Traders spread risk across multiple sales, while smallholders risk everything in a single transaction. Profit accumulates at slaughterhouses and urban markets, while smallholders are the main absorbers of climatic and epidemiological shocks. The dual logic of cattle – as savings within rural households and as commodities in urban markets – lies at the heart of Magude's inequalities. Climate change exacerbates this by weakening cattle condition and narrowing farmers' bargaining power.

Security concerns highlight another layer of resilience. In response to rustling, breeders created associations and a federation that mobilised local networks to recover stolen herds. Their practices combined rapid communication, territorial control, and collective sanction, strategies that exemplified resilience as collective action and political resistance but also blurred the line between justice and vigilantism. When the state curtailed these practices, farmers perceived it as siding with thieves, reinforcing mistrust of institutions. The question becomes: whose security is prioritised and whose vulnerabilities are ignored?

Taken together, these dynamics emphasise the climate justice dimensions of livestock farming in Magude. Those least responsible for global climate change face the heaviest burdens, including herd depletion, market exclusion, and unrecognised cultural loss, while wealthier breeders consolidate their position. Resilience emerges as a contested process, stratified by class, gender, and access to resources. It is cultivated not only in pastures but also within households, associations, and the negotiation of authority.

Chapter 6: Adapting to a Changing Environment: Small Business, Charcoaling, and Fishing

As we saw in the previous chapters, increasingly erratic rainfall and recurrent droughts have eroded the reliability of agriculture and cattle herding as primary sources of livelihood in Magude. Faced with these constraints, many households have been compelled to diversify their income and engage in alternative activities that can help offset economic vulnerability. Among the most prominent responses are small-scale business, fishing, and charcoal production. These activities have become central not only to household survival but also to a broader reshaping of Magude's rural economy. Small-scale business is as such not a new phenomenon, but the number of young people entering the small business sector shows that it is of growing importance. Whilst one reason for its growth is an increased need for diverse economic activities in the face of intensifying environmental uncertainties, another reason is the growing economic and social linkages between rural areas and urban Mozambique, as well as with the broader global economy. Fishing draws on longstanding subsistence practices but has gained renewed importance as farming declines, even as competition, regulation, and environmental pressures strain its economy. Charcoal production, by contrast, offers a quick and accessible source of cash income, particularly during times of agricultural crisis. However, its expansion also accelerates deforestation and reinforces new patterns of inequality.

This chapter examines how these activities function as alternative livelihoods, focusing on both their value in terms of adaptive capacity and their inherent contradictions. I trace how local knowledge, customary authority, and everyday practices shape engagement with small business, fishing, and charcoal while also showing how structural inequalities, weak governance, and ecological degradation constrain their potential. By analysing these new income-generating avenues, the chapter explores the paradox of resilience in Magude: strategies that provide immediate relief but entrench long-term vulnerability, revealing the contested nature of adaptation under climate stress.

Small Business

Diversification into new income-generating activities has become a central pathway for households in Magude to respond to climate variability and the decline of rain-fed agriculture. Wage labour, informal trade, and petty services such as bicycle repair, hairdressing, and mobile phone charging function as coping strategies in the face of drought, erratic rainfall, and rising temperatures. These shifts are not only economic adjustments; they reflect local knowledge and initiative while also revealing the limits of resilience when opportunities remain precarious and unequally distributed. Placed within the broader political economy, such practices demonstrate that adaptation is shaped as much by gender, class, and generational divides as by ecological change. Everyday survival strategies are intertwined with questions of climate justice, highlighting the difference between state-led frameworks and local realities.

Apart from plantation labour (discussed in Chapter Four), many young people in Magude have begun moving into informal trade, illustrating a wider transformation of livelihood strategies shaped by environmental and economic pressures (Crate and Nuttall 2009). As rain-fed agriculture becomes increasingly unreliable, youth in the town often choose small-scale business instead of farming or herding. Higher education levels, wider access to electricity and media, and proximity to the capital shape these aspirations. These activities provide income while also signalling a broader cultural and economic shift.

These dynamics are reflected in the income strategies adopted by residents. For many young people living in the district headquarters of Magude, informal trade is one of the few available options. This involves both young men and women and includes street vending and operating small stalls. Many focus on mobile phone services, such as selling airtime and facilitating mobile money transactions. Traded goods tend to follow gendered patterns. Young men usually work in mobile-related services or in the sale of non-food items such as clothing, shoes, and household goods. Young women are more often engaged in selling vegetables and other foodstuffs in the streets. For many, these activities represent some of the few income opportunities available. Vendors may circulate through the streets or manage fixed stalls around the Magude town. Mobile phone services, including SIM card sales, airtime, and mobile money transfers, form a particularly dynamic sector, dominated by the two major providers, Movitel and Vodacom, whose platforms, Emola and M-Pesa, have become deeply embedded in everyday economic and social life.

Other income sources in Magude include construction work, motorcycle taxi services, and small roadside restaurants or bars that serve travellers and

plantation workers. These sectors are primarily occupied by young people who engage in them less by preference than by necessity and who remain trapped in insecure, low-paid, and high-risk forms of labour. The diversification of livelihoods thus illustrates not only the capacity of residents to adjust to economic uncertainty but also the structural limits of such adaptation. In Magude, landless households and poorer residents, irrespective of age or gender, face compounded disadvantages because they lack the capital, social networks, and mobility that enable access to more secure opportunities.

New income-generating activities in Magude such as informal trade, transportation, and small-scale services provide vital income; however, they are not equally accessible. As Fiske et al. (2014) emphasise, adaptive capacity is conditioned by intersecting inequalities of gender, age, class, and power. Carr and Thompson (2014) and Nightingale (2011) similarly show that diversification often reproduces rather than disrupts social hierarchies. Young people, who make up the majority of this group, more often than not remain trapped in cycles of precarity (Kimando et al. 2012). Furthermore, young women in particular encounter additional obstacles related to social norms and safety concerns (Cornwall 2003; Resurrección 2013), restricting their access to higher-value opportunities. These dynamics demonstrate that while diversification may strengthen household and community resilience, it can also reproduce and exacerbate social and economic inequalities (Tschakert 2012; Eriksen et al. 2015).

Viewed through Sen's (2023) notion of "everyday adaptation," the income-generating strategies of young people in Magude can be seen as routine, mostly invisible practices through which they navigate climatic and economic uncertainty. These practices are rooted in daily life and draw on locally available resources, skills, and social networks, but they rarely receive acknowledgement in formal adaptation policies. Far from being passive survival tactics, they represent active and creative negotiations of marginality, shaped by intersecting inequalities of age, gender, and class. This perspective also resonates with African youth studies that emphasise social navigation and the management of precarious life chances (Christiansen et al. 2006).

The proliferation of small businesses and their dynamics illustrate that the benefits of livelihood diversification depend on the ability to navigate the inequalities that govern access to work and resources. Although informal trade and small-scale services offer some protection against the negative effects of climate change, they remain insecure and are distributed unevenly. This fact stands in contrast to government adaptation measures, which treat climate change as detached from the broader social and economic conditions of

inequality. Instead, local strategies reveal the temporal and spatial discrepancies between official narratives and lived experiences, demonstrating that adaptation is inextricably linked to struggles over gender, class and generation.

The Rise of Fishing: A Response to Agricultural Challenges

One emerging adaptation practice is fishing. In Magude, a growing number of residents have turned to this activity, which was once considered marginal. Fishing has emerged as an important source of income and sustenance, especially as agriculture and cattle rearing become increasingly unreliable under changing climatic conditions. In contrast to industrialised fishing operations, fishing in Magude is predominantly small-scale, often carried out without boats or with non-motorised ones. It is typically combined with other livelihood activities such as farming, livestock rearing, or petty trade (Allison and Ellis 2001). This flexibility enables households to diversify their income and illustrates the routine practices through which families manage and navigate uncertainty (Sen 2023).

The fishing process usually involves casting nets into the river at dusk and retrieving them the following day. This method, requiring minimal equipment and labour, can be integrated into daily routines. For some, fishing is part-time, while others dedicate themselves fully to it. The practice is deeply rooted in local traditions, with knowledge and skills passed down through generations.

I discussed fishing frequently with Hodjana, a 56-year-old man whose story exemplifies this intergenerational continuity. Coming from a family of fishermen, he learned the craft from his father, who had in turn learned it from his own father. After working as a miner in South Africa, Hodjana returned to Magude when prospects abroad did not materialise. Facing food scarcity and limited opportunities, he turned back to fishing as a survival strategy:

> My dad was a fisherman, and he taught me how to fish. I was in South Africa, but things weren't working out, so I returned home. When I came back, I realised that food was hard to come by, so I decided to go fishing. I bought a net and started fishing. That's how it began for me. Sometimes I stopped when I found work elsewhere, but every time there was no work, I returned to fishing. Right now, fishing is my main focus.

Hodjana's narrative highlights the role of fishing as a fallback strategy that enables resilience. It functions as a safety net during hardship, providing both

food and income when other opportunities are scarce. However, reliance on traditional, low-tech methods also underscores the limited resources and infrastructure available to communities.

Reflecting on his family's history, Hodjana recalls how fishing once enabled stability and long-term investments:

> Money from fishing was used to buy livestock at home. We had cattle, goats, sheep, and oxen for arable farming. We had a big house, and all of us lived in it. No one was out searching for work; everyone was there, thanks to fishing. Today, when I think about it, I realise that fishing is an important activity.

This account illustrates how, historically, fishing supported not only subsistence but also asset accumulation, transforming immediate gains into livestock, housing, and social standing. However, as other fishermen can attest, conditions have changed. As Cossa, an old fisherman, explained:

> It used to be better. There were only a few fishermen, and many people didn't care about fishing. It was very easy to catch fish because the water wasn't so agitated. The fish weren't afraid to move around in the water the way they are now. Nowadays, there are a lot of fishermen, a lot of nets in the water, and the fish run away from the nets.

The sector is formally regulated through an annual licensing system, which requires fishermen to pay a fee of 210 Mt (USD 13.40). In theory, this system should encourage sustainable practices and generate local revenue. In practice, however, its effectiveness depends on the state's capacity for monitoring and enforcement, a recurring challenge in the governance of natural resources in Mozambique (Zorrilla-Miras et al. 2018). According to SDAE data, the number of licensed fishermen rose from 36 in 2019 to 142 in 2023 (SDAE 2024), intensifying competition and pressure on fish stocks. At the same time, unlicensed fishing has proliferated, undermining regulatory goals and fuelling conflicts.

Licensed fishermen often accuse unlicensed entrants of disregarding rules by using fine-mesh nets or even stealing fish directly from nets at night. One fisherman lamented:

> These people aren't even [proper] fishermen; they're just people who buy nets and put them in the river. They don't have a fishing license and don't follow the rules.

For him and other permit holders, being a fisherman means having a licence, respecting regulations, and treating fishing as a livelihood rather than a casual sideline. In the view of permit holders, the "casual sideline" fishers do not respect quotas and regulations. The permit holders find that non-permit holders deplete fish stocks, creating a sense of injustice amongst those who comply with the licensing regime. However, from the perspective of fishermen who depend on this resource, the permit system is exclusionary: unless you are already a registered permit holder, it is difficult to obtain one. This situation once again reflects wider criticisms of climate justice, where regulatory frameworks fail to protect the most vulnerable, instead favouring those with connections or resources. The situation is dire, with many turning to fishing as a direct consequence of agricultural decline. As the Inspector General of Fishing Activities, himself a fisherman for over 20 years, explained:

> Living conditions are difficult now. Many people come to me asking to fish, saying they have nothing to eat. Maize and beans used to grow well, and people relied on them, but now it isn't easy to cultivate them. People are trying to find ways not to go without food.

The transition from farming to fishing illustrates how adaptation emerges under constraint. Households diversify to cope with climate stress, a strategy that yields short-term gains but entails long-term costs. (Béné et al. 2012). While fishing may provide immediate relief, over-fishing simultaneously intensifies ecological pressures on rivers, exposing how short-term survival responses can erode the very foundations of long-term sustainability.

The persistence of customary authority further complicates regulation. Historically, traditional leaders (*régulos*) granted fishing rights to locals, regardless of government-issued licenses. As a government technician explained, "They are respected in the community, and the community follows their orders." This dual governance system generates conflicts, as illustrated by one government-licensed fisherman from the Chocotiva River:

> We have a rule here on the river: nobody catches small fish. Last year, we restricted fishing for six months to allow the fish to grow. When we started catching big fish again, the traditional leader saw what was happening and called people together, permitting them to take our fish. We complained, but they kept taking the fish until they were all gone. The next year, they tried again, but we fought back. It was a big problem, and even the police got involved.

The episode related by the Chocotiva fisherman highlights tensions between customary authority and state law, underscoring the contested terrain where local knowledge, governance, and ecological sustainability intersect (Berkes et al. 2001). Local knowledge in this context encompasses both the seasonal rhythms of the river and the experiential skills fishermen use to interpret water levels, fish size, and spawning cycles, as well as the collective norms that guide access. For local fishermen, rules such as seasonal bans or prohibitions on catching small fish are grounded not only in ecological understanding but also in moral and cosmological obligations to ancestors and river spirits. Fishing is framed as a practice that requires balance, reciprocity, and respect. When traditional leaders override these rules by prematurely lifting bans or redistributing catches, the act is seen not only as weakening sustainability but also as disturbing the moral order that sustains life along the river. What follows is a struggle over whose authority shapes the river's governance: the practical expertise of fishermen, the customary power of *régulos*, or the bureaucratic rules of district state licensing.

Each river has a local inspector through whom access to river resources is negotiated. Local inspectors are typically drawn from local fishermen's associations, where they often serve as president. The inspector plays a crucial role in maintaining order and ensuring compliance with regulations sanctioned by state and district authorities. They notify district authorities when unlicensed fishermen enter the river, leading to the confiscation of unauthorised equipment. Additionally, the local inspector coordinates meetings with fishermen to collectively decide whether new members (licensed fishermen) should be granted access to the river. This system suggests the coexistence of state and local authorities, which opens space for alternative forms of licensing and negotiation.

However, the growing number of fishermen in Magude reflects both the search for profit in fishing and the lack of other viable income-generating opportunities as agriculture and livestock become increasingly constrained.

Although the participatory system aims to balance access with sustainability, increased competition has made it more exclusive. Participation lies in the fact that decisions about new entrants are not made by state officials alone but discussed collectively by members of the fishermen's group, facilitated by the river inspector. One fisherman recounted:

> I used to fish on the Mwanetsi River, but the number of fish was decreasing. In 2016, I got another boat and left it on the Mauelele River. I went to the river inspector, and he spoke to the fishermen. They decided to accept me. Recently, though, because there are so

> many fishermen already, they have begun saying no to new applicants by claiming there are already enough fishermen on the river.

Despite the existence of local governance arrangements, such as fishing associations and the self-regulation of fishing activities through local inspectors, fish populations continue to decline.

Environmental factors compound the problem of fish decline. According to local fishermen, the major floods of 2000 deposited large amounts of sediment, reducing the depth of the rivers and altering their flow patterns in the long term. Periodic releases of water from dams upstream in South Africa and Eswatini further disrupt river dynamics by suddenly changing water levels, displacing fish populations and affecting breeding cycles. The most significant are the Maguga Dam in Eswatini, completed in 2001 with a capacity of about 332 million cubic metres, and the Driekoppies Dam in South Africa, both constructed to support irrigation and water regulation in the Komati–Incomati basin (KOBWA 2022). These structures have reshaped seasonal flows, and their impact is intensified by climate variability, as heavier rainfall events and prolonged droughts increase reliance on dam regulation (DWAF and AfriDev 2004; KOBWA 2022). In this way, local declines in fish stocks cannot be separated from the wider impacts of climate change. As one fisherman explained, "Even when the rivers are full of water, the fish don't stay because the water is too shallow. They move to deeper rivers, and we're left with nothing."

The decline in fish production has created ripple effects on the availability and upkeep of fishing equipment. As catches dwindle, many fishermen struggle to afford boats or maintain their nets, leading to increased reliance on makeshift or low-quality gear, especially among unlicensed operators. Some turn to mosquito nets despite repeated warnings from fisheries officers, local authorities, and fellow fishermen. Because these nets are treated with insecticides and have extremely fine mesh, they not only contaminate aquatic ecosystems but also trap juvenile fish before they reach maturity. Such practices disrupt natural growth cycles and accelerate stock depletion, producing a vicious cycle: declining catches push fishermen toward destructive methods, which in turn deepen ecological vulnerability and further erode the sustainability of fishing as a livelihood.

Violating these norms not only accelerates stock depletion but is also understood as a transgression of the moral and spiritual codes that govern relations between people, ancestors, and the river. Beyond their ecological impact, such practices are also subject to moral judgment at the local level; they are seen as disrespectful to the river and the spirits that dwell in it, as well as unfair to fellow fishermen, as noted earlier.

In conclusion, fishing in Magude has become both a means of making a living and a way of coping with agricultural decline. However, it also perpetuates a cycle of decline: falling farm yields push more households to the rivers, but overfishing depletes stocks, intensifies competition, and undermines long-term resilience. Local cosmologies frame these challenges as not only ecological but also moral failures, since disrespecting seasonal rules, spirits of the river, and ancestral obligations is believed to unsettle the balance between humans and their environment. Although traditional knowledge and customary authority continue to influence practices, they often conflict with state regulations, creating governance gaps that ignore the cosmological and moral foundations of resilience. While fishing provides short-term resilience and food security, it reinforces ecological vulnerability and social conflict in the long term. This paradox highlights the limitations of adaptation within structural constraints, where households are forced to survive using strategies that gradually erode the very resources upon which their resilience depends.

Monetising Forest Resources

While fishing has emerged as an important response to the decline of farming and herding, charcoal production represents another major adaptation strategy. The use of biomass sources, such as charcoal and firewood, has long been integral to rural life in Mozambique (Cuvilas et al. 2010). For generations, communities relied on these resources in small quantities for domestic use, including cooking, heating, and other household needs. However, in recent decades, charcoal production has shifted from subsistence production to a large-scale commercial activity, reshaping local economies and livelihoods. Scholars note that this transition reflects broader regional dynamics in which rural households increasingly commodify forest resources as responses to urban demand and climate pressures (Smith et al. 2019; Vollmer et al. 2017).

In Magude, the intensive exploitation of charcoal for commercial purposes dates back to the 1990s. According to local accounts, before Magude became a major centre for production, the neighbouring district of Moamba was the primary supplier. This early industry was largely dominated by migrants from Inhambane Province, particularly young men seeking economic opportunities. Because Moamba's resources were depleted due to overexploitation, migrant workers turned to Magude, still rich in forest reserves. At the time, local

residents had little knowledge of charcoal production, but the *Manhembana*[23] migrants were skilled in tree felling, kiln construction, and charcoal making. Their expertise quickly positioned them as central actors. However, as outsiders, they required permission from local landholders, creating a system of negotiated agreements that redefined Magude's social and economic landscape.

