# CLIMATE-RELATED RISKS AND COASTAL LIVELIHOODS: LIVED REALITIES, GENDER AND ADAPTATION

*Minor dissertation presented in partial fulfilment of the requirements for the degree of Master of Philosophy in Climate Change and Development*


Anele Songo Benya

(BNYANE001)

Supervised by Dr Philile N. Mbatha

*2024*

DECLARATION

I know the meaning of plagiarism and declare that all of the work in the dissertation, save for that which is properly acknowledged, is my own.

Signature: Signed by candidate Date:

## ABSTRACT

Rural coastal people are highly susceptible to climate-related risks, which can result in a range of adverse impacts. These impacts are felt differently based on the assets people possess and their gender. This research seeks to understand how people in Tshani Mankosi, a coastal rural village in the Eastern Cape, South Africa, navigate the complex challenges presented by a changing climate onto their livelihoods. This research examines the nexuses between natural resource dependency, livelihoods and gender within the broader socio-economic and political landscape of South Africa. A qualitative research design was employed, particularly a case study approach, which allowed for an in-depth, context-specific exploration of the experiences and lived realities of the people of Tshani Mankosi within the broader socio-ecological, economic and gendered context. Empirical evidence was collected using semi-structured interviews, focus groups and direct observations of community life. In analysing the data, this study critically draws from the sustainable livelihoods framework (SLF), Dorward's livelihood aspirations theory and the concept of social reproduction, all with a gender lens. This mini dissertation argues that climate responses are influenced by how people understand and experience their natural environment and the assets they possess to reduce their vulnerability and increase adaptive capacity, ultimately leading to better livelihood outcomes. Key findings reveal that the respondents are aware of the changing climatic conditions, such as erratic rainfall, increased frequency of storm surges and winds, and longer high tide periods. The respondents noted minimal changes in their ocean-based livelihoods compared to their land-based livelihoods. While the respondents noted these changes, they attributed them to varying factors influenced by their positionality and beliefs. The study shows that climate change exacerbates existing vulnerabilities within this community, ultimately affecting people's adaptive capacity. While adaptation strategies such as diversification of livelihoods and drawing from local knowledge to enhance resilience, these efforts are often constrained by resource access, marginal government and institutional support, and gendered vulnerabilities. The findings also reveal how, in Tshani Mankosi, people have noted the increasing unreliability of local knowledge due to changing climatic conditions.



**Keywords:** Rural coastal livelihoods, Climate change adaptation, Adaptive capacity, Vulnerability, Gender, Social reproduction, Sustainable Livelihoods Framework, Dorward's Livelihood Aspirations Theory, Wild Coast, Tshani Mankosi.

**DEDICATION**

To the journeys we have travelled and continue to travel

Vuyokazi Amelia Jonas Benya – Mangwanya, Thole lomthwakazi

12/03/1966 – 22/12/2021

Serenity Prayer

"God grant me the serenity to accept the things I cannot change, the courage to change the things I can and the wisdom to know the difference…" To my mother, my forever best friend.

Thank you!

## ACKNOWLEDGEMENTS

I want to express my sincere gratitude to the people of Tshani Mankosi who generously shared their time and knowledge with me. Thank you for opening your homes and allowing me into your lives. I will forever be grateful for the kindness you showed me during my fieldwork and your contribution to making this a reality.

I am grateful to my supervisor, Dr. Philile Mbatha, who offered guidance, encouragement and financial contributions towards my fieldwork. Prof Gina Ziervogel and the ACDI team for creating an academic space where I learnt invaluable lessons. To Leigh Stadler, thank you for your continuous check-ins and for the many conversations where you listened and helped lift the weight off my shoulders whenever I felt uncertain about my research. Dr Michelle Pressend, whose course in my honour's year inspired my work and has been a constant source of support. TRAJECTS and Prof Martine Visser with DSI-NRF (Department of Science and Innovation-National Research Foundation), thank you for providing me with financial support that enabled me to complete this degree.

Master's cohort of 2023, thank you for holding space for me and listening when I needed to process experiences and emotions. I am grateful to have met you all and walked this journey with you—from our collective complaints, moments of feeling overwhelmed, and the proactive steps we took together, to our writing sessions. My friends at the UCT, Faaria Theba and Osas Asemota thank you for providing intellectual and moral support. I truly appreciate our discussions, working dates, and constant banter, which helped lighten the load when things got tough. Sisipho Sathula, Chulumanco Soboyisi, and Chuma Sompeta, thank you for standing by me throughout this process, for calming me down when I panicked, and for being just a phone call away when I needed a long chat to remind myself why I started this journey in the first place.

To Sithandiwe Yeni, thank you for being the best mentor—listening to me vent, checking me when you thought I was "over exaggerating," graciously offering your time to discuss my ideas, and recommending literature. Thank you for helping me through those overwhelming "I feel like I don't know what I'm doing" moments. I truly appreciate you, Stharara.

My family has been a constant source of love, support and encouragement. My late mum and late sister, Vuyokazi Jonas Benya and Sinazo Benya, thank you for being my most gracious

guiding angels. You are forever in my heart. My father, Mzwanele Benya, has been such an incredible support system, continuously checking in on me, and for your unwavering love and encouragement. I am profoundly grateful for you. My sister, Asanda-Jonas Benya, thank you for your love, kindness, and occasional strictness. From the beginning, you have been my cheerleader, confidant, and safe space—always believing in me even when I doubted myself. Thank you for the late-night pep talks between your busy schedule, your patience in listening to my worries, and your constant reassurances. My cousin, Phiwokuhle Benya, thank you for being my escape from the thesis whenever I felt demotivated. From our walks to gym dates, you were my breath of fresh air when the research process felt overwhelming and lonely.