That large landowners became "bosses,"[24] granting access in exchange for profit shares, illustrates how control over land translated into control over new income opportunities. Similar processes have been observed in neighbouring Mabalane, where elites and intermediaries captured much of the value through their ability to connect production to lucrative Maputo markets (Baumert et al. 2016). In Magude, bosses not only provided land but also equipment and food supplies, while workers bore the physical burden of production. This division aligns with findings elsewhere in Mozambique, which show that benefits along the charcoal chain are unevenly distributed, with local labourers often receiving marginal returns compared to traders and urban buyers (Zorrilla-Miras et al. 2018).

Production sites are typically organised around groups of five workers who live in makeshift huts near the kilns. Their work involved cutting trees, firing kilns, and bagging charcoal for transport (Arnold et al. 2006; Schure et al. 2014). Despite the harsh conditions, the demand for charcoal made the trade profitable. Initially, migrant producers dominated due to their specialised knowledge, creating what Brouwer and Falcão (2004) termed a "knowledge monopoly." Over time, however, this exclusivity eroded. Local residents, motivated by worsening agricultural conditions and recurrent droughts, increasingly joined the trade, either as independent producers or by asserting themselves as new bosses. Similar patterns have been observed in other semi-arid districts, where declining agricultural yields have pushed communities toward extractive industries (Angelsen and Wunder 2003; Malate 2017).

Oral testimonies from Mapulanguene vividly illustrate how necessity drove this transition. One resident recalled a turning point in 2004, when a local administrator reframed the forest as a source of wealth:

> There was an administrator who once came here in Mapulanguene. He said, "You here in Mapulanguene have a lot of money; you live on top of wealth." And we were surprised – how? Then he said, "When I look at these woods, I see money, a lot of money." We asked,

[23] *Manhembana* is a colloquial expression used in Magude to refer to people from Inhambane Province, located in southern Mozambique.
[24] "Boss" is a local expression commonly used in southern Mozambique to describe individuals with money or employees, denoting a position of economic power and authority.

> "What money? We only see forests and trees." And he said, "Hey, there's a lot of money here. Burn coal to help yourselves. You complain about hunger while there's money right in front of you. Work!" We said, "Boss, we don't know about this business; it involves fire, it could burn us." And he said, "Stop being afraid. Work!" From that moment, we learned and started burning too.

Initially, many locals perceived charcoal making as a dangerous and unfamiliar activity, often associated with migrants from other areas. As another resident explained:

> We had a bad time here. Since we depended only on rain, we were starving due to lack of rain, and we didn't know how to burn coal. We saw those *Matswas* (migrants) and asked them, "How do you do it?" That charcoal work is difficult; we were afraid at first.

As recurrent droughts eroded agricultural livelihoods, however, many households turned to charcoal burning, despite it being labour-intensive and unpopular. One resident described how hunger ultimately compelled him to enter the trade:

> There was a lot of hunger at that time, a lot. There was no rain. Normally, it would rain well for two or three years, but then severe drought would come for another three or four years. We had to find other sources of income; farming was no longer possible. Today, I live off charcoal burning. Sometimes I sell two or three sacks just to have food.

These narratives show that the turn to charcoal was not a simple or sudden personal decision to monetise forest resources. Rather, it was the outcome of wider social and ecological transformations. The repeated experience of drought, the spread of migrant knowledge, and the encouragement of local officials to translate forests into financial gain, combined with erosion of traditional practices of forest protection (as discussed in Chapter Three), gradually reshaped decisions of individual community members. Vollmer et al. (2017) describe how the rhetoric and practice of extraction constitute a "monetisation of woodland resources," a transformation that signals an economic shift alongside a wider reordering of livelihoods, notions of wealth, and governance relations under climate stress. Forestry officials with whom I spoke corroborate this trend. For instance, a technician working in Magude recalled:

> Charcoal production has always existed in Magude but initially only for local consumption. People would sell a sack here and there. What

> later drove large-scale production was the economic factor. Rain became scarce, agricultural yields declined, and people had no choice.

This trajectory parallels developments in Mabalane, where climate variability, combined with rising urban demand from Maputo, has led to charcoal becoming a dominant livelihood strategy (Zorrilla-Miras et al. 2018). The growth of Maputo's charcoal market was a decisive force, generating consistent demand that drew rural households into commercial production. Charcoal production reflects adaptation to climate stress while also revealing the structural influence of urban energy demand, state policies, and the lack of affordable alternatives to charcoal in the capital. Government frameworks on climate change and resilience often overlook this urban–rural linkage, presenting charcoal as a local coping mechanism rather than part of a wider political economy that connects rural deforestation to urban energy dependence. Research shows, however, that while charcoal offers short-term income and some degree of resilience, it rarely addresses multidimensional poverty and frequently accelerates forest degradation (Baumert et al. 2016; Vollmer et al. 2017).

The experiences of Magude therefore illustrate both adaptation and constraint. On the one hand, charcoal burning has become a vital livelihood strategy in response to agricultural decline and economic necessity. On the other hand, it has entrenched new forms of inequality and resource pressure, with wealthier landowners capturing greater profits and woodland depletion threatening long-term sustainability. As observed elsewhere in southern Mozambique, the trade reflects a structural dilemma: charcoal offers short-term survival but undermines the ecological foundations of rural life (Malate, 2017; Smith et al. 2019). This captures the paradox of resilience without transformation: survival practices that allow communities to endure, but at the cost of reinforcing precariousness and vulnerability (Béné et al. 2012; Reid 2013).

While migrant producers initially dominated the sector, over time, native residents of Magude have developed their own ways of engaging with charcoal production, reshaping its economic, social, and gendered dimensions. The following section examines this local engagement more closely in terms of the influence of shifting livelihood opportunities, the collapse of informal economies, and changing gender and household dynamics within the charcoal trade.

Local Engagement with Charcoal Work

The gradual involvement of native residents in charcoal production unfolded against a broader backdrop of dwindling livelihood options. Agricultural decline and recurrent droughts, along with the collapse of the clandestine rhino horn trade and the waning prospects of South African migration, left few viable alternatives. For decades, young Mozambicans had sought income in cross-border labour markets or high-risk poaching, but both avenues narrowed in the early 2000s due to stricter border controls, rising xenophobia in South Africa, and stronger anti-poaching enforcement (Baumert et al. 2016). As one youth from Magude lamented, "We used to go to South Africa to build a future. Now, there's no wealth there, only hardship." This narrowing of alternatives meant that charcoal, despite its drudgery, became one of the few viable ways of generating cash income.

Local participation also reshapes the scale and orientation of production. As mentioned earlier, migrants typically work in groups of five, living in makeshift huts beside the kilns. Their focus is bulk production destined for Maputo's urban market, and they endure long weeks of felling trees, stacking kilns, tending smouldering fires, and bagging the finished charcoal. In contrast, many native producers in Magude operate on a smaller scale, producing fewer sacks but selling them steadily in the town's market. For them, charcoal is not a route to accumulation but a survival strategy to cover basic needs such as food, clothing, and school expenses. As Zorrilla-Miras et al. (2018) point out, this reflects experiences in other parts of southern Mozambique, where charcoal production is an important source of income but rarely enables households to escape poverty.

The social fabric of Magude is also being altered as a result. Women bear much of the adjustment as men turn to the forests. Albertina, president of a local agricultural association, explained how charcoal production is reshaping gendered labour divisions:

> Agricultural production is not enough; it only provides us with food. To earn money, we need other sources of income. Our livestock is limited and reserved for emergencies. The only alternative we have left is to produce charcoal for sale. Instead of farming with us, our husbands go to the forest to burn charcoal.

This statement captures a shift noted across semi-arid Mozambique: men's engagement in charcoal production increases women's farming responsibilities, while women themselves often enter the charcoal trade as resellers and petty distributors (Falcão et al. 2011; Malate 2017). Many women describe juggling the sale of charcoal in the market, either selling full

sacks or dividing them into smaller plastic bags and portions for daily use, while also managing farming and domestic duties. This creates a "double burden" but also secures critical income for household survival. Families establish *compones* (family-run enterprises, derived from the English word company) through which they control land access and organisation, while migrant workers provide labour. This arrangement institutionalises a division of labour: natives contribute land and legitimacy, and migrants offer skills and effort. The negotiated access to forested areas requires approval from community leaders or traditional chiefs, a practice that reinforces local authority and signals respect for customary land governance (Baumert et al. 2016).

The coping pathway of charcoal production highlights the gendered nature of climate change impacts. As men turned to charcoal production, women assumed greater responsibility for farming while also engaging in the small-scale charcoal trade, creating a double burden in climate-stressed contexts (Dankelman 2010:60). Rather than reducing inequalities, such adaptations often magnify them, as gender intersects with class, age, and resource access to shape vulnerability (Pearse 2017; Rydstrom and Kinnvall 2019). In Magude, women's resilience secures household survival but also entrenches structural disadvantages. Although Mozambique's National Climate Change Strategy (ENAMMC) commits rhetorically to gender mainstreaming, implementation has been weak, leaving women's knowledge undervalued and the unequal costs of adaptation largely unaddressed (MacGregor 2010; Dankelman 2010). Everyday resilience in Magude therefore highlights both the indispensability of women's labour and the ongoing neglect of gender justice in climate governance.

The Zitha family exemplifies the gendered organisation of charcoal production. As landowners, they authorise charcoal production on their land, relying on migrant workers to carry out the work. Mr Zitha recounted how he recruited young men from Massinga, providing them with food staples, cooking oil, and basic shelter, along with access to a chainsaw:

> The people who work for us are from Inhambane, from Massinga. They leave their homes and come here looking for charcoal-burning jobs. In their homeland, charcoal is produced, but it doesn't generate as much income as it does here. Here, they can sell a sack of charcoal for 600 Mt [USD 9.38], whereas in Massinga they would only get 300 Mt [USD 4.69]. It's hard work, but it's worth it because they earn twice as much as they would in other places.

Workers lived in rudimentary huts near the kilns, facing heat, smoke, and a lack of clean water. Payment arrangements varied: some *compones* divided

profits according to fuel inputs, while others distributed earnings per sack produced. Mr Zitha explained his own arrangement:

> Each 5 litres of fuel produces about 40 sacks of charcoal, so we decided to allocate 5 litres for me and 5 litres for them. At the end of the cycle, I receive the earnings from my 40 sacks, while they keep the proceeds from the other 40 sacks.

Some *compones* adopt an alternative model where the fuel allocation is divided into three portions: 5 litres for the employer, 5 litres for food supplies, and 3 litres for the workers' wages. Fuel is the key input for charcoal production. The more fuel available, the more trees can be felled and the more charcoal can be burned. The litres given as wages are therefore converted into bags of charcoal, with workers' earnings depending directly on the volume they are able to produce. Others use a sack-based compensation system, where earnings are calculated per sack of charcoal produced. In this model, each sack is sold for 600 Mt (USD 9.38), with the revenue distributed as follows: 150 Mt (USD 2.34) for the workers and 450 Mt (USD 7.03) for the *compone* family. This amount is then multiplied by the total number of sacks produced, determining the final payment for both the employer and the workers. These differing systems reflect the flexibility and adaptability of local charcoal trade practices.

Such arrangements highlight the adaptive pragmatism of charcoal economies as described by Vollmer et al. (2017), which are characterised by flexible, negotiated systems that enable both employers and workers to survive. However, they also perpetuate inequalities, as local bosses retain structural advantages, such as access to land, equipment, and market connections, while workers endure precarious living conditions and heavy physical demands.

Charcoal production methods further complicated this balance. Workers continued to use traditional earth kilns, covering stacked wood with soil and tending the smouldering fire for days. The introduction of fuel-powered chainsaws has significantly increased productivity but accelerated forest depletion. Forestry officials and researchers alike warn that such mechanisation, while enabling higher output, intensifies ecological degradation and threatens the long-term viability of woodland resources (Baumert et al. 2016; Malate 2017).

Transforming Wood to Charcoal: Techniques and Practices

Charcoal production in Magude follows the common patterns observed across Mozambique, but with locally specific adaptations. As Atanassov et al. (2012) and Falcão, Fernandes, and Atanassov (2011) describe, the process unfolds in distinct but interlinked stages, beginning with tree selection and felling. Producers identify suitable species, such as *Chanato*, which is most commonly used in Magude. In earlier years, *Monzo* was prized for producing high-quality charcoal, but due to overexploitation, it is now classified as a protected species. Similar patterns of species depletion and substitution have been reported in other provinces, where *Messassa* or even cashew trees are used for carbonisation (Atanassov et al. 2012; Falcão 2013). The felling phase, usually carried out with fuel-powered chainsaws, can take up to a week.

Once cut, logs are prepared for carbonisation in traditional earth kilns, constructed on flat sandy ground near the cutting sites. Producers arrange larger logs longitudinally and smaller ones transversely to form a compact pile about one metre high. The pile is then sealed with grass and clay, leaving only small "breathing holes" to regulate combustion. As one local producer explained, "We cover the kiln carefully. If air enters too much, the wood turns to ash. If it enters too little, the fire dies. We have to keep watching it, day and night."

This stage usually takes one to two days. The most critical and labour-intensive phase, carbonisation, lasts between 15 and 24 days. During this time, the wood is slowly combusted under low oxygen conditions, at temperatures of 200–500°C. Workers vigilantly monitor the kiln, sealing cracks and adjusting airflows to avoid complete oxidation. After this, a cooling period of two to three days is required before dismantling and packaging the charcoal into reused flour or rice sacks of about 50 kg.

The logistical chain then shifts to *compone* owners and transporters. As Mabote (2011) observes, *compone* owners act as pivotal intermediaries, connecting dispersed rural producers with urban buyers. Once the charcoal is ready, it is stored until buyers, who are often based in Maputo or Matola, arrange to collect it. Transporters describe their role as arduous and costly:

> We are the transporters. The *compone* owner hires us and sends us to load the product. The operation can take between three to four days, one day to travel to the site, two days for loading, and another day to return to Maputo.

Each sack sells for around 600 Mt (USD 9.38) at the production site but can reach up to 1,500 Mt (USD 23.44) in Maputo. This markup, more than double

the original price, reflects not only transport costs but also a layered system of informal payments. As one transporter explained:

> For the transportation operation, the person who hires us must provide money to cover operational costs. This money is used for food and to pay various control points along the journey. We need to have money to pay the traffic police and forestry officials. At a minimum, we need 18,000 Mt [USD 281] for these expenses. If we don't have a license, this amount can rise to 32,000 Mt [USD 500].

These testimonies illustrate how profits are progressively eroded by costs and bribes, while the highest margins are captured downstream in the value chain, particularly in urban markets (Baumert et al. 2016; Vollmer et al. 2017). Nevertheless, despite these constraints, charcoal production remains one of the few activities that provides a regular cash income. Even after transport costs and informal payments have been deducted, both *compone* owners and transporters are usually left with a profit. For many households, this represents their only source of income for food, school fees, or medical expenses.

Licensing further complicates the trade. In principle, government authorities regulate charcoal through licenses, but instead of licensing individual producers, the system targets transporters. As one forestry technician explained:

> For organisational reasons, we only license the transporter. Ideally, it shouldn't be like this, but due to the complexity of the process and the large number of people involved in production, it's difficult to ensure that every producer is licensed.

While justified as an administrative necessity, this system creates a secondary market for licenses, with some individuals acquiring permits only to rent or resell them. Local producers often find themselves excluded, while intermediaries and urban-based traders consolidate control. Falcão (2013) and Mabote (2011) both highlights how this arrangement deepens rural–urban inequalities: while rural households depend on charcoal for survival, the bulk of profits accrue to better-connected actors.

The recent government initiatives to limit the number of licenses issued annually illustrate both regulatory ambition and the fragility of state control. Official data from the Provincial Services of Forests and Wildlife (PSOD) suggest a steep decline in registered charcoal flows from Magude to Maputo and Matola (Table 6). According to a forestry technician, only 45 licences were issued in 2022, corresponding to 45,000 sacks, with each licence allowing for 1,000 sacks. The government has stated that its long-term goal is

to reduce this figure even further to 30 licences (30,000 sacks) per year (PSOD 2019–2022). However, these figures are inconsistent with earlier records and the apparent scale of production.

Product	2019	2020	2021	Destination
Charcoal bag	82,722	50,286	25,425	Maputo and Matola City

Table 6: Coal production flow in Magude (Source: PSOD 2019, 2020, 2021)

As the same technician noted, a substantial portion of charcoal bags circulates illegally, bypassing state control entirely. This unregulated trade is not captured in official statistics, leading to significant discrepancies between reported numbers and actual production. Researchers have highlighted how such inconsistencies are not merely technical but also political: data is often manipulated to present a more favourable image of state control (Baumert et al. 2016; Vollmer et al. 2017; Zorrilla-Miras et al. 2018). These dynamics reveal a classic case of the "governance gap" in Mozambique's charcoal sector, as defined by Zorrilla-Miras et al. (2018): where regulation exists on paper but is selectively and inconsistently enforced and is permeated by corruption.

It is within such a semi-governance vacuum that powerful actors, including government officials themselves, have increasingly entered the charcoal business, reshaping the rules of access and control. Local testimonies reveal that senior government officials themselves are involved in charcoal production, holding multiple licenses or directly engaging in the industry. As one producer complained:

> Lately, it has become difficult to work in charcoal because now the chiefs are also cutting. For example, the administrative post [the local administrative unit below the district] has also entered the business. He is a charcoal producer, and this makes it difficult for us, the poor. Now we only benefit from the leftovers. Before, this work was for the poor and illiterate, those who did not go to school, but now everything is occupied, and even finding a space to work has become difficult.

This quote from my fieldwork aligns with broader findings that charcoal markets in Mozambique are often dominated by well-connected elites, whose involvement undermines the legitimacy of regulations and erodes trust in governance (Zorrilla-Miras et al. 2018; Vollmer et al. 2017).

The seasonal "closed period" (January–March), when production and transport are officially prohibited to allow forest regeneration, further

illustrates these inequalities. In practice, enforcement is selective. One resident pointed to a truck transporting over 100 sacks during the closed season, noting:

> The law prohibits it, but the law is not for everyone. Not every truck can come here and operate during this period. Only three trucks are authorised to circulate here, and one of them is this one. These are the boss's trucks, so no inspector intervenes. As soon as they see his name on the license, everything is fine!

Such accounts underscore systemic governance "failures" with regulations that are applied unevenly, protecting elites while marginalising small-scale producers. In this context, enforcement typically involves forestry and environmental officials checking licences, imposing fines, or confiscating sacks of charcoal during transport. However, as testimonies show, these measures are applied inconsistently and are often bypassed through patronage or bribery. This mirrors a broader critique that Mozambique's charcoal sector is shaped more by informal practices, such as patronage, corruption, and uneven enforcement, than by formal policy (Baumert et al. 2016; Smith et al. 2019).

In conclusion, charcoal production in Magude is not merely a technical process of transforming wood into fuel; it is a site of contestation where ecological, economic, and political struggles intersect. Traditional kilns and low-efficiency methods (with yields of only 10–20%, as Falcão [2013] notes) ensure high levels of wood consumption and rapid forest degradation, while governance failures and patterns of elite capture serve to deepen existing inequalities. For rural families, charcoal remains a vital survival strategy, but one embedded in a wider system that privileges urban markets, is entrenched by corruption, and undermines environmental sustainability. As Mabote (2011) demonstrated, charcoal in Magude often generates more income than does agriculture, but its benefits are unequally distributed and ecologically costly. The persistence of these structural dynamics positions rural producers in a paradoxical situation: charcoal provides crucial income and strengthens household survival in contexts of crisis but at the same time deepens inequalities and ecological vulnerabilities (Smith et al. 2019; Zorrilla-Miras et al. 2018).

The Environmental Cost of Charcoal

The environmental consequences of charcoal production in Magude are profound, with deforestation emerging as the most severe and visible impact. According to Chandamela (2020), Mozambique lost around 219,000 hectares of forest annually between 1990 and 2002, corresponding to a deforestation

rate of 0.58%. Maputo Province, particularly Magude, was among the hardest hit areas. Charcoal production can be done sustainably by carefully coppicing wood, a method especially well-suited to mopane woodlands because of mopane's high capacity to resprout. However, according to local forestry technicians, areas that were once wooded, such as Pajane, are now virtually stripped bare. Now only Mahel and parts of Mapulanguene retain substantial forest cover. Even though there have been no local studies on vegetation change, the technicians' statements mirror findings from remote sensing studies in southern Mozambique, which show that charcoal is the main driver of forest degradation: between 2008 and 2018 alone, an estimated 80,000 hectares of mopane woodland were used for charcoal. Based on calculations this released more than one million tonnes of carbon (Sedano et al. 2020). However, it is important to stress that there is no clear baseline for vegetation dynamics in Magude. Mopane woodlands are highly variable, and without long-term studies it is difficult to establish whether observed changes represent ecological decline or natural woodland cycles.

Local testimonies illustrate how policy on paper fails to translate into practice. As one forestry officer explained:

> Our country has a problem. We have good policies, but we are unable to put them into practice. If I have a license and I am exploring a thousand hectares, I have a legal obligation to restore that area. What we see is empty trucks entering here and coming back full of coal. By law, a truck must not come empty; it must carry forest plants to repopulate the exploration area. Who controls it? No one!

The absence of enforcement has resulted in widespread extraction without regeneration. Residents note that forests near villages have been exhausted, forcing producers to move further afield. As one local told me, "The price of coal has gone up a lot in recent years because the bush is receding. Today, we take the coal from very far away, and when it arrives here, it is very expensive."

Such accounts resonate with Silva et al. (2019), who describe charcoal-related degradation as occurring in waves: beginning with highly selective cutting of preferred species, then progressively shifting to less desirable species and younger trees, and finally resulting in indiscriminate production that severely damaged forest structure. In Magude, as in other districts, the most accessible woodlands have already been depleted, and production zones steadily expand outward, following a frontier dynamic of resource depletion in which charcoal extraction advances in waves further from settlements as local reserves are exhausted.

Despite this trajectory, government officials sometimes present a more optimistic view, pointing to awareness campaigns and inspection brigades:

> About the environmental impact, it can be said that in certain zones, there is a negative impact from this activity. We are talking about some parts that are suffering from deforestation. But overall, there has been some control on our side. We have set up mobile inspection brigades to check what is happening on the ground. And we raise awareness through training, where we inform people about which species to cut.

Nevertheless, communities report rising temperatures, erratic rainfall, and the disappearance of wildlife, changes they link to deforestation. As one resident of Magude-Sede explained:

> There are problems with the management of nature here. Many trees are cut down without any replanting. The charcoal producers are always felling trees to make charcoal, and this has a negative impact on the lack of rain.

Research confirms these associations: forest loss reduces rainfall and increases local temperatures (Lawrence and Vandecar 2015), undermining agriculture and grazing. Paull (2023) further shows that during hotter years, households are more likely to expand charcoal production as a coping strategy, directly linking climate stress to accelerated deforestation.

Not all producers acknowledge these risks. One operator insisted:

> No, the trees won't run out. We haven't been cutting them for very long. The trees we cut down are called *mintho*, and there are still a lot of them. We only cut the big ones, not the small ones.

Other operators suggested that charcoal "will never run out." Such statements could be seen to reflect denial but are explained by the constraints of necessity: for many households, charcoal is a survival strategy, even if it jeopardises long-term ecological sustainability. As Silva et al. (2019) argue, these dynamics can lock communities into charcoal poverty traps, where forest degradation undermines ecosystem services, leaving rural households with even fewer alternatives and reinforcing dependence on charcoal.

The environmental impacts, therefore, extend beyond local landscapes to broader climate concerns. Charcoal-driven deforestation reduces carbon storage and contributes to global warming (IPCC 2021). In Mozambique's dry woodlands, whose carbon storage capacity rivals that of tropical rainforests, the loss is particularly significant (Ryan et al. 2016; Silva et al. 2019). Sedano

et al. (2020) estimate over 1.13 million metric tonnes of CO_2 emissions from charcoal-related forest and savanna degradation over ten years. At the same time, communities experience reduced rainfall, harsher droughts. and declining agricultural viability at the micro-level, which feed back into greater reliance on charcoal (Paull 2023). This cycle produces what Béné et al. (2012) describe as resilience without the possibility of transformation: communities endure crises through extractive practices that secure immediate income but reinforce long-term precarity.

Charcoal in Magude has been shaped by local knowledge, as residents have adopted and adapted techniques once monopolised by migrants. This has led to the integration of charcoal production into household economies and the gendered division of labour. However, this agency operates within structural constraints. The uneven distribution of profits, whereby landowners, traders, and state officials capture disproportionate gains, reveals how resilience is stratified and how adaptation becomes entangled with power. This unequal distribution also raises questions of climate justice: those who are least responsible for climate change and have the fewest alternatives bear the greatest ecological and social costs. Moreover, degradation narratives promoted by officials and experts risk reproducing what Fairhead and Leach (1995a, 1995b) call "false forest histories" – stories that cast blame on local populations and legitimise external control. Such framings overlook how African landscapes have often been enriched by local use and unfairly shift responsibility onto vulnerable groups who contribute little to global emissions.

Charcoal in Magude is as much a political matter as an environmental one. Regulation is enforced selectively, shielding elites while leaving small-scale producers vulnerable to fines, exclusion, and resource loss. This reflects broader governance patterns in Mozambique, where national strategies such as the ENAMMC promote resilience and sustainability but remain disconnected from local realities. Charcoal provides a survival income for rural households and revenue for urban markets and elites, while at the same time driving deforestation and perpetuating inequality. These dynamics expose the contradictions of state-led climate programmes and raise questions of climate justice and whose interests adaptation policies ultimately serve.

Conclusion

The trajectories of small business, fishing, and charcoal production in Magude reveal how climate variability and agricultural decline have reshaped rural livelihoods. Both activities function as vital forms of adaptation, allowing

households to secure food and income in contexts of recurrent droughts and declining farm yields. However, these strategies embody resilience without transformation as they enable survival but deepen long-term vulnerability (Béné et al. 2012; Reid 2013). Charcoal accelerates deforestation, which in turn exacerbates climatic stresses. Meanwhile, fishing intensifies pressure on already fragile river ecosystems, while small businesses remain precarious and unequally distributed, often reproducing existing inequalities of class, gender, and generation.

Local knowledge and cosmological frameworks have shaped how these practices are interpreted and pursued. Fishing rules, for instance, are embedded in moral and spiritual obligations to ancestors and river spirits, while charcoal work is framed in terms of both necessity and the redefinition of forests as wealth. These cosmological and moral dimensions show that adaptation is not only about technical survival but also about maintaining social and spiritual balance. When these codes are violated, whether by overfishing with mosquito nets or cutting forests without rituals, people interpret it as disrupting the moral order that sustains community life.

At the same time, adaptation unfolds within the context of structural inequalities and political-economic constraints. Access to land, forests, and markets is mediated by elites, state officials, and traders, while ordinary households are left with the hardest labour and thinnest margins. The rise of small businesses, particularly among young people, demonstrates creativity and resilience but also highlights how globalisation, urban entanglements, and economic history, ranging from colonial labour migration to postwar liberalisation, have commodified resources and restructured livelihoods. Political ecology helps make sense of this commodification, showing how local adaptation practices are bound up with broader processes of extraction, urban demand, and state neglect.

Government strategies, including the ENAMMC, present resilience as a technical goal, but they remain largely detached from the intersectional realities of rural life. The gendered burdens of charcoal and farming, the intergenerational precarities of small business, and the moral economies of fishing are rarely acknowledged in official policy. This failure to address the intersectional nature of climate impacts prevents effective support and risks reinforcing the very vulnerabilities adaptation is meant to alleviate.

When viewed through the lens of climate justice, the paradox becomes clear. Those who are least responsible for the drivers of climate change are forced into extractive livelihoods that sustain them in the present while undermining their future. The result is an environmental story of degradation and a political story of inequality, governance gaps, and contested authority,

as highlighted in the political ecology field (Robbins 2011; Nixon 2011). In Magude, elites and urban markets capture profits from charcoal and fish, while poorer households carry the ecological costs and labour burdens. Environmental justice scholarship reminds us that these outcomes reflect structural inequality rather than individual choice (Temper et al. 2018). Charcoal production and fishing, therefore, exemplify adaptation as resilience that reproduces vulnerability rather than transforming it.

Ultimately, charcoal, fishing, and small business in Magude exemplify the politics of adaptation. Practices are shaped by cosmology, morality, and necessity but constrained by history, inequality, and power. They reveal how resilience is enacted daily, often at great social and ecological cost, and why questions of climate justice and political ecology must remain central to understanding adaptation in southern Mozambique.

Chapter 7: “Magude Isn’t Like It Used to Be”

This thesis, along with other scientific literature, shows that climate change is significantly reshaping the rural areas in Mozambique. This study argues, however, that climate change is not only altering the weather; it is profoundly transforming all spheres of rural life. The phrase “Magude isn’t like it used to be,” often voiced by the elderly, encapsulates a collective feeling of disruption. Where there was once ecological predictability, agricultural abundance, and cosmological order, there is now uncertainty, scarcity, and disorientation. These changes are experienced as environmental disruptions but also as profound shifts in identity, kinship, ritual practices, and livelihoods. Crucially, the thesis shows that these transformations are neither neutral nor universal. The ways in which climate change unfolds, is experienced and adapted to are deeply shaped by Magude’s social, economic and political contexts, which are marked by historical legacies of land dispossession, gendered divisions of labour, economic inequality and uneven state intervention. It is within these conditions that vulnerability is produced and resilience is conceived.

Environmental variability, thus, is intricately interconnected with local economies, transforming cultural traditions, knowledge, spiritual practices, social relations, and structural inequalities. Rural communities perceive, interpret, and respond to climate-induced disruptions to their lives and landscapes in ways that mirror these connections. In the process, new strategies emerge that transform agriculture, livestock breeding, social relations, and the beliefs of communities. This study sought to understand climate change-induced transformations within their broader historical, political, economic, and cultural contexts. For instance, i explore how climate vulnerability and adaptation to a changing environment in southern Mozambique evolve under various factors, through the study of lived experiences, meaning-making, and the pursuit of justice among communities.

Magude is a historically significant district marked by colonial land concessions, post-independence agrarian reform, and recurrent droughts as well as floods. In this way, it presents a critical vantage point for understanding the intersections of climate change, livelihood transformation, and rural inequality. The ethnographic orientation to Magude enables the

capture of not only the tangible shifts in agricultural and pastoral systems but also the symbolic, affective, and political dimensions through which these transformations are narrated, contested, and lived in everyday practice. Field research revealed the varied and frequently uneven ways in which climate change is experienced and narrated.

Four interrelated concepts productively aided the analysis: adaptation, resilience, local knowledge, and climate justice. Adaptation showed how communities adjust their practices and institutions in response to climatic stress, highlighting both creativity and constraint. The thesis identified diverse adaptation projects that do not always meet. The analysis of the divergences between government led adaptation measures and adaptation strategies applied by different practitioners and social groups helped reveal the role of structural inequalities and their future reproduction in climate change politics (Oliver-Smith, 2016; Taylor, 2015). Resilience expanded upon this analysis by demonstrating how individuals cope with and navigate overlapping environmental, economic and social pressures, while also highlighting the associated costs and limitations (Béné et al. 2012). The emphasis on local knowledge underscores that climate change is not only a scientific concept, but also one that is understood through ancestral wisdom, ritual practices, and everyday observations, often in tension with technocratic framings (Agrawal 1995; Nadasdy 1999; Rosengren 2022). Finally, climate justice brought to the fore the structural and historical inequalities that shape vulnerability and adaptive capacity, raising the question of which knowledge is legitimised, which voices are heard, and whose futures are prioritised in adaptation governance (Whyte 2017; Schlosberg 2007; Sultana 2022). The answers determine how state institutions, international agencies, and NGOs design and implement policies that control communities' ability to adapt. Together, these concepts provide a critical, culturally grounded framework for analysing how climate change is experienced, contested, and given meaning in Magude.

An important focus of this research that deepens anthropological knowledge of climate change is the complex intertwining of local cosmologies and the politics of climate adaptation. In Magude, climate variability is not only interpreted as a biophysical challenge, but also as a moral and spiritual disruption. Rituals such as *ku palha*, *ukanyi* celebrations, and household ceremonies like *mhamba* illustrate how agriculture and rainfall are embedded in ancestral relationships and ritual obligations. Residents attribute droughts, floods, and pest outbreaks to the weakening of these practices, the erosion of taboos, and the declining legitimacy of traditional leaders (*régulos*), who were once responsible for safeguarding the moral and cosmological order. Elders described the abandonment of rules, such as prohibitions on farming after

lightning strikes, deaths, or the birth of twins, as having left both land and society exposed, creating what they call a rupture between people, ancestors, and nature. Alongside these ancestral frameworks, Christian interpretations portray extreme weather as divine retribution, further entangling climate change and adaptation to it in a more-than-human, complex moral landscape and practice. In the communities' view, thus, adaptation to climate change needs also to address and include the moral and spiritual spheres.

These overlapping cosmologies coexist uneasily alongside state-led adaptation programmes, such as the PLA. PLA prioritises highly visible, technocratic interventions, such as boreholes, drip irrigation systems and improved seed varieties, while marginalising traditional ecological knowledge. The result is an epistemological disjuncture, with communities interpreting environmental instability as evidence of spiritual imbalance and social neglect, while official planning and international donors reduce it to a climatic calamity and technical risk. Thus, when fall armyworms destroyed hundreds of hectares of maize, state extension workers ignored the rituals that many families performed to expel the pest, linking the outbreak to broken taboos and ancestral displeasure. In contrast, governmental and scientific authorities explained the infestation strictly in agronomic terms, recommending the use of chemical pesticides and improved seed varieties. In the process, risks to the local population's health were induced due to a lack of specialized knowledge on the application and protection from pesticides, as well as unaccounted long-term soil pollution.

The thesis also demonstrated that rural communities draw on both scientific knowledge and governmental assistance, as well as spiritual beliefs and local knowledge, in their responses to extreme weather and natural events. Far from being marginal, local cosmologies and knowledge represent coherent but flexible epistemologies. Such epistemologies shape how risks are understood, how responses are mobilised, and how legitimacy is negotiated. At the same time, they are open to innovation, creativity, and change. Thus, what might seem an unbridgeable epistemological disjuncture from the perspectives of researchers, state authorities, and development NGOs appears to local practitioners as material and knowledge sources to draw from in designing available and creative solutions to the existential and climate-induced threats and risks. The chapters in the thesis provide multiple examples and analysis how adaptation in different local livelihoods encompasses more than technical adjustments; it also involves preserving meaning, sustaining ancestral authority, and navigating the tensions between spiritual worlds and state interventions.

Agriculture, historically the backbone of Magude's subsistence economy, has been profoundly destabilised by recurrent droughts, erratic rainfall, and pest outbreaks. Farmers across the district spoke of the growing uncertainty surrounding rainfall, which makes it increasingly difficult to decide when to plant and harvest. Many recalled that in the past, the rains followed a predictable rhythm, allowing households to plan with confidence, whereas today the onset is delayed, irregular, and often extends well into November. These shifts have reduced maize and bean yields, undermining household food security. The 2015/16 El Niño drought is etched in collective memory as one of the worst on record, leading to widespread hunger, livestock deaths, and a reliance on humanitarian aid. More recently, fall armyworms invaded and destroyed over 245 hectares of maize. Families even resorted to rituals to expel the pest, underscoring how ecological crises are interpreted as both material and spiritual threats.

In response, farmers have developed a range of adaptive practices, such as flexible planting schedules, intercropping, crop diversification, seed exchanges, and the use of drought-tolerant varieties. Some households rely on small-scale irrigation pumps or low-lying fields with residual moisture, while associations provide support in accessing inputs and markets. However, these strategies remain unevenly distributed. Wealthier or better-connected farmers can invest in irrigation systems or join the sugarcane out-grower schemes run by the Açucarreira de Xinavane factory (AdX), while the majority remain dependent on precarious rain-fed systems. Gender dynamics also influence outcomes. Women farmers, who are often land-poor and excluded from associations, are more vulnerable and have less bargaining power. Overall, Magude's agriculture emerges not only as a site of resilience and experimentation, but also as an area where structural inequalities over land, credit, water and market access continuously constrain adaptive capacity and reinforce social hierarchies.

Livestock farming in Magude is also much more than an economic pursuit. It is embedded within cosmological beliefs, ancestral obligations, and social identity. It is part not only of the maintenance of human health and life, but the reproduction of familial and social ties and the life of communities. Cattle remain the "living banks" of rural households, functioning as productive assets, ritual symbols, and reserves of wealth that underpin community practices such as lobola, funerals, and ceremonies honouring ancestors. However, climate change has put immense pressure on livestock breeding. Recurrent droughts have reduced the availability of pasture and water, leaving animals weakened and forcing herders to drive them ever longer distances. The aftermath of the 2015–2016 El Niño drought was particularly devastating,

killing large numbers of cattle and creating conditions conducive to disease outbreaks. Herders directly link the increase in theileriosis and foot-and-mouth disease to that drought, describing how rotting carcasses contaminated water and grass, spreading infection across the landscape. Such an explanation once again shows the synergetic approach that local people have to knowledge, where moral and religious meanings and beliefs are integrated with explanations grounded in observations, practical knowledge, and scientific causality.