This thesis would not have been possible without each and every one of you. Thank you!

## LIST OF ABBREVIATIONS AND ACRONYMS

**CBD** - Convention on Biological Diversity

**COVID** -19- Coronavirus disease 2019

**CSO** - Civil Society Organisations

**DEDEAT** - Department of Economic Development, Environmental Affairs and Tourism

**FAO** - Food and Agriculture Organisation

**ICZM** - Integrated Coastal Zone Management

**IOM** - International Organization for Migration

**IPCC AR6 WG2** - Intergovernmental Panel on Climate Change, sixth assessment report, working group two

**IPCC** - Intergovernmental Panel on Climate Change

**MLR** - Marine Living Resources

**NCCAS** - National Climate Change Adaptation Strategy

**NCMP** - National Coastal Management Programme

**SLF** - Sustainable Livelihoods Framework

**UN** - United Nations

**UNDP** - United Nations Development Programme

**WEP** - Women's Environmental Program

## LIST OF FIGURES

## LIST OF TABLES

**Table of Contents**

# CHAPTER ONE – INTRODUCTION

## 1.1 Introduction

Climate-related risks present a complex and multifaceted environmental threat, with noticeable impacts on the livelihoods of coastal rural people, such as natural resources that marginal people depend on for survival (Kauneckis & Martin, 2020; Thindaa, Ogundeji, Bellea & Ojo, 2020). Given the complexities presented by climate-related risks on rural livelihoods, the interest for this study stems from the deep concern of the capacities (or lack thereof) which shape the vulnerabilities and resilience of rural coastal people, particularly in the Eastern Cape, South Africa. Having grown with an awareness of how climate-related risks affect livelihoods, and how various socio-economic factors shape livelihood outcomes, I have been increasingly drawn to understanding in depth how these risks intersect with rural livelihoods and social identities such as gender, race, and class (UNDP, 2009; Halder et al., 2012; Oyarzo et al., 2024). This study then seeks to understand how coastal rural people adapt to climate-related risks as a means of sustaining their livelihoods, with a specific focus on gender and the assets people possess.

For this study, the concept of climate-related risk is used, as it refers to the "potential for adverse consequences of both climate change and variability on natural and human systems which results in reshaping landscapes, disrupting ecosystems and altering natural resources upon which people depend on" (Jurgilevich et.al., 2017; Reisinger, Howden, Vera, et.al, 2020; IPCC, 2022; Simpson et.al., 2023). This study uses the United Nations and the Intergovernmental Panel on Climate Change (IPCC) (2007) definition of climate change, as the "changes in temperature and precipitation patterns, which can be identified by changes in the mean or variability that persist for an extended period, typically decades or longer[1]".

According to the IPCC (2022), climate change is resulting in climate variability and the increased intensity and timing of extreme weather events. These will ultimately affect people's security, health, well-being, economies, and culture, especially through compounded stress and events (Thornton et al., 2014). Climate variability refers to "the interannual variations in temperature and precipitation" ( Malpeli et al., 2020; IPCC, 2022).

[1] For more definitions see Masinga et al.'s (2021); Bob & Babugura's (2014); Zwane (2019); Onwutuebe's (2019); Rankomise (2015), (Ogra & Bodola, 2015; Call & Sellers, 2019; Andra, 2022). For the purpose of this study, definitions from Onwutuebe (2019) and Rankomise (2015) are used to foreground the direct and indirect links between human activities and climate change, the historical, natural but currently rapid and unnatural pace of climate change.

To understand the impacts of climate-related risks on livelihoods, conceptually, this study draws on multiple theoretical and conceptual frameworks, namely the Sustainable Livelihoods Framework (SLF) and, Dorwards livelihood aspirations theory, and the concept of social reproduction, all with a gender lens. SLF asserts that people leverage on different assets, capabilities and strategies as a means of sustaining their livelihoods, particularly in the dawn of environmental change and economic disenfranchisement (Scoones, 2015:6). Dorward's livelihood aspirations theory highlights how people see and pursue future livelihood opportunities, shaping their adaptation strategies (Dorward, 2009). Building on this, the use of the concept of social reproduction offers a gendered lens to understand how adaptation is embedded in everyday social processes, highlighting the position of women. Social reproduction refers to the often-invisible social processes and relationships, including unpaid labour that sustain households and communities, which is primarily performed by women (Fernandez, 2018: 145). A gender lens is central in this study as it recognises that women and men, including other gender identities, experience climate-related risks differently due to their social roles and access to resources (Goh, 2012; Liru, 2020; Duru, Aro & Oladipo, 2022; Rubekie, Pauline & Kaaya, 2022). Integrating these perspectives offers a nuanced and comprehensive perspective in understanding how climate-related risks are reshaping rural coastal livelihoods and the gendered implications this brings.

Rural coastal areas are at the frontlines of climate-related risks and the vulnerability imposed by climatic change and variability (Barbier, 2015, see Garai, 2015 on Bangladesh & de la Torre-Castro et.al, 2022 on Zanzibar