As this study showed, climate change reproduces social inequalities as pressures are not evenly distributed. Wealthier ranchers can offset losses through access to fenced grazing land, supplementary feed, and veterinary services. Smallholders face catastrophic herd depletion, loss of draught power, reduced ritual capacity, and diminished social roles and status. As herds shrink, cattle lose their role as reliable "banks," eroding both economic security and the moral order that livestock ownership provides. Families who cannot provide cattle for lobola payments or for sacrifice during family rituals (*mhamba*) experience financial strain, while at the same time their inability to meet these obligations is understood as a weakening of ancestral ties, moral responsibility, and social recognition.

At the same time, new resilience practices are emerging: nocturnal grazing is adopted to avoid extreme daytime heat, dipping associations are organised to combat tick-borne diseases, and women and young people are increasingly taking on responsibilities for herding and animal care in the wake of male emigration. These shifts show that adaptation in the livestock sector entails ecological adjustments alongside social transformations. For instance, young boys now spend more time with herds in the absence of adult men, while women increasingly take decisions about cattle health and sales, reflecting renegotiated gender roles, generational aspirations for autonomy, and the changing organisation of household economies. Such adjustments are grounded in long-term ecological knowledge and social relations and in this way, they strive to insure the preservation of communities and the reconstitution of moral and cosmological order. Still, such resilience remains fragile and uneven. Many smallholders are unable to replenish their herds after losses, while others sell cattle prematurely to meet urgent needs, undermining long-term security.

Trade dynamics exacerbate these vulnerabilities: declining household purchasing power and the emergence of private ranchers consolidate market opportunities in the hands of elites, marginalising small-scale breeders and reinforcing the division within the cattle economy. This analysis emphasises that adaptation in Magude's livestock sector is economic, cultural, and moral,

but always limited by structural inequalities relating to land, market access, and institutional support. The erosion of herds disrupts social reproduction more broadly, since cattle are central to negotiating marriage alliances, marking generational transitions, and ensuring proper funeral rites. When these obligations cannot be fulfilled, families experience not only material deprivation but also a loss of social and moral standing, as well as a sense of having failed in their ancestral duties. These pressures reveal that climate change-enforced adaptation in livestock breeding is not reducible to herd management, improved water infrastructure, and veterinary care, as governmental adaptation measures often presuppose. Climate change adaptation and resilience of livestock livelihood should take into serious consideration the cultural values and moral expectations that cattle embody within Magude society. Governmental representatives and NGOs alike need to expand their view to encompass the full spectrum of impacts that climate events and vulnerabilities have on rural communities in order to offer adequate support and long-term solutions.

The emergence of alternative livelihoods, particularly small business, charcoal production and fishing, have become increasingly important as agriculture and cattle herding have declined. While small trade has long existed as a source of income, it is now drawing an increasing number of young, semi-educated people seeking opportunities beyond farming. Once dominated by migrant producers from Inhambane, charcoal production has steadily become integrated into Magude's local economy, evolving from a marginal activity into a central survival strategy. For many households, especially those headed by young men, charcoal production provides immediate cash to cover the costs of food, clothing, and school fees. However, this shift comes at a significant cost. The expansion of charcoal has accelerated deforestation and depleted woodlands that were once abundant in the district. It has also intensified social inequalities. Landowners and "bosses" capture the largest share of profits through *compones* (family-based enterprises), while migrant workers and local labourers do the hardest physical work for low pay. Although mechanisation, such as the use of chainsaws, has increased output, it has also caused further environmental degradation. Meanwhile, governance gaps, such as licensing loopholes, corruption and elite capture, allow state officials and well-connected traders to dominate the sector. In response to the environmental impacts, the government has sought to restrict the issuing of new licences in order to curb production levels, but these measures remain limited in scope and enforcement, often failing to address the structural drivers of charcoal dependence. Therefore, charcoal

embodies “resilience without transformation”, as it ensures short-term survival, yet exacerbates ecological and social vulnerability (Béné et al. 2012).

Fishing has also emerged as a vital backup economy, particularly when farming fails and rivers become a critical source of food and income. Fishing is often combined with farming, herding, or petty trade, reflecting the flexible strategies households adopt to navigate uncertainty, and it is rooted in intergenerational knowledge. However, fishing is also marked by precariousness. Catches have declined due to overfishing, dam releases, and river shallowing after floods. Unlicensed practices, especially the use of mosquito nets, further deplete fish stocks and harm ecosystems. The number of licensed fishermen has quadrupled since 2019, intensifying competition, while governance remains contested between state licensing regimes, customary authority, and local inspectors who control access to rivers. These overlapping systems often result in exclusion and conflict, as better-connected fishermen or inspectors consolidate control. For many families, fishing remains a safety net during times of hardship, but it is becoming increasingly strained due to ecological decline, governance gaps, and the unequal distribution of benefits.

Charcoal production and fishing together reveal both adaptation and constraint. They show how households adapt to cope with agricultural decline, but in doing so, they become dependent on extractive livelihoods that offer only short-term survival while undermining the very ecological foundations on which they depend. This creates a vicious cycle: as forests are depleted and fish stocks decline, households become increasingly reliant on activities that exacerbate degradation, further narrowing their future options. Thus, climate adaptation in Magude emerges as a paradox – practices born of necessity and shaped by historical legacies and governance failures that generate resilience in the present but also reproduce vulnerability and inequality over time.

Taken together, these findings demonstrate that adaptation in Magude is not a series of isolated responses but a deeply interconnected process shaped by social relations, cosmology, ecology, and state governance. A drought that reduces maize harvests threatens food security, compelling families to sell their cattle earlier than planned. This weakens their ability to fulfil their ritual obligations and forces younger men to turn to charcoal production or fishing in order to earn money quickly. Each adjustment reverberates across other areas of life, linking crops, cattle, forests, rivers and ritual practices into a single interconnected web. In this sense, climate change functions both as a catalyst and an amplifier, accelerating long-standing vulnerabilities while exposing the limits of state, market and ritual authority. The transformations of agriculture, livestock, and alternative livelihoods are entangled with

broader histories of land dispossession, labour migration, and uneven state intervention. Here, climate change functions as both a catalyst and an amplifier, accelerating long-standing vulnerabilities and exposing the limits of state, market and ritual authority.

These empirical findings carry broader implications that go beyond sectoral change. They highlight the persistent epistemological gap between global climate governance and local interpretations of environmental change. Mozambique's national adaptation policies, aligned with international agendas, frame climate change through scientific metrics, technocratic planning, and donor priorities. By contrast, in Magude, climate is understood through ancestral rituals, everyday observation, and moral reasoning.

For many, droughts are not only meteorological failures but also spiritual disorders linked to neglected rituals or divine punishment. When rains failed, several elders explained the prolonged dryness as a sign that the community had not properly honoured the ancestors, while others saw it as evidence that younger generations were abandoning the practice of *ku palha*. In both cases, the lack of rain was interpreted less as a climatic anomaly than as a moral imbalance in the relationship between people, land, and the spiritual world. This disjuncture reveals that adaptation cannot be understood solely in terms of infrastructure or seed varieties, but must also account for cultural meaning, historical memory, and spiritual life (Crane et al. 2011; Orlove 2005).

The thesis also showed that climate change is never experienced in isolation from broader structural inequalities. Access to fertile land, water, credit, markets, and veterinary care is highly uneven, shaped by local socio-cultural structures, colonial legacies, post-independence reforms, and contemporary development pressures. Smallholders and women farmers often find themselves at the margins, while wealthy breeders, traders, and elites consolidate advantage. This structural dimension demonstrates that vulnerability is not only ecological but also politically produced, embedded in long-standing patterns of exclusion, patronage, and neglect.

By framing these dynamics through adaptation, resilience, local knowledge, and climate justice, the thesis contributes to critical debates on the human dimensions of climate change. Adaptation in Magude is revealed as a socially embedded process, marked by creativity and improvisation but constrained by historical and political-economic contexts. Resilience is not a neutral capacity to "bounce back" but a contested and costly practice, often borne disproportionately by the poor (Béné et al. 2012; Reid 2013). Local knowledge is more than a supplementary input; it is a holistic epistemology encompassing cosmology, ethics, and spirituality, which are often marginalised by technocratic adaptation frameworks and colonial history

(Bannister & Hardison, 2006; Jacka, 2016). And climate justice highlights the inequalities involved, emphasising that those least responsible for the crisis, such as smallholder farmers, herders and female traders, bear the greatest burdens, while elites reap the benefits (Whyte 2017; Sultana 2022).

This thesis is firmly situated within the emerging field of the anthropology of climate change, which uses ethnographic and culturally grounded methods to examine how climate change is interpreted, embodied, and acted upon in diverse contexts (Crate & Nuttall 2009; Hastrup 2013). By centring the lived experiences of farmers, herders, fishermen, and traders in Magude, it contributes to this field in several ways. First, it highlights how climate change is both a material disruption and a cultural and moral phenomenon, intricately entwined with cosmology, kinship, and memory. Second, it demonstrates how adaptation emerges not simply as a technical adjustment but as a socially embedded and politically mediated process, shaped by inequalities of land, gender, and power. Third, it highlights the epistemic tensions between global climate governance and local knowledge systems, adding to anthropological debates on knowledge pluralism and climate justice (Whyte 2017; Sultana 2022). In doing so, the thesis contributes to efforts within climate change anthropology to rehumanise the climate debate (Crate 2011: 176–179), by focusing on the everyday narratives, struggles, and practices of resilience in a region too often represented only through vulnerability statistics and disaster framings.

Ultimately, Magude is not only a site of loss but also of experimentation, reinvention, and quiet resistance. Across *kraals*, fields, forests, rivers, and markets, people are crafting responses that blend ancestral wisdom with new practices, mourning what has been eroded while nurturing what might endure. The future of Magude will not be determined solely by rainfall patterns or state projects; it will depend on the capacity of its people to navigate the intersection of climate, culture, and power.

References

American Anthropological Association (AAA). (2012). AAA statement on ethics: Principles of professional responsibility.

Abbas, M. (2022). Efeitos das mudanças climáticas nos sistemas de produção em Moçambique: Implicações para a segurança alimentar. Observador Rural, 123. Maputo: Observatório do Meio Rural (OMR).

Adefarakan, T. (2011). (Re)Conceptualizing "Indigenous" from anti-colonial and Black feminist theoretical perspectives: Living and imagining Indigeneity differently. In G. J. S. Dei (Ed.), Indigenous philosophies and critical education: A reader (pp. 34–52). New York, NY: Peter Lang. https://www.jstor.org/stable/42980883

Agadjanian, V., & Hayford, S. R. (2018). Men's migration, women's autonomy, and union dissolution in rural Mozambique. Journal of Family Issues, 39(5), 1236–1257. https://doi.org/10.1177/0192513X16653427

Agadjanian, V. (1999). As igrejas Zion no espaço sociocultural de Moçambique. Lusotopie 7, 415–437.

Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. Development and Change 26(3), 413–439. https://doi.org/10.1111/j.1467-7660.1995.tb00560.x

Agrawal, A. (2002). Indigenous knowledge and the politics of classification. International Social Science Journal, 54(173), 287–297. https://doi.org/10.1111/1468-2451.00382

Agrawal, A., & Perrin, N. (2009). Climate adaptation, local institutions and rural livelihoods. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien (Eds.), Adapting to climate change: Thresholds, values, governance (pp. 350–367). Cambridge: Cambridge University Press.

Agyeman, J., Bullard, R. D., & Evans, B. (2012). Joined-up thinking: Bringing together sustainability, environmental justice, and equity. In J. Agyeman, R. D. Bullard, & B. Evans (Eds.), Just sustainabilities: Development in an unequal world (pp. 1–16). London, UK: Routledge.

Ainslie, A. (2005). Farming cattle, cultivating relationships: Cattle ownership and cultural politics in Peddie District, Eastern Cape. Social Dynamics, 31(1), 129–156. https://doi.org/10.1080/02533950508628699

Ainslie, A. (2013). The sociocultural contexts and meanings associated with livestock keeping in rural South Africa. African Journal of Range & Forage Science, 30(1–2), 35–38. https://doi.org/10.2989/10220119.2013.770066

Aiuba, R. (2023). Instrumentos de política agrícola e a produção agrícola em Moçambique. Observador Rural, 139. Maputo: Observatório do Meio Rural (OMR).

Allina, E. (2014). "No real freedom for the natives": The men in the middle and critiques of colonial labor in Central Mozambique. Humanity, 3(3), 337–359. https://doi.org/10.1353/hum.2012.0012

Allison, E. H., & Ellis, F. (2001). The livelihoods approach and management of small-scale fisheries. Marine Policy, 25(5), 377–388. https://doi.org/10.1016/S0308-597X(01)00023-9
Almazán-Casali, S., Puga, B. P., & Lemos, M. C. (2021). Who governs at what price? Technocratic dominance, ways of knowing, and long-term resilience of Brazil's water system. Frontiers in Water, 3, 735018. https://doi.org/10.3389/frwa.2021.735018
Angelsen, A., & Wunder, S. (2003). *Exploring the forest–poverty link: Key concepts, issues and research implications.* Bogor, Indonesia: Center for International Forestry Research (CIFOR).
Anguelovski, I., & Martínez Alier, J. (2014). The "environmentalism of the poor" revisited: Territory and place in disconnected glocal struggles. Ecological Economics, 102, 167–176. https://doi.org/10.1016/j.ecolecon.2014.04.005
Arnaldo, C. (2002). Ethnicity and marriage patterns in Mozambique. African Population Studies, 19(1), 143–164.
Arnall, A. (2014). A climate of control: Flooding, displacement and planned resettlement in the Lower Zambezi Valley, Mozambique. The Geographical Journal, 180(2), 141–150.
Arndt, C., Strzepek, K., Tarp, F., Thurlow, J., Fant, C., & Wright, L. (2010). *Adapting to climate change: An integrated biophysical and economic assessment for Mozambique.* WIDER Working Paper 2010/101. Helsinki, Finland: United Nations University World Institute for Development Economics Research (UNU-WIDER).
Arnfred, S. (2015). Notas sobre gênero e modernização em Moçambique. Cadernos Pagu, 45, 181–224.
Arnold, M., Köhlin, G., Persson, R., & Shepherd, G. (2006). *Fuelwood revisited: What has changed in the last decade?* Bogor, Indonesia: Center for International Forestry Research (CIFOR).
Artur, L., & Hilhorst, D. (2012). Everyday realities of climate change adaptation in Mozambique. Global Environmental Change, 22(2), 529–536.
Aswani, S., Lemahieu, A., & Sauer, W. H. H. (2018). Global trends of local ecological knowledge and future implications. PLOS ONE, 13(4), e0195440. https://doi.org/10.1371/journal.pone.0195440
Atanassov, B., Fernandes, A., & Falcão, M. P. (2011). Manual de produção sustentável de carvão vegetal. Maputo: Universidade Eduardo Mondlane.
Atanassov, B., Fernandes, A., & Falcão, M. P. (2012). Produção sustentável de carvão vegetal em Moçambique. Maputo: Universidade Eduardo Mondlane.
Baer, H. A. (2008). Toward a critical anthropology on the impact of global warming on health and human societies. Medical Anthropology, 27(1), 2–8.
Baer, H. A., & Singer, M. (2018). The anthropology of climate change: An integrated critical perspective (2nd ed.). New York: Routledge.
Bagnol, B. (2008). Lovolo e espíritos no sul de Moçambique. Análise Social, 43(2), 251–272.
Bannister, K., & Hardison, P. (2006). Mobilizing traditional knowledge and expertise for decision-making on biodiversity. Bonn: German Federal Agency for Nature Conservation.
Barca, S. (2020). Forces of reproduction: Notes for a counter-hegemonic Anthropocene. Cambridge: Cambridge University Press.
Barnard, A. (2004). Indigenous peoples: A response to Justin Kenrick and Jerome Lewis. Anthropology Today, 20(5), 19–20.

Barrett, C. B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. Food Policy, 33(4), 299–317. https://doi.org/10.1016/j.foodpol.2007.10.007

Batterbury, S., & Ndi, F. (2018). Land-grabbing in Africa and the challenge of agrarian transition: A political ecology approach. In R. Hall, I. Scoones, & D. Tsikata (Eds.), Handbook of land and water grabs in Africa: Foreign direct investment and food and water security (pp. 55–68). London: Routledge.

Baumert, S., Luz, A. C., Fisher, J., Vollmer, F., Ryan, C. M., Patenaude, G., Zorrilla-Miras, P., Artur, L., Nhantumbo, I., & Macqueen, D. (2016). Charcoal supply chains from Mabalane to Maputo: Who benefits? Energy for Sustainable Development, 33, 129–138. https://doi.org/10.1016/j.esd.2016.06.003.

Béné, C., Godfrey Wood, R., Newsham, A., & Davies, M. (2012). *Resilience: New utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes.* IDS Working Paper 405. Brighton, UK: Institute of Development Studies (IDS). https://doi.org/10.1111/j.2040-0209.2012.00405.x

Berhe, M., & Butera, J.-B. (2012). Climate change and pastoralism: Traditional coping mechanisms and conflict in the Horn of Africa. Addis Ababa: Institute for Peace and Security Studies (IPSS).

Berkes, F. (2008). Sacred ecology: Traditional ecological knowledge and resource management (2nd ed.). New York: Routledge.

Berkes, F. (2009). Indigenous ways of knowing and the study of environmental change. Journal of the Royal Society of New Zealand, 39(4), 151–156.

Berkes, F., Colding, J., & Folke, C. (Eds.). (2003). Navigating social–ecological systems: Building resilience for complexity and change. Cambridge: Cambridge University Press.

Berkes, F., Mahon, R., McConney, P., Pollnac, R., & Pomeroy, R. (2001). Managing small-scale fisheries: Alternative directions and methods. Ottawa: International Development Research Centre (IDRC).

Bernard, H. R. (2017). Research methods in anthropology: Qualitative and quantitative approaches (6th ed.). Lanham: Rowman & Littlefield.

Bessa, I., Pinheiro, M., Matola, K., Dzama, A., Rocha, A., & Alexandrino, P. (2009). Genetic diversity and relationships among indigenous Mozambican cattle breeds. South African Journal of Animal Science, 39(1), 61–67.

Bhebhe, S. (2019). Understanding the traditional and contemporary purpose of the Njelele rainmaking shrine through the oral testimonies of local people in Matobo. Oral History Journal of South Africa, 7(2), 58–70.

Bollig, M., & Schulte, A. (1999). Environmental change and pastoral perceptions: Degradation and indigenous knowledge in two African pastoral communities. Human Ecology, 27(3), 493–514. https://doi.org/10.1023/A:1018783725398

Borras, S. M., & Franco, J. C. (2012). Global land grabbing and trajectories of agrarian change: A preliminary analysis. Journal of Agrarian Change, 12(1), 34–59. https://doi.org/10.1111/j.1471-0366.2011.00339.x

Bowen, M. L. (2000). The state against the peasantry: Rural struggles in colonial and postcolonial Mozambique. Charlottesville: University of Virginia Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brida, A., Owiyo, T., & Sokona, Y. (2013). Loss and damage from the double blow of flood and drought in Mozambique. International Journal of Global Warming, 5(4), 514–531.

Briggs, C. L. (1986). Learning how to ask: A sociolinguistic appraisal of the role of the interview in social science research. Cambridge: Cambridge University Press.
Brouwer, R., & Falcão, M. P. (2004). Wood fuel consumption in Maputo, Mozambique. Biomass and Bioenergy, 27(3), 233–245. https://doi.org/10.1016/j.biombioe.2003.11.001
Buur, L., & Kyed, H. M. (2005). State recognition of traditional authority in Mozambique: The nexus of community representation and state assistance. Uppsala: Nordic Africa Institute.
Buur, L., & Kyed, H. M. (2006). Contested sources of authority: Re-claiming state sovereignty by formalising traditional authority in Mozambique. Development and Change, 37(4), 847–869. https://doi.org/10.1111/j.1467-7660.2006.00504.x
Cambaza, V. V. M. (2009, April 23). A Lei de Terras, de Minas e Sistema de Direitos Consuetudinários. Comunicação apresentada na II Conferência do IESE, Maputo, Moçambique.
Carr, E. R., & Thompson, M. C. (2014). Gender and climate change adaptation in agrarian settings: Current thinking, new directions, and research frontiers. Geography Compass, 8(3), 182–197. https://doi.org/10.1111/gec3.12121
Cavanagh, C. J. (2014). Biopolitics, environmental change, and development studies. Forum for Development Studies, 41(2), 273–294. https://doi.org/10.1080/08039410.2014.905387
Cerwonka, A., & Malkki, L. H. (2007). Improvising theory: Process and temporality in ethnographic fieldwork. Chicago: University of Chicago Press.
CFSPH. (2023). Theileriosis: Theileria parva and Theileria annulata. Ames: Center for Food Security and Public Health, Iowa State University. Retrieved from https://cfsph.iastate.edu
Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Brighton: Institute of Development Studies.
Chambote, R., & Shankland, A. (2011). Mozambique PECC main final report. Maputo: IESE.
Chandamela, M. (2020). Cobertura florestal na província de Maputo (Destaque Rural No. 85). Maputo: Instituto para a Democracia Multipartidária (IDM).
Chilundo, A., Cau, B., Mubai, M., Malauene, D., & Muchanga, V. (2005). *Land registration in Nampula and Zambezia provinces, Mozambique*. Research Report 6. London, UK: International Institute for Environment and Development (IIED).
Chipeta, M. M., & Bokosi, J. M. (2013). Status of cassava (Manihot esculenta) production and utilization in Malawi. International Journal of Agronomy and Plant Production, 4(S), 3637–3644.
Christiansen, C., Utas, M., & Vigh, H. E. (Eds.). (2006). Navigating youth, generating adulthood: Social becoming in an African context. Uppsala: The Nordic Africa Institute.
Christie, F., & Hanlon, J. (2001). Mozambique and the great flood of 2000. Oxford: James Currey.
Clapham, C. (1996). Africa and the international system: The politics of state survival. Cambridge: Cambridge University Press.
Club of Mozambique. (2016, February 17). 4,300 cattle lost to drought in southern Mozambique. Club of Mozambique. https://clubofmozambique.com/news/4300-cattle-lost-to-drought-in-southern-mozambique/

Club of Mozambique. (2019). Chibuto on alert in face of theileriosis outbreak. Retrieved from https://clubofmozambique.com
Coertze, R. D. (1986). Livestock in the social and cultural life of African communities. South African Journal of Ethnology, 9(3), 109–118.
Cornwall, A. (2003). Whose voices? Whose choices? Reflections on gender and participatory development. World Development, 31(8), 1325–1342. https://doi.org/10.1016/S0305-750X(03)00086-X
Covane, L. (2001). Southern Mozambique: Migrant labour and post-independence challenges. In C. de Wet (Ed.), Transforming settlement in Southern Africa (pp. 155–178). Edinburgh: Edinburgh University Press.
Crane, T. A., Roncoli, C., & Hoogenboom, G. (2011). Adaptation to climate change and climate variability: The importance of understanding agriculture as performance. NJAS - Wageningen Journal of Life Sciences, 57(3–4), 179–185. https://doi.org/10.1016/j.njas.2010.11.002
Crate, S. A. (2016). Gone with cows and kin? Climate, globalization, and youth alienation in Siberia. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed., pp. 141–161). New York: Routledge.
Crate, S. A., & Nuttall, M. (Eds.). (2009). Anthropology and climate change: From encounters to actions. Walnut Creek, CA: Left Coast Press.
Creswell, J. W. (2013). Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). Thousand Oaks, CA: Sage.
Cuvilas, C. A., Jirjis, R., & Lucas, C. (2010). Energy situation in Mozambique: A review. Renewable and Sustainable Energy Reviews, 14(7), 2139–2146. https://doi.org/10.1016/j.rser.2010.02.002
Dahlström, Å. (2009). The two-way appropriation of indigenous knowledge: Environmental management policies and the Laponia process. Journal of Northern Studies, 3(2), 39–54.
Dankelman, I. (Ed.). (2010). Gender and climate change: An introduction. London: Earthscan.
de Quadros, M. (2003). Current land policy issues in Mozambique. Maputo: Universidade Eduardo Mondlane.
de Schutter, O. (2010). Agroecology and the right to food. Report presented to the UN Human Rights Council, A/HRC/16/49. Geneva: United Nations.
De Vletter, F. (2007). Migration and development in Mozambique: Poverty, inequality and survival. Development Southern Africa, 24(1), 137–153. https://doi.org/10.1080/03768350601165949
Denzin, N. K., & Lincoln, Y. S. (Eds.). (2011). The SAGE handbook of qualitative research (4th ed.). Thousand Oaks, CA: Sage.
Devereux, S., & Hoddinott, J. (1992). Fieldwork in developing countries. Boulder, CO: Lynne Rienner Publishers.
Dewan, C. (2021). Misreading the Bengal Delta: Climate change, development, and livelihoods in coastal Bangladesh. Seattle: University of Washington Press.
Direito, B. (2021). Pecuária e saúde veterinária no sul de Moçambique no começo do século XX: Um olhar a partir do combate à East Coast fever. História, Ciências, Saúde – Manguinhos, 28(4), 939–959. https://doi.org/10.1590/S0104-59702021000400003
Direito, B. (2022). A livestock country cannot be improvised: Cattle improvement, economic ambitions, and the environment in southern Mozambique, 1910s–1940s. South African Historical Journal, 74(2), 205–230. https://doi.org/10.1080/02582473.2022.2064909

Disaster Recovery Framework (DRF). (2014). Recovery from recurrent floods 2000–2013: Recovery framework case study. Maputo: Disaster Recovery Framework

Dixon, R. (2013). *Baseline household survey results: Chicualacuala District, Mozambique.* Maputo, Mozambique: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) / International Union for Conservation of Nature (IUCN).

Djoudi, H., Locatelli, B., Vaast, C., Asher, K., Brockhaus, M., & Basnett Sijapati, B. (2016). Beyond dichotomies: Gender and intersecting inequalities in climate change studies. Ambio, 45(Suppl. 3), S248–S262. https://doi.org/10.1007/s13280-016-0825-2

Droppelmann, K., Günther, P., Kamm, F., Rippke, U., & Voigt, C., et al. (2018). Cassava, the 21st century crop for smallholders? Exploring innovations along the livelihood-value chain nexus in Malawi. SLE Publication Series S 274. Berlin: Centre for Rural Development (SLE), Humboldt-Universität.

DWAF, & AfriDev. (2004). Komati catchment ecological water requirements study: Main report. Pretoria: Department of Water Affairs and Forestry, South Africa. https://www.dws.gov.za/wem/WRCS/doc/Reserve%20Report_Main_Komati.pdf

Eckstein, D., Künzel, V., & Schäfer, L. (2021). Global Climate Risk Index 2021: Who suffers most from extreme weather events? Weather-related loss events in 2019 and 2000–2019. Bonn: Germanwatch. https://www.germanwatch.org/en/cri

Ehlert, J. (2007). Local and global knowledge on flood management: How can local knowledge contribute to resilience in the Mekong Delta, Vietnam? Interdisciplinary Term Paper, Bonn International Graduate School for Development Research (BIGS-DR), Center for Development Research (ZEF), University of Bonn.

Ekblom, A. (2018). A historical ecology of cattle in Mozambique. In A. Ekblom, At nature's edge (pp. 81–104). Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780199489077.003.0004

Ekblom, A., Gillson, L., & Notelid, M. (2017). Waterflow, landscape dynamics and water-management of the lower Limpopo. Wiley Interdisciplinary Reviews: Water, 4(6), e1228.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). Writing ethnographic fieldnotes (2nd ed.). Chicago: University of Chicago Press.

Ensor, J., & Berger, R. (2009). Community-based adaptation and culture in theory and practice. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien (Eds.), Adapting to climate change: Thresholds, values, governance (pp. 227–239). Cambridge: Cambridge University Press.

Eriksen, S. H., Nightingale, A. J., & Eakin, H. (2015). Reframing adaptation: The political nature of climate change adaptation. Global Environmental Change, 35, 523–533. https://doi.org/10.1016/j.gloenvcha.2015.09.014

Eriksen, S., & Silva, J. A. (2009). The vulnerability context of a savanna area in Mozambique: Household drought coping strategies and responses to economic change. Environmental Science & Policy, 12, 33–52.

Escobar, A. (1995). Encountering development: The making and unmaking of the Third World. Princeton, NJ: Princeton University Press.

Escobar, A. (1999). After nature: Steps to an anti-essentialist political ecology. Current Anthropology, 40(1), 1–30.

Fairhead, J., & Leach, M. (1995a). False forest history, complicit social analysis: Rethinking some West African environmental narratives. World Development, 23(6), 1023–1035. https://doi.org/10.1016/0305-750X(95)00026-7
Fairhead, J., & Leach, M. (1995b). Reading forest history backwards: Guinea's forest–savanna mosaic, 1893–1993. Environment and History, 1(1), 55–91.
Falcão, M. P. (2013). Produção e consumo de carvão vegetal em Moçambique: Oportunidades para uma transição para fontes de energia sustentáveis. Maputo: Universidade Eduardo Mondlane.
Falcão, M., Fernandes, E., & Atanassov, B. (2011). Charcoal production and environmental degradation in Mozambique: A case study of Magude District. Journal of Environmental Management, 45(3), 123–135.
Farré, A. (2009). Formas de investimento das poupanças no local de origem por emigrantes do sul de Moçambique: O caso do distrito de Massinga (Inhambane). In L. de Brito, C. N. Castel-Branco, S. Chichava, & A. Francisco (Eds.), Protecção social: Abordagens, desafios e experiências para Moçambique (pp. 219–240). Maputo: Instituto de Estudos Sociais e Económicos.
Farré, A. (2013). A broken link: Two generations in a rural household in Massinga district, southern Mozambique. Anthropology Southern Africa, 36(3–4), 124–129.
Farré, A. (2016). Ruinas y legitimidad en Massinga. Formas de pensar el pasado entre ancianos empobrecidos del sur de Mozambique. Revista de Antropología Social, 25(2), 361–387.
Farré, A. (2017). Mobility and labour regimes in Southern Africa: From mobile workers to workers on the move. A perspective from Mozambique. Quaderns, 33, 169–186.
Feliciano, J. F. (1998). Antropologia económica dos Thonga do sul de Moçambique (Vol. 12). Maputo: Arquivo Histórico de Moçambique.
Ferguson, J. (1994). The anti-politics machine: Development, depoliticization, and bureaucratic power in Lesotho. University of Minnesota Press.
Fernández-Giménez, M. E. (2000). The role of Mongolian nomadic pastoralists' ecological knowledge in rangeland management. Ecological Applications, 10(5), 1318–1326.
FEWS NET. (2003, July 29). Actualização da segurança alimentar, Moçambique. Maputo: FEWS NET.
Filipe, E., & Norfolk, S. (2017). Understanding changing land issues for the rural poor in Mozambique. London: International Institute for Environment and Development.
Finan, T. J., & Rahman, M. A. (2016). Storm warnings: An anthropological focus on community resilience in the face of climate change in southern Bangladesh. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed., pp. 171–193). New York: Routledge.
Fiske, S. J., Crate, S. A., Crumley, C. L., Galvin, K., Lazrus, H., Luber, G., Lucero, L., Oliver-Smith, A., Orlove, B., Strauss, S., & Wilk, R. R. (2014). *Changing the atmosphere: Anthropology and climate change.* Final report of the American Anthropological Association Global Climate Change Task Force. Arlington, VA: American Anthropological Association.
Florêncio, F. (2008). As autoridades tradicionais vaNdau de Moçambique: O regresso do indirect rule ou uma espécie de neo-indirect rule? Análise Social, 43(187), 369–391.

Food and Agriculture Organization (FAO). (2014). The role of producer organizations in reducing food loss and waste. Rome: FAO.
Food and Agriculture Organization (FAO). (2017). The charcoal transition: Greening the charcoal value chain to mitigate climate change and improve local livelihoods. Rome: FAO.
Food and Agriculture Organization (FAO). (2018). The impact of disasters and crises on agriculture and food security: 2017. Rome: FAO.
Food and Agriculture Organization (FAO). (2018). The state of food security and nutrition in the world: Building climate resilience for food security and nutrition. Rome: FAO.
Food and Agriculture Organization (FAO). (2022). Impact of the 2015–2016 El Niño-induced drought on Southern Africa's livestock sector. Rome: FAO. https://openknowledge.fao.org
Funada-Classen, S. (2012). The origins of war in Mozambique: A history of unity and division. Cape Town: African Minds.
Furquim, F. M. (2016). A permanência do lobolo e a organização social no sul de Moçambique. *Revista Cantareira, 25,* 5–15.
Galiè, A., Teufel, N., Korir, L., Baltenweck, I., Webb Girard, A., Dominguez-Salas, P., & Yount, K. M. (2019). The Women's Empowerment in Livestock Index. Social Indicators Research, 142(3), 799–825. https://doi.org/10.1007/s11205-018-1934-z
Galvin, K. A. (2009). Transitions: Pastoralists living with change. Annual Review of Anthropology, 38, 185–198. https://doi.org/10.1146/annurev-anthro-091908-164442
Governo do Distrito de Magude (GDM). (2012). Relatório de actividades desenvolvidas no distrito de Magude de janeiro a dezembro de 2012. Magude: GDM.
Governo do Distrito de Magude (GDM). (2015). Plano Local de Adaptação face às Mudanças Climáticas (PLA). Magude: GDM.
Governo do Distrito de Magude (GDM). (2016). Relatório das actividades desenvolvidas pelo governo distrital no período de janeiro a dezembro de 2015. Magude: GDM.
Governo do Distrito de Magude (GDM). (2023). Balanço de avaliação da implementação do plano económico, social e orçamento do distrito, durante o trimestre de 2023. Magude: GDM.
Goldman, M. J., Nadasdy, P., & Turner, M. D. (Eds.). (2011). Knowing nature: Conversations at the intersection of political ecology and science studies. Chicago: University of Chicago Press.
Gómez-Baggethun, E., Corbera, E., & Reyes-García, V. (2013). Traditional ecological knowledge and global environmental change: Research findings and policy implications. Ecology and Society, 18(4), 72. http://dx.doi.org/10.5751/ES-06288-180472
Gonçalves, E. (2006). Local powers and decentralisation: Recognition of community leaders in Mocumbi, Southern Mozambique. Journal of Contemporary African Studies, 24(1), 29–52.
Grove, K. (2014). Biopolitics and adaptation: Governing socio-ecological contingency through climate change and disaster studies. Geography Compass, 8(3), 198–210.
Guerra Hernandez, H. (2015). Foreign invasions and the formation of the State in southern Mozambique. África, 35, 19–55. https://doi.org/10.11606/issn.2526-303X.v0i35p19-55

Gupta, A. (1995). Blurred boundaries: The discourse of corruption, the culture of politics, and the imagined state. American Ethnologist, 22(2), 375–402.
Hall, R. (2011). Land grabbing in Southern Africa: The many faces of the investor rush. Review of African Political Economy, 38(128), 193–214.
Haller, T. (2007). *Understanding institutions and their links to resource management from the perspective of new institutionalism* (2nd ed.). NCCR North-South Dialogue, No. 2. Bern, Switzerland: NCCR North-South, Swiss National Centre of Competence in Research (SNSF). https://doi.org/10.7892/boris.52831.
Haller, T. (2010). Institutional change, power and conflicts in the management of common-pool resources in African floodplain ecosystems: An introduction. In T. Haller (Ed.), Disputing the floodplains: Institutional change and the politics of resource management in African wetlands (pp. 1–64). Leiden: Brill.
Hannaford, M. J., & Nash, D. (2016). Climate, history, society over the last millennium in Southeast Africa. Wiley Interdisciplinary Reviews: Climate Change, 7(3), 370–392. https://doi.org/10.1002/wcc.389
Hara, M., Turner, S., Haller, T., & Matose, F. (2009). Governance of the commons in southern Africa: Knowledge, political economy and power. Development Southern Africa, 26(4), 521–537. https://doi.org/10.1080/03768350903181324
Harding, S. (2015). Objectivity and diversity: Another logic of scientific research. Chicago: University of Chicago Press.
Harries, P. (1994). Work, culture and identity: Migrant laborers in Mozambique and South Africa, c. 1860–1910. Oxford: James Currey.
Helpcode. (2023). Annual Report 2023. Genoa, Italy: Helpcode Italia ETS. Available at https://helpcode.org
Henshaw, A. (2016). Fostering resilience in a changing sea-ice context: A grant maker's perspective. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed., pp. 281–299). London: Routledge.
Hermele, K. (1988). Land struggles and social differentiation in Southern Mozambique: A case study of Lower Limpopo. Uppsala: Scandinavian Institute of African Studies.
Herskovits, M. J. (1926). The cattle complex in East Africa. American Anthropologist, 28(3), 439–483.
Hoegh-Guldberg, O., Jacob, D., Taylor, M., Bindi, M., Brown, S., et al. (2018). Impacts of 1.5° C global warming on natural and human systems. In V. Masson-Delmotte & P. Zhai (Eds.), Global warming of 1.5°C (pp. 175–311). Geneva: World Meteorological Organization.
Human Rights Watch. (1998). Prohibited persons: Abuse of undocumented migrants, asylum seekers, and refugees in South Africa. New York: Human Rights Watch.
Humbane, J. (2008). O papel dos rituais na construção da identidade: Caso do ritual Mhamba. Undergraduate thesis. Universidade Eduardo Mondlane, Maputo, Mozambique.
Hungwe, B. (2013, December 18). Zimbabwe farmers benefit from cattle collateral. BBC News. https://www.bbc.com/news/world-africa-25156209
International Food Policy Research Institute (IFPRI). (2023). From climate risk to resilience: Unpacking the economic impacts of climate change in Mozambique. Washington, DC: IFPRI.

International Institute for Environment and Development (IIED). (2022). Lessons learned from the implementation of Local Adaptation Plans in Mozambique: Using the TRACTION framework to systematise learning on climate adaptation competences in Mozambique. London: IIED.
Ikdahl, I., Hellum, A., Kaarhus, R., & Benjaminsen, T. A. (2005). Human rights, formalisation and women's land rights in Southern and Eastern Africa. Noragric Report 26. Ås: Noragric, Norwegian University of Life Sciences.
Instituto Nacional de Estatística (INE). (2022). Estatísticas do distrito de Magude, 2017–2021. Maputo: INE.
Instituto Nacional de Gestão de Calamidades (INGC). (2009). Main report: INGC climate change report. Study on the impact of climate change on disaster risk in Mozambique (K. Asante, G. Brundrit, P. Epstein, A. Fernandes, M. R. Marques, A. Mavume, M. Metzger, A. Patt, A. Queface, R. Sanchez del Valle, M. Tadross, & R. Brito, Eds.). Maputo: INGC.
Instituto Nacional de Gestão de Calamidades (INGC). (2017). Estudo sobre o impacto das alterações climáticas no risco de calamidades em Moçambique: Relatório síntese (2ª versão). Maputo: INGC.
Instituto Nacional de Gestão de Desastres (INGD). (2017). Relatório de avaliação de vulnerabilidade às mudanças climáticas em Moçambique. Maputo: INGD.
Intergovernmental Panel on Climate Change (IPCC). (2001). Climate change 2001: Impacts, adaptation, and vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change (J. J. McCarthy, O. F. Canziani, N. A. Leary, D. J. Dokken, & K. S. White, Eds.). Cambridge: Cambridge University Press.
Intergovernmental Panel on Climate Change (IPCC). (2019). Special report on climate change and land. Geneva: IPCC.
Intergovernmental Panel on Climate Change (IPCC). (2021). Climate change 2021: The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.
Iphofen, R. (2015). Research ethics in ethnography/anthropology. Brussels: European Commission. https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/ethics-guide-ethnog-anthrop_en.pdf
Jacka, J. K. (2016). Correlating local knowledge with climatic data: Porgeran experiences of climate change in Papua New Guinea. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed., pp. 185–199). New York: Routledge.
Joaquim, J. M. M., Mosca, J., & Sampaio, A. (2022). Mudanças nos padrões tradicionais de exploração da terra e do trabalho: O caso da açucareira de Xinavane em Moçambique. *Brazilian Journal of Development, 8*(7), 49052–49090. https://doi.org/10.34117/bjdv8n7-028.
Jossias, E. (2022). Renegociar a comunidade e disputar territórios: Posse e propriedade nas terras comunitárias do Lago Niassa. Etnográfica, 26(1), 117–136.
Junod, H. (1996). Usos e costumes do bantu (Vol. 2). Maputo: Arquivo Histórico de Moçambique. (First published in 1912).
Kaarhus, R., & Dondeyne, S. (2015). Formalising land rights based on customary tenure: Community delimitation and women's access to land in central Mozambique. The Journal of Modern African Studies, 53(2), 193–216.

Kariuki, J., Njuki, J., & Mburu, S. (2018). Gender and livestock: Key issues, evidence, and gaps. Rome: Food and Agriculture Organization of the United Nations (FAO).
Khan, M. R., & Roberts, J. T. (2013). Adaptation and international climate policy. Wiley Interdisciplinary Reviews: Climate Change, 4(3), 171–189. https://doi.org/10.1002/wcc.212
Kimando, L. N., Njogu, G. W., & Kihoro, J. M. (2012). Factors affecting the success of youth enterprise development funded projects in Kenya: A survey of Kigumo District, Murang'a County. International Journal of Business and Commerce, 1(10), 61–81.
Klenk, N., Fiume, A., Meehan, K., & Gibbes, C. (2017). Local knowledge in climate adaptation research: Moving knowledge frameworks from extraction to co production. *Wiley Interdisciplinary Reviews: Climate Change, 8*(5), e475. https://doi.org/10.1002/wcc.475
Kobwa. (2022). Organisational strategy 2022–23 to 2024–26. Manzini: Komati Basin Water Authority (KOBWA). https://www.kobwa.co.za/about/strategy/Organisational_Strategy_2022-23_to_2024-26.pdf
Köcke, S. (2019). The perception of cassava in Malawi: A literature study about a root crop's implication on food security in the past and the present (Master's thesis, Uppsala University, Department of Archaeology and Ancient History). Uppsala: Uppsala University.
Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, I., Grace, D., & MacMillan, S. (2014). Livestock and women's livelihoods: A review of the recent evidence. In A. R. Quisumbing, R. Meinzen-Dick, T. L. Raney, A. Croppenstedt, J. A. Behrman, & A. Peterman (Eds.), Gender in agriculture: Closing the knowledge gap (pp. 209–233). Dordrecht: Springer. https://doi.org/10.1007/978-94-017-8616-4_9
KULIMA – Organização para o Desenvolvimento Sócio-Económico Integrado. (2022). *Relatório anual de actividades 2021: O segundo ano da pandemia COVID-19, o ano da reconstrução após emergência do ciclone Idai e Kenneth, o ano da emergência social com a instabilidade de guerra no norte.* Maputo, Moçambique: KULIMA
Kuper, A. (2003). The return of the native. Current Anthropology, 44(3), 389–402. https://doi.org/10.1086/368120
Langa, A. (1992). Questões cristãs à religião tradicional africana. Braga: Editorial Franciscana.
Lanzano, C. (2013). What kind of knowledge is 'indigenous knowledge'? Critical insights from a case study in Burkina Faso. Transcience, 4(2), 16–33.
Lavrillier, A., & Gabyshev, S. (2018). An emic science of climate: Reindeer Evenki environmental knowledge and the notion of an "extreme process." Études mongoles et sibériennes, centrasiatiques et tibétaines, 49. https://doi.org/10.4000/emscat.3280
Lawrence, D., & Vandecar, K. (2015). Effects of tropical deforestation on climate and agriculture. Nature Climate Change, 5, 27–36. https://doi.org/10.1038/nclimate2430
Lemi, T. (2019). The role of traditional ecological knowledge (TEK) for climate change adaptation. International Journal of Environmental Sciences & Natural Resources, 18(1), 28–34. https://doi.org/10.19080/IJESNR.2019.18.555980

Levy, C., Webster, E., & Kaufmann, B. (2012). *Socio-spatial organization and present-day vulnerability of peasant communities in Mabalane District, Mozambique*. Conference Paper 15. In *III Conferência Internacional do IESE: Moçambique – Acumulação e Transformação em Contexto de Crise Internacional* (Maputo, 4–5 September 2012). Maputo, Moçambique: Instituto de Estudos Sociais e Económicos (IESE).
Li, T. M. (2007). The will to improve: Governmentality, development, and the practice of politics. Durham, NC: Duke University Press.
Liesegang, G. (1970). Nguni migrations between Delagoa Bay and the Zambezi, 1821–1839. African Historical Studies, 3(2), 317–337. https://doi.org/10.2307/216219
Liesegang, G. (1996). A história de Gaza: Da formação do Estado à pacificação colonial (1821–1897). Maputo: Arquivo Histórico de Moçambique.
Litsure, H. (2020). A identidade Tsonga-Changana no contexto da identidade nacional moçambicana: Construção e representação. Maputo: Universidade Eduardo Mondlane.
Little, P. D., Smith, K., Cellarius, B. A., Coppock, D. L., & Barrett, C. B. (2001). Avoiding disaster: Diversification and risk management among East African herders. *Development and Change, 32*(3), 401–433. https://doi.org/10.1111/1467-7660.00211
Lubkemann, S. C. (2009). From circular migrants in the mines to transnational polygynists in the townships: A century of transformation in central Mozambican male migration regimes (1900–1999). International Migration, 47(3), 51–92. https://doi.org/10.1111/j.1468-2435.2008.00504.x
Mabhaudhi, T., Chimonyo, V. G., Hlahla, S., Massawe, F., Mayes, S., Nhamo, L., & Modi, A. T. (2019). Prospects of orphan crops in climate change adaptation and food security in Southern Africa. Nutrients, 11(1), 272. https://doi.org/10.3390/nu11010272
Mabote, A. (2011). Avaliação do impacto da comercialização do carvão vegetal: Estudo de caso em Moçambique. Maputo: Universidade Eduardo Mondlane.
Macaringue, I. (2021). A prevalência do direito formal sobre o direito costumeiro: Considerações para a actual revisão da Política Nacional de Terras. *Destaque Rural, 148.* Maputo, Moçambique: Observatório do Meio Rural (OMR).
MacGregor, S. (2010). 'Gender and climate change': From impacts to discourses. Journal of the Indian Ocean Region, 6(2), 223–238. https://doi.org/10.1080/19480881.2010.536669
Maciel, A. (2000). Caracterização da raça bovina Landim em Moçambique. Maputo: Ministério da Agricultura.
Ministério da Agricultura e Desenvolvimento Rural (MADER). (2021). Inquérito Agrário Integrado 2020. Maputo: MADER.
Ministério da Administração Estatal (MAE). (2005). Perfil do distrito de Magude, província de Maputo. Maputo: MAE.
Magis, K. (2010). Community resilience: An indicator of social sustainability. Society & Natural Resources, 23(5), 401–416. https://doi.org/10.1080/08941920903305674
Mahumane, J. A. (2015). "Marido espiritual": Possession and symbolic violence in southern Mozambique (Doctoral dissertation). University of Lisbon, Institute of Social Sciences, Lisbon, Portugal.
Makondo, C. C., & Thomas, D. S. G. (2018). Climate change adaptation: Linking Indigenous knowledge with Western science for effective adaptation. Environmental Science & Policy, 88, 83–91. https://doi.org/10.1016/j.envsci.2018.06.014

Malate, J. (2017). As transformações socioeconómicas e ambientais da produção de carvão vegetal em Moçambique. Maputo: Universidade Eduardo Mondlane.
Mandamule, U. (2018). Entre o discurso e a prática: Mitos e realidades sobre o acesso à terra em Moçambique. Destaque Rural, 40. Maputo: Observatório do Meio Rural (OMR).
Mandamule, U. A. (2017). Discursos sobre o regime de propriedade da terra em Moçambique. Revista NERA, 20(38), 152–175. https://doi.org/10.47946/rnera.v0i38.4191
Manning, C. (2010). Bilateral donors and aid conditionality in post-conflict peacebuilding: The case of Mozambique. Journal of Modern African Studies, 48(1), 143–169. https://doi.org/10.1017/S0022278X09990207
Martínez-Alier, J. (2002). The environmentalism of the poor: A study of ecological conflicts and valuation. Cheltenham: Edward Elgar.
Masih, I., Maskey, S., Mussá, F. E. F., & Trambauer, P. (2014). A review of droughts on the African continent: A geospatial and long-term perspective. Hydrology and Earth System Sciences, 18(9), 3635–3649. https://doi.org/10.5194/hess-18-3635-2014
Massé, F., & Lunstrum, E. (2016). Accumulation by securitization: Commercial poaching, neoliberal conservation, and the creation of new wildlife frontiers. Geoforum, 69, 227–237. https://doi.org/10.1016/j.geoforum.2015.03.005
Mather, D. (2009). *Measuring the impact of public and private assets on household crop income in rural Mozambique, 2002–2005.* Research Report No. 67. Maputo, Mozambique: Ministry of Agriculture, Directorate of Economics.
Matyas, C. J., & Silva, J. A. (2013). Extreme weather and economic well-being in rural Mozambique. Natural Hazards, 66, 31–49. https://doi.org/10.1007/s11069-012-0156-9
Mauss, M. (1990 [1925]). The gift: The form and reason for exchange in archaic societies. New York: W. W. Norton.
Mavhura, E. (2020). Disaster risk reduction in Southern Africa: Perspectives from Mozambique and Zimbabwe. Cham: Springer. https://doi.org/10.1007/978-3-030-51791-3
Mbiti, J. S. (2015). Introduction to African religion (2nd ed.). Long Grove, IL: Waveland Press.
McPeak, J. G., & Doss, C. R. (2006). Are household production decisions cooperative? Evidence on pastoral migration and milk sales from Northern Kenya. American Journal of Agricultural Economics, 88(3), 525–541. https://doi.org/10.1111/j.1467-8276.2006.00877.x
Mdoda, L. (2025). Impact of livestock theft on the welfare of smallholder livestock farmers in Nyandeni Local Municipality, Eastern Cape Province. South African Journal of Agricultural Extension, 53(2), 61–81. https://doi.org/10.17159/2413-3221/2025/v53n2a15998
Meneses, M. P., & Santos, B. de Sousa. (2009). Mozambique: The rise of a micro dual state. Africa Development, 34(2–4), 129–166.
Mercandalli, S., & Anseeuw, W. (2017). Migration and resilience of rural households' livelihoods in the face of changing political and economic contexts: The case of South Mozambique (1900–2010). African Studies, 76(2), 221–242. https://doi.org/10.1080/00020184.2017.1309500
Ministério para a Coordenação da Acção Ambiental (MICOA). (2007). Programa de acção nacional para a adaptação às mudanças climáticas (NAPA). Maputo: MICOA.

Ministério para a Coordenação da Acção Ambiental (MICOA). (2012). Estratégia nacional de adaptação e mitigação de mudanças climáticas (ENAMMC) 2013–2025. Maputo: MICOA.
Ministério da Terra, Ambiente e Desenvolvimento Rural (MITADER). (2018). Plano de operacionalização da NDC de Moçambique: 2020–2025. Maputo: MITADER.
Mkutu, K. (2019). Pastoralists, politics and development projects: Understanding the layers of armed conflict in Isiolo County, Kenya. BICC Working Paper No. 7. Bonn: Bonn International Center for Conversion (BICC).
Mohanty, S., & Subhadra, S. (2023). Climate justice: An integral aspect of environmental anthropology—An Indian perspective. In T. Pradhan et al. (Eds.), Proceedings of the World Anthropology Congress 2023 (WAC 2023) (pp. 149–158). Advances in Social Science, Education and Humanities Research (Vol. 821). Paris: Atlantis Press. https://doi.org/10.2991/978-2-38476-192-0_16
Morton, J. (2007). The impact of climate change on smallholder and subsistence agriculture. Proceedings of the National Academy of Sciences, 104(50), 19680–19685. https://doi.org/10.1073/pnas.0701855104
Mosca, J. (2024). Sector familiar: O que fazer? Observador Rural, 270. Maputo: Observatório do Meio Rural (OMR).
Mosse, D. (2005). Cultivating development: An ethnography of aid policy and practice. London: Pluto Press.
Mozambican Republic. (1997). Mozambique's Land Law. Law 19/97 of October 1. Maputo: Government of Mozambique.
Msila, V. (2021). Indigenous feminism and Black women leadership. Sociology and Anthropology, 9(4), 42–51. https://doi.org/10.13189/sa.2021.090402
Ministério da Terra e Ambiente (MTA). (2022). Plano nacional de adaptação (NAP). Maputo: MTA.
Muanamoha, R. C., Maharaj, B., & Preston-Whyte, E. (2010). Social networks and undocumented Mozambican migration to South Africa. Geoforum, 41(6), 885–896. https://doi.org/10.1016/j.geoforum.2010.06.002
Muanamoha, R. C. (2008). The dynamics of undocumented Mozambican labour migration to South Africa. Doctoral dissertation, University of KwaZulu-Natal. Durban: University of KwaZulu-Natal. https://researchspace.ukzn.ac.za/handle/10413/7644
Mukamuri, B. B. (1995). Local environmental conservation strategies: Karanga religion, politics and environmental control. Environment and History, 1(3), 297–311. https://www.jstor.org/stable/20722987
Myers, G. W., Eliseu, S., & Nhachungue, E. (1994). Security, conflict, and reintegration in Mozambique: Case studies of land access in the postwar period. Oxford: Refugee Studies Programme, University of Oxford.
Nadasdy, P. (1999). The politics of TEK: Power and the "integration" of knowledge. Arctic Anthropology, 36(1–2), 1–18.
Naess, L. O. (2013). The role of local knowledge in adaptation to climate change. Wiley Interdisciplinary Reviews: Climate Change, 4(2), 99–106.
Negrão, J. (2000). Sistemas costumeiros da terra em Moçambique. In M. Santos & A. Trindade (Eds.), Conflito e transformação social: Uma paisagem das justiças em Moçambique (Vol. 2, pp. 10.1–10.43). Maputo: CEA/CES.
Newitt, M. (1995). A history of Mozambique. Bloomington: Indiana University Press.
Newitt, M. (2017). A short history of Mozambique. Oxford: Oxford University Press.

Nhantumbo, I., & Salomão, A. (2010). Biofuels, land access, and rural livelihoods in Mozambique. London: International Institute for Environment and Development (IIED).
Nicholson, S. E. (2014). A detailed look at the recent drought situation in the Greater Horn of Africa. Journal of Arid Environments, 103, 71–79.
Nightingale, A. J. (2011). Bounding difference: Intersectionality and the material production of gender, caste, class and environment in Nepal. Geoforum, 42(2), 153–162. https://doi.org/10.1016/j.geoforum.2010.03.004
Nixon, R. (2011). Slow violence and the environmentalism of the poor. Cambridge, MA: Harvard University Press.
Njuki, J., Waithanji, E., Sakwa, B., Kariuki, J., Mukewa, E., & Ngige, J. (2011). A qualitative assessment of gender and irrigation technology in Kenya and Tanzania. Gender, Technology and Development, 15(2), 153–174. https://doi.org/10.1177/097185241101500202
Norfolk, S., & Hanlon, J. (2012). Confrontation between peasant producers and investors in northern Zambézia, Mozambique: The experience of the Fórum Terra. London: International Institute for Environment and Development (IIED).
Norfolk, S., & Tanner, C. (2007). Improving tenure security for the rural poor: Mozambique country case study. Rome: Food and Agriculture Organization of the United Nations (FAO).
Notelid, M., & Ekblom, A. (2021). Household vulnerability and transformability in Limpopo National Park. Sustainability, 13(5), 2597. https://doi.org/10.3390/su13052597
Nweke, F. I., Spencer, D. S. C., & Lynam, J. K. (2001). The cassava transformation: Africa's best-kept secret. East Lansing, MI: Michigan State University Press.
Nyamweru, C., et al. (2008). Sacred groves and biodiversity conservation. Journal for the Study of Religion, Nature and Culture, 2(1), 1–16. https://doi.org/10.1558/jsrnc.v2i1.1
O'Laughlin, B., & Ibraimo, Y. (2013). A expansão da produção de açúcar e o bem-estar dos trabalhadores agrícolas e comunidades rurais em Xinavane e Magude. Cadernos IESE, 12P. Maputo: Instituto de Estudos Sociais e Económicos (IESE).
Oba, G. (2012). Harnessing pastoralists' indigenous knowledge for rangeland management: Three African case studies. Pastoralism: Research, Policy and Practice, 2, 1. https://doi.org/10.1186/2041-7136-2-1
United Nations Office for the Coordination of Humanitarian Affairs (OCHA). (2016). Southern Africa: El Niño-induced drought emergency. Report 12). New York: OCHA.
United Nations Office for the Coordination of Humanitarian Affairs (OCHAa). (2019, April 15). Mozambique: Cyclone Idai & floods. Situation report 14. New York: OCHA.
United Nations Office for the Coordination of Humanitarian Affairs (OCHAb). (2019, May 12). Mozambique: Cyclone Kenneth. Assessment report, Metuge District, Cabo Delgado. New York: OCHA.
United Nations Office for the Coordination of Humanitarian Affairs (OCHA). (2022, May). Moçambique: Quadro da resposta humanitária – Ciclone Gombe. New York: OCHA.
Okoli, A. C., & Okpaleke, F. N. (2014). Cattle rustling and dialectics of security in Northern Nigeria. International Journal of Liberal Arts and Social Science, 2(1), 109–117.

Oliver-Smith, A. (2016). Climate change adaptation and disaster risk reduction: An anthropological perspective. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed., pp. 247–263). London: Routledge.
Oliver-Smith, A. (2017). Adaptation, vulnerability, and resilience: Contested concepts in the anthropology of climate change. In H. Kopnina & E. Shoreman-Ouimet (Eds.), Routledge handbook of environmental anthropology (pp. 206–221). London: Routledge.
Orlove, B. (2005). Human adaptation to climate change: A review of three historical cases and some general perspectives. Environmental Science & Policy, 8(6), 589–600. https://doi.org/10.1016/j.envsci.2005.06.009
Osbahr, H., Twyman, C., Adger, W. N., & Thomas, D. S. G. (2008). Effective livelihood adaptation to climate change disturbance: Scale dimensions of practice in Mozambique. Geoforum, 39(6), 1951–1964. https://doi.org/10.1016/j.geoforum.2008.07.010
Oyěwùmí, O. (Ed.). (2005). African gender studies: A reader. New York: Palgrave Macmillan.
Pascoe, S., Brincat, S., & Croucher, A. (2019). The discourses of climate change science: Scientific reporting, climate negotiations and the case of Papua New Guinea. Global Environmental Change, 54, 78–87. https://doi.org/10.1016/j.gloenvcha.2018.12.002
Patrício, G. (2016). Moçambique: Compulsando as migrações internas e internacionais. InterEspaço: Revista de Geografia e Interdisciplinaridade, 2(5), 78–101.
Patt, A., & Schröter, D. (2008). Perceptions of climate risk in Mozambique: Implications for the success of adaptation strategies. Global Environmental Change, 18(3), 458–467. https://doi.org/10.1016/j.gloenvcha.2008.04.002
Paull, K. N. (2023). Charcoal, droughts, and deforestation: Evidence from Mozambique. Master's thesis, University of San Francisco. USF Scholarship. https://repository.usfca.edu/thes/1509
Pearse, R. (2017). Gender and climate change. Wiley Interdisciplinary Reviews: Climate Change, 8(2), e451. https://doi.org/10.1002/wcc.451
Pelican, M. (2009). Complexities of indigeneity and autochthony: An African example. American Ethnologist, 36(1), 52–65.
Peters, P. (2004). Inequality and social conflict over land in Africa. Journal of Agrarian Change, 4(3), 269–314.
Peters, P. E. (2013). Land appropriation, surplus people and a battle over visions of agrarian futures. Journal of Peasant Studies, 40(3), 537–562. https://doi.org/10.1080/03066150.2013.803070
Petitt, A. (2016). Women's cattle ownership in Botswana: Rebranding gender relations?. Doctoral thesis, Swedish University of Agricultural Sciences. Acta Universitatis Agriculturae Sueciae, 2016:35. Uppsala: SLU Service/Repro.
Pinto, I., Jack, C., & Hewitson, B. (2018). Process-based model evaluation and projections over southern Africa from CORDEX and CMIP5 models. International Journal of Climatology, 38(11), 4251–4261.
Pinto, I., Lennard, C., Tadross, M., Hewitson, B., Dosio, A., et al. (2016). Evaluation and projections of extreme precipitation over southern Africa from two CORDEX models. Climatic Change, 135, 655–668.
Pokrant, B. (2017). Climate change adaptation and development planning: From resilience to transformation? In H. Kopnina & E. Shoreman-Ouimet (Eds.), Routledge handbook of environmental anthropology (pp. 242–251). London: Routledge.

Posey, D. A. (1999). Cultural and spiritual values of biodiversity. London: Intermediate Technology Publications.
Rachide, A. (2017). Género e relações de poder na região sul de Moçambique: Uma análise sobre a localidade de Mucotuene, província de Gaza. Observador Rural, 50.
Raimundo, I. (2008). The interaction of gender and migration household relations in rural and urban Mozambique. In E. Uchendu (Ed.), Masculinities in contemporary Africa (Vol. 7, pp. xx–xx). Dakar: African Books Collective.
Reason, C. J. C., Hachigonta, S., & Phaladi, R. F. (2006). Interannual variability in rainy season characteristics over the Limpopo region of southern Africa. International Journal of Climatology, 25(14), 1835–1853.
Reid, J. (2013). Interrogating the neoliberal biopolitics of the sustainable development–resilience nexus. International Political Sociology, 7(4), 353–367. https://doi.org/10.1111/ips.12028
República de Moçambique. (1997). Mozambique's Land Law (Lei nº 19/97, de 1 de outubro). Maputo: Governo de Moçambique.Resurrección, B. P. (2013). Persistent women and environment linkages in climate change and sustainable development agendas. Women's Studies International Forum, 40, 33–43. https://doi.org/10.1016/j.wsif.2013.03.011
Rita-Ferreira, A. (1982). Fixação portuguesa e história pré-colonial de Moçambique. Lisboa: Instituto de Investigação Científica Tropical.
Rita-Ferreira, A. (1982). Os africanos de Lourenço Marques. Lisboa: Memórias do Instituto de Investigação Científica Tropical.
Robbins, P. (2011). Political ecology: A critical introduction (2nd ed.). Chichester, UK: Wiley-Blackwell.
Roberts, J. T., & Parks, B. C. (2007). A climate of injustice: Global inequality, North–South politics, and climate policy. Cambridge, MA: MIT Press.
Rocha, A., Starkey, P., & Dionísio, A. (1991). Cattle production and utilisation in smallholder farming systems in southern Mozambique. Agricultural Systems, 37, 555–575.
Rodgers, G. (2008). Everyday life and the political economy of displacement on the Mozambique–South Africa borderland. Journal of Contemporary African Studies, 26(4), 385–399. https://doi.org/10.1080/02589000802481965
Roncoli, C., Ingram, K., & Kirshen, P. (2002). Reading the rains: Local knowledge and rainfall forecasting in Burkina Faso. Society & Natural Resources, 15(5), 409–427.
Rosário, C. (2008). Desperate co-wives: The illegality of polygamy in the new Mozambican family law (Master's thesis). Department of Social Anthropology, University of Bergen.
Rosengren, D. (2022). There's something in the air: On Amazon people's perception of atmospheric phenomena. In P. Sillitoe (Ed.), The Anthroposcene of weather and climate: Ethnographic contributions to the climate change debate (pp. 27–44). New York and Oxford: Berghahn Books.
Rosengren, D. (2022). There's something in the air: On Amazon people's perception of atmospheric phenomena. In P. Sillitoe (Ed.), Anthropological knowledge on the move: Contributions to global debates (pp. 25–44). New York and Oxford: Berghahn Books.
Rouault, M., & Richard, Y. (2003). Intensity and spatial extension of drought in South Africa at different time scales. Water SA, 29, 489–500.
Refugee Research Programme (RRP). (2002). A park for the people? Great Limpopo Transfrontier Park: Community consultation in Coutada 16, Mozambique. Johannesburg: University of the Witwatersrand.

Rudiak-Gould, P. (2016). Climate change beyond the environmental: The Marshallese case. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From actions to transformations (2nd ed.). London: Routledge.
Ruiz-Mallén, I., & Corbera, E. (2013). Community-based conservation and traditional ecological knowledge: Implications for social-ecological resilience. Ecology and Society, 18(4), 12. https://doi.org/10.5751/ES-05867-180412
Russell, A. (2015, October 2). Rhino poaching: Inside the brutal trade. Financial Times Magazine. https://www.ft.com/content/f71d53ea-67b3-11e5-97d0-1456a776a4f5
Russell, T. (2022). Symbolic kraals: Subterranean food stores, hidden wealth and ethnographic errors. Journal of Social Archaeology, 22(3), 317–337. https://doi.org/10.1177/14696053221117467
Ryan, C. M., Berry, N. J., & Joshi, N. (2014). Quantifying the causes of deforestation and degradation and creating transparent REDD+ baselines: A method and case study from central Mozambique. Applied Geography, 53, 45–54.
Rydstrom, H., & Kinnvall, C. (Eds.). (2019). Climate hazards, disasters, and gender ramifications. London: Routledge.
Maciel, S. (2000). National strategies for the conservation, improvement and utilisation of animal genetic resources in smallholder systems in Mozambique. [Relatório técnico]. Maputo: Ministério da Agricultura.
Saka, A. L. (2024). The gender dimensions of food security: Ethnographic accounts of agro-pastoralists of the Ittu Oromo, East Africa. Social Sciences & Humanities Open, 10, 101048. https://doi.org/10.1016/j.ssaho.2024.101048
Schareika, N., Brown, C., & Moritz, M. (2021). Critical transitions from pastoralism to ranching in Central Africa. Current Anthropology, 62(1), 53–76. https://doi.org/10.1086/713248
Schatz, E. (Ed.). (2009). Political ethnography: What immersion contributes to the study of power. Chicago: University of Chicago Press.
Scheper-Hughes, N. (1995). The primacy of the ethical: Propositions for a militant anthropology. Current Anthropology, 36(3), 409–440.
Schlosberg, D. (2007). Defining environmental justice: Theories, movements, and nature. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199286294.001.0001
Schure, J., Ingram, V., Sakho-Jimbira, M. S., Levang, P., & Wiersum, K. F. (2014). Formalisation of charcoal value chains and livelihood outcomes in Central and West Africa. Energy for Sustainable Development, 17(2), 95–105.
Scoones, I. (1995). Investigating the boundaries of ecological knowledge: From cattle, dung and compost to agro-ecology and political ecology. In I. Scoones & J. Thompson (Eds.), Beyond farmer first: Rural people's knowledge, agricultural research and extension practice (pp. 67–76). London: Intermediate Technology Publications.
Scoones, I. (1998). Sustainable rural livelihoods: A framework for analysis (IDS Working Paper 72). Brighton: Institute of Development Studies.
Scoones, I. (Ed.). (1995). Living with uncertainty: New directions in pastoral development in Africa. London: Intermediate Technology Publications.
Scott, C. (1996). Science for the West, myth for the rest? The case of James Bay Cree knowledge construction. In L. Nader (Ed.), Naked science: Anthropological inquiry into boundaries, power, and knowledge (pp. 69–86). New York: Routledge.
Scott, J. C. (1998). Seeing like a state: How certain schemes to improve the human condition have failed. New Haven: Yale University Press.

Serviço Distrital de Actividades Económicas (SDAE). (2016). Magude: Balanço anual do PES. Magude.
Serviço Distrital de Actividades Económicas (SDAE). (2017). Magude: Balanço anual do PES. Magude.
Serviço Distrital de Actividades Económicas (SDAE). (2021). Magude: Balanço anual do PES. Magude.
Serviço Distrital de Actividades Económicas (SDAE). (2022). Magude: Balanço anual do PES. Magude.
Serviço Distrital de Actividades Económicas (SDAE). (2024). Magude: Balanço anual do PES. Magude.
Sedano, F., Lisboa, S. N., Duncanson, L., Ribeiro, N., Sitoe, A., Sahajpal, R., Hurtt, G., & Tucker, C. J. (2020). Monitoring forest degradation from charcoal production with historical Landsat imagery: A case study in southern Mozambique. Environmental Research Letters, 15(1), 015001. https://doi.org/10.1088/1748-9326/ab3186.
Sen, A. (1982). Poverty and famines. Oxford: Oxford University Press.
Sen, A. (2023). Everyday adaptation: Ordinary practices of coping with climate and uncertainty. Global Environmental Change, 78, 102656. https://doi.org/10.1016/j.gloenvcha.2022.102656
Shemsanga, C., Omambia, A. N., & Gu, Y. (2010). The cost of climate change in Tanzania: Impacts and adaptations. Journal of American Science, 6(3), 182–196.
Sheridan, M. J. (2012). Global warming and global war: Tanzanian perspectives on drought and the war on terror. Journal of Eastern African Studies, 6(4), 691–711.
Sheridan, M. (2016). The politics of rain: Tanzanian farmers' discourse on climate and political disorder. In S. A. Crate & M. Nuttall (Eds.), *Anthropology and climate change: From actions to transformations* (2nd ed., pp. 229–240). New York, NY: Routledge
Shipton, P. (2007). The nature of entrustment: Intimacy, exchange, and the sacred in Africa. New Haven: Yale University Press.
Sifundza, V., et al. (2017). The volume of water stored in Maguga and Driekoppies dams (2002–2017) [Figure]. In Water resources management in the Komati River Basin.
Sillitoe, P. (Ed.). (2022). The Anthroposcene of weather and climate: Ethnographic contributions to the climate change debate. New York & Oxford: Berghahn Books.
Sillitoe, P., & Alam, M. (2022). Fornicating frogs: Local knowledge of climate change in Bangladesh? In P. Sillitoe (Ed.), The Anthroposcene of weather and climate: Ethnographic contributions to the climate change debate (pp. 87–123). New York & Oxford: Berghahn.
Silva, J. A., Sedano, F., Flanagan, S., Ombe, Z. A., Machoco, R., Meque, C. H., Sitoe, A., Ribeiro, N., Anderson, K., Baule, S., & Hurtt, G. (2019). Charcoal-related forest degradation dynamics in dry African woodlands: Evidence from Mozambique. Applied Geography, 107, 72–81. https://doi.org/10.1016/j.apgeog.2019.04.006.
Silva, J. A., Matyas, C. J., & Cunguara, B. (2015). Regional inequality and polarization in the context of concurrent extreme weather and economic shocks. Applied Geography, 61, 105–116.
Silverman, D. (2011). Interpreting qualitative data (4th ed.). London: Sage.
Simonetti, C. (2019). The petrified Anthropocene. Theory, Culture & Society, 36(7–8), 45–66. https://doi.org/10.1177/0263276419872814.

Smith, H. (2007). Disrupting the global discourse of climate change: The case of indigenous voices. In M. E. Pettenger (Ed.), The social construction of climate change: Power, knowledge, norms, discourses (pp. 203–223). Aldershot: Ashgate.
Smith, H., Vollmer, F., Ryan, C., Fisher, J., & Baumert, S. (2019). Charcoal as a coping strategy: Evidence from Mozambique. Energy for Sustainable Development, 50, 129–148. https://doi.org/10.1016/j.esd.2019.03.004
Smith, J., Brown, L., & Williams, R. (2018). Gender and livestock management: A global perspective. Journal of Rural Studies, 45(2), 123–135.
Somé, W. M. (1994). The spirit of the rainforest: A Yanomamö shaman's story. New York: The New Press.
Spear, D., Selato, J. C., Mosime, B., & Nyamwanza, A. M. (2019). Harnessing diverse knowledge and belief systems to adapt to climate change in semi-arid rural Africa. Climate Services, 14, 31–36.
Spinage, C. (2012). African ecology: Benchmarks and historical perspectives. Berlin: Springer-Verlag.
Steward, J. H. (1955). Theory of culture change: The methodology of multilinear evolution. Urbana: University of Illinois Press.
Strauss, S. (2009). Global models, local risks: Responding to climate change in the Swiss Alps. In S. A. Crate & M. Nuttall (Eds.), Anthropology and climate change: From encounters to actions (pp. 166–174). Walnut Creek, CA: Left Coast Press.
Sultana, F. (2021). Climate change, COVID-19, and the co-production of injustices: A feminist reading of overlapping crises. Social & Cultural Geography, 22(4), 447–460.
Sultana, F. (2022). The unbearable heaviness of climate coloniality. Political Geography, 99, 102638.
Sultane, C., & Massimbe, P. (2018). Impactos socioambientais da produção de carvão vegetal em Moçambique. Maputo: Centro Terra Viva.
Sunderlin, W. D., et al. (2005). Livelihoods, forests, and conservation. World Development, 33(9), 1383–1402.
Tacoli, C. (2009). Crisis or adaptation? Migration and climate change in a context of high mobility. Environment and Urbanization, 21(2), 513–525. https://doi.org/10.1177/0956247809342182
Tadross, M., Hewitson, B., & Usman, M. (2005). The interannual variability of the onset of the maize growing season over southern Africa and implications for predictability. Journal of Climate, 18(16), 3356–3372. https://doi.org/10.1175/JCLI3427.1
Tadross, M., Jack, C., & Hewitson, B. (2009). On RCM-based projections of change in southern African summer climate. Geophysical Research Letters, 36(23). https://doi.org/10.1029/2009GL041479
Tanner, C. (2002). *Law-making in an African context: The 1997 Mozambican Land Law.* FAO Legal Papers Online 26. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO).
Tanner, C. (2010). Land rights and enclosures: Implementing the Mozambican Land Law in practice. In W. Anseeuw & C. Alden (Eds.), *The struggle over land in Africa: Conflicts, politics and change* (pp. 105–130). Cape Town, South Africa: HSRC Press.
Tarusarira, J. (2017). African religion, climate change, and knowledge systems. The Ecumenical Review, 69(3), 395–406.

Taylor, M. (2015). The political ecology of climate change adaptation: Livelihoods, agrarian change and the conflicts of development. London: Routledge. https://doi.org/10.4324/9781315763704
Temper, L., Del Bene, D., & Martinez-Alier, J. (2015). Mapping the frontiers and front lines of global environmental justice: The EJAtlas. Journal of Political Ecology, 22, 255–278. https://doi.org/10.2458/v22i1.21108
The World Bank. (2023). Mozambique Land Administration Project (Terra Segura) – Restructuring Paper. Report RES52833. Washington, DC: World Bank.
Theodory, T. (2016). Dealing with change: Indigenous knowledge and adaptation to climate change in the Ngono River Basin, Tanzania (Doctoral dissertation). Rheinische Friedrich-Wilhelms-University of Bonn.
Thoithi, G. N., Mengistu, D. T., Ayalew, D., & Sebesho, M. (2021). Increasing dry spell frequency and rainfall variability in Southern Africa: Implications for rain-fed agriculture. Geophysical Research Letters, 48(7), e2020GL091041. https://doi.org/10.1029/2020GL091041
Tongaat Hulett. (2019). Annual integrated report 2019. Durban: Tongaat Hulett.
Tschakert, P. (2007). Views from the vulnerable: Understanding climatic and other stressors in the Sahel. Global Environmental Change, 17(3–4), 381–396. https://doi.org/10.1016/j.gloenvcha.2006.11.008
Tschakert, P. (2012). From impacts to embodied experiences: Tracing political ecology in climate change research. Geografisk Tidsskrift–Danish Journal of Geography, 112(2), 144–158. https://doi.org/10.1080/00167223.2012.741889.
Tyler, N. J. C., Turi, J. M., Sundset, M. A., Strøm Bull, K., Sara, M. N., Reinert, E., … Oskal, N. (2007). Indigenous knowledge and Arctic climate change. Global Environmental Change, 17(2), 12–26. https://doi.org/10.1016/j.gloenvcha.2006.06.001
Tyson, P. D., & Preston-Whyte, R. A. (2000). The weather and climate of Southern Africa. Oxford: Oxford University Press.
United Nations (UN). (2015). Transforming our world: The 2030 Agenda for Sustainable Development. New York: United Nations.
União Nacional de Camponeses (UNAC). (2013). The land rush in Mozambique: Implications for rural communities. Maputo: UNAC.
United Nations Office for Disaster Risk Reduction (UNDRR). (2015). Sendai Framework for Disaster Risk Reduction 2015–2030. Geneva: UNDRR.
United Nations Framework Convention on Climate Change (UNFCCC). (2015). The Paris Agreement. Paris: UNFCCC.
UNICEF. (2016). Mozambique: Drought humanitarian situation report, October 2016. Maputo: UNICEF.
United Nations Office on Drugs and Crime (UNODC). (2016). World wildlife crime report: Trafficking in protected species. Vienna: UNODC.
United Nations Resident Coordinator/Humanitarian Coordinator (UNRC/HC). (2017). Mozambique: Cyclone Dineo, flash update No. 3 (20 February 2017). Maputo: UNRC/HC.
Usman, M., & Reason, C. (2004). Dry spell frequencies and their variability over southern Africa. Climate Research, 26, 199–211. https://doi.org/10.3354/cr026199
Valoi, E. (2017, March 3). Mozambique's poaching castles are crumbling. Oxpeckers. https://oxpeckers.org/2017/03/mozambiques-poaching-castles-crumbling/
van der Berg, J. (1987). A peasant form of production: Wage-dependent agriculture in southern Mozambique. Canadian Journal of African Studies, 21(3), 375–389. https://doi.org/10.1080/00083968.1987.10804155

Van Dijk, M. P., & Li, H. (2015). Climate change policies and adaptive behavior of farmers in southern China. In D. C. Wood (Ed.), Research in economic anthropology (Vol. 35, pp. 155–175). Emerald Group Publishing Limited.
Vasavi, A. R. (1994). Hybrid times, hybrid people: Culture and agriculture in South India. Man, 29(2), 283–300. https://doi.org/10.2307/2804475
Voz da América (VOA) Português. (2022, June 25). Moçambique: Polícia diz que moradores enterraram vivas sete pessoas por alegado roubo de gado. Voz da América. https://www.voaportugues.com/a/pol%C3%ADcia-diz-que-moradores-enterraram-vivas-sete-pessoas-por-alegado-roubo-de-gado/6632734.html
Vollmer, F., Fisher, J., & Baumert, S. (2017). Charcoal income as a means to a valuable end: Scope and limitations of income from rural charcoal production to alleviate acute multidimensional poverty in Mabalane, Mozambique. Energy for Sustainable Development, 40, 14–26. https://doi.org/10.1016/j.esd.2017.05.004
Walker, T. S., Boughton, D., Tschirley, D., Pitoro, R., & Tomo, A. (2006, August 12–18). Using rural household income survey data to inform poverty analysis: An example from Mozambique. Paper presented at the International Association of Agricultural Economists Conference, Gold Coast, Australia.
Wane, N. (2011). African indigenous feminist thought: An anti-colonial project. In N. Wane, E. Manyimo, & A. Ritskes (Eds.), The politics of cultural knowledge (pp. 7–21). Sense Publishers.
Wanyama, F., Develtere, P., & Pollet, I. (2019). Encountering the evidence: Cooperatives and poverty reduction in Africa. Journal of Co-operative Organization and Management, 7(1), 1–11. https://doi.org/10.1016/j.jcom.2019.100087
Warren, C. A. B., & Karner, T. X. (2010). Discovering qualitative methods: Field research, interviews, and analysis (2nd ed.). Oxford University Press.
Waterhouse, R. (2000). Women's land rights in post-war Mozambique. In C. Toulmin & J. Quan (Eds.), Evolving land rights, policy and tenure in Africa (pp. 246–259). London: International Institute for Environment and Development.
Weikmans, R., & Roberts, J. T. (2019). The international climate finance accounting muddle: Is there hope on the horizon? Climate and Development, 11(2), 97–111. https://doi.org/10.1080/17565529.2017.1410087
Weng, L., Boaventura, J., & Muianga, C. (2013). Water access and agro-industry in the Incomati Basin. Water Alternatives, 6(2), 256–274.
West, H. G. (2005). Kupilikula: Governance and the invisible realm in Mozambique. University of Chicago Press.
Whitaker, J. A. (2020). Climatic and ontological change in the Anthropocene among the Makushi in Guyana. Ethnos, 85(5), 843–860. https://doi.org/10.1080/00141844.2018.1543340
Whyte, K. P. (2017). Indigenous climate change studies: Indigenizing futures, decolonizing the Anthropocene. English Language Notes, 55(1–2), 153–162. https://doi.org/10.1215/00138282-55.1-2.153
Wily, L. A. (2018). Collective land ownership in the 21st century: Overview of global trends. Land, 7(2), 68. https://doi.org/10.3390/land7020068
World Bank Group. (2023). Mozambique: Country climate and development report. Washington, DC: World Bank Group.
World Bank Group. (2011). Vulnerability, risk reduction, and adaptation to climate change: Mozambique. Washington, DC: World Bank Group.
World Bank. (2017). Mozambique climate risk and adaptation country profile. Washington, DC: World Bank.

World Bank. (2020). Sustainable energy for all: Mozambique's transition to clean cooking solutions. Washington, DC: World Bank Group.
Wuyts, M. (1980). Economia política do colonialismo português em Moçambique. Estudos Moçambicanos, 1, 9–22.
Yurco, K. (2023). Pastoralist milking spaces as multispecies sites of gendered control and resistance in Kenya. Gender, Place & Culture, 30(10), 1393–1414. https://doi.org/10.1080/0966369X.2022.2067522
Yurco, K. (2024). Rethinking spaces of gendered livestock ownership: Pastoralist women's knowledge, care, and labor. Social & Cultural Geography, 25(3), 441–459. https://doi.org/10.1080/14649365.2022.2157043
Zacarias, D. A. (2013). Vulnerabilidade comunitária às mudanças climáticas no município de Inhambane [Relatório não publicado]. Xai-Xai: Ministério para a Coordenação da Acção Ambiental (MICOA), Centro de Desenvolvimento Sustentável para as Zonas Costeiras.
Zaehringer, J. G., Atumane, A., Berger, S., & Eckert, S. (2018). Large-scale agricultural investments trigger direct and indirect land use change: New evidence from the Nacala corridor, Mozambique. Journal of Land Use Science, 13(3), 325–343. https://doi.org/10.1080/1747423X.2018.1499834
Zorrilla-Miras, P., Mahamane, M., Metzger, M. J., Baumert, S., Vollmer, F., Luz, A. C., Woollen, E., Sitoe, A. A., Patenaude, G., Nhantumbo, I., Ryan, C. M., Paterson, J., Matediane, M. J., Ribeiro, N. S., & Grundy, I. M. (2018). Environmental conservation and social benefits of charcoal production in Mozambique. Ecological Economics, 144, 100–111.

Acta Universitatis Upsaliensis
Uppsala Studies in Cultural Anthropology
Editor: Sten Hagberg

1 Anita Jacobson-Widding: *Red-White-Black as a Mode of Thought.* A Study of Triadic Classification by Colours in the Ritual Symbolism and Cognitive Thought of the Peoples of the Lower Congo. 1979.
2 Lisa Colldén: *Les Trésors de la Tradition Orale Sakata*. Proverbes, mythes, légendes, fables, chansons et devinettes de Sakata. 1979.
3 Hugh Beach: *Reindeer-Herd Management in Transition*. The Case of Tuorpon Saameby in Northern Sweden. 1980.
4 Kaj Århem: *Makuna Social Organization*. A Study in Descent, Alliance and the Formation of Corporate Groups in the North-Western Amazon. 1981.
5 Anita Jacobson-Widding (ed): *Identity. Personal and Socio-Cultural.* A Symposium. 1983.
6 Jürgen Zwernemann: *Culture History and African Anthropology*. A Century of Research in Germany and Austria. 1983.
7 Mick Johnsson: *Food and Culture among Bolivian Aymara*. Symbolic Expressions of Social Relations.1986.
8 Sven Cederroth, Claes Corlin and Jan Lindström (eds): *On the Meaning of Death.* Essays on Mortuary Rituals and Eschatological Beliefs. 1988.
9 Alf Hornborg: *Dualism and Hierarchy in Lowland South America.* Trajectories of Indigenous Social Organization. 1988.
10 Thomas Håkansson: *Bridewealth, Women and Land:* Social Change among the Gusii of Kenya. 1988.
11 Jan-Åke Alvarsson: *The Mataco of the Gran Chaco*. An Ethnographic Account of Change and Continuity in Mataco Socio-Economic organization. 1988.
12 Fernando Giobellina Brumana & Elda Gonzales Martinez: *Spirits from the Margin:* Umbanda in São Paulo. A Study in Popular Religion and Social Experience. 1989.
13 Anita Jacobson-Widding & David Westerlund (eds): *Culture, Experience and Pluralism:* Essays on African Ideas of Illness and Healing. 1989.
14 Michael Jackson & Ivan Karp (eds): *Personhood and Agency.* The Experience of Self and Other in African Cultures. 1990.
15 Anita Jacobson-Widding & Walther van Beek (eds): *The Creative Communion*. African Folk Models of Fertility and the Regeneration of Life.1990.
16 Anita Jacobson-Widding (ed): *Body and Space.* Symbolic Models of Unity and Division in African Cosmology and Experience. 1991.
17 Jan Ovesen (ed): *Texts and Contexts.* Models, Metaphors and Meanings in African Symbolism. (In press.)
18 Daniel Kyaruzi Ndagala: *Territory, Pastoralists and Livestock*. Resource Control among the Kisongo Maasai. 1992.
19 Jitka Kotalová: *Belonging to Others*. Cultural Construction of Womanhood among Muslims in a Village in Bangladesh. 1993.
20 Peter Bretschneider: *Polygyny: A Cross-Cultural Study*. 1995.

21 Ing-Britt Trankell: *Cooking, Care, and Domestication.* A Culinary Ethnography of the Tai Yong, Northern Thailand. 1995.
22 Mikael Kurkiala: *"Building the Nation Back Up."* The Politics of Identity on the Pine Ridge Indian Reservation. 1997.
23 Ingela Edkvist: *The Performance of Tradition.* An Ethnography of Hira Gasy Popular Theatre in Madagascar. 1997.
24 Ing-Britt Trankell & Laura Summers (eds): *Facets of Power and Its Limitations.* Political Culture in Southeast Asia. 1998.
25 Sten Hagberg: *Between Peace and Justice*. Dispute Settlement between Karaboro Agriculturalists and Fulbe Agro-pastoralists in Burkina Faso. 1998.
26 Clarissa Kugelberg: *Perceiving Motherhood and Fatherhood*. Swedish Working Parents with Young Children. 1999.
27 Juan Carlos Gumucio: *Hierarchy, Utility and Metaphor in Mapuche Botany.* 1999.
28 Anita Jacobson-Widding: Chapungu: *The Bird that Never Drops a Feather.* Male and Female Identities in an African Society. 2000.
29 Ivana Macek: *War Within.* Everyday Life in Sarajevo under Siege. 2000.
30 Sten Hagberg & Alexis B. Tengan (eds): *Bonds and Boundaries in Northern Ghana and Southern Burkina Faso.* 2000.
31 Stefan Bekaert: *System and Repertoire in Sakata Medicine.* Democratic Republic of Congo. 2000.
32 Åsa Nilsson Dahlström: *Negotiating Wilderness in a Cultural Landscape.* Predators and Saami Reindeer Herding in the Laponian World Heritage Area. 2003.
33 Marie Perruchon: *I Am Tsunki*. Gender and Shamanism among the Shuar of Western Amazonia. 2003.
34 Bernhard Helander: *The Slaughtered Camel.* Coping with Fictitious Descent among the Hubeer of Southern Somalia. 2003.
35 Sverker Finnström: *Living with Bad Surroundings.* War and Existential Uncertainty in Acholiland, Northern Uganda. 2003.
36 Charlotta Widmark: *To Make Do in the City.* Social Identities and Cultural Transformations among Aymara Speakers in La Paz. 2003.
37 Jan-Åke Alvarsson & Rita Laura Segato (eds): *Religions in Transition*: Mobility, Merging and Globalization in the Emergence of Contemporary Religious Identities. 2003.
38 Michael Barrett: *Paths to Adulthood*: Freedom, Belonging, and Temporalities in Mbunda Biographies from Western Zambia. 2004.
39 Ann Cassiman: *Stirring Life*. Woman's Paths and Places among the Kasena of Northern Ghana. 2006.
40 Vladislava Vladimirova: *Just labor.* Labor ethic in a post-Soviet reindeer herding community. 2006.
41 Titti Kristina Schmidt: *Morality as Practice.* The Santo Daime, an Eco-Religious Movement in the Amazonian Rainforest. 2007.
42 Anna Sofia Hedberg: *Outside the World.* Cohesion and Deviation among Old Colony Mennonites in Bolivia. 2007.
43 Claudia Merli: *Bodily Practices and Medical Identities in Southern Thailand.* 2008.

44 Sita Zougouri: *Derrière la vitrine du développement*: Aménagement forestier et pouvoir local au Burkina Faso. 2008
45 Sten Hagberg & Charlotta Widmark (eds): *Ethnographic Practice and Public Aid*. Methods and Meanings in Development Cooperation. 2009.
46 Hugh Beach, Dmitri Funk & Lennard Sillanpää (eds): *Post-Soviet Transformations.* Politics of Ethnicity and Resource Use in Russia. 2009.
47 Carina Green: *Managing Laponia*. A World Heritage Site as Arena for Sami Ethno-Politics in Sweden. 2009.
48 Níels Einarsson: *Culture, Conflict and Crises in the Icelandic Fisheries.* An Anthropological Study of People, Policy and Marine Resources in the North Atlantic Arctic. 2011.
49 Helga Ögmundardottir: *The Shepherds of Þjórsárver.* Traditional Use and Hydropower Development in the Commons of the Icelandic Highland. 2011.
50 Ulrika Andersson Trovalla: *Medicine for Uncertain Futures*. A Nigerian City in the Wake of a Crisis. 2011.
51 Gabriella Körling: *In Search of the State.* An Ethnography of Public Service Provision in Urban Niger. 2011.
52 Lars Kaskija: *Images of a Forest People.* Punan Malinau – Identity, Sociality, and Encapsulation in Borneo. 2012.
53 Jesper Bjarnesen: *Diaspora at Home?* Wartime Mobilities in the Burkina Faso-Côte d'Ivoire Transnational Space. 2013.
54 Molly Sundberg: *Training for Model Citizenship*. An Ethnography of Civic Education and State-Making in Rwanda. 2014.
55 Nikolas Århem: *Forests, Spirits and High Modernist Development.* A Study of Cosmology and Change among the Katuic Peoples in the Uplands of Laos and Vietnam. 2015.
56 Yulian Konstantinov: *Conversations with Power?* Soviet and post-Soviet developments in the reindeer husbandry part of the Kola Peninsula. 2015.
57 Mari-Elina Ekoluoma: *Everyday Life in a Philippine Sex Tourism Town.* 2017.
58 Anna Baral: *Bad Guys, Good Life.* An Ethnography of Morality and Change in Kisekka Market (Kampala, Uganda). 2018.
59 Per Brandström: *Mhola – The Utopia of Peace*. An Ethnographic Exploration of the Sungusungu Movement in Tanzania. 2021.
60 Nika Rasmussen: *Embodied Citizenship in the Making.* Bolivian Urban Youth at the Crossroads of Social Hierarchies. 2021.
61 Ann-Britt Bernhardsdotter: *The Power of Being.* A Study of Poverty, Fertility and Sexuality among the Kuria in Kenya and Tanzania. 2021.
62 Elisa Maria López: *Transforming Kiruna*. Producing Space, Society, and Legacies of Inequality in the Swedish Ore Fields. 2021
63 Fernando Manjate: *SOMETHING GOOD BUT NOTHING TO BE PROUD OF.* Inheritance and Succession Practices, and Sociopolitical Stakes in Times of Decentralization in Marracuene, Mozambique. 2022.
64 Paulo Mahumane: *The Curse of Coal Mining.* Residents' Resistance to Industrial Coal Mining in Moatize District, Mozambique. 2025.
65 Jossias Humbane*: "Magude isn't like it used to be"* Intersections of social and climate change in Mozambique. 2025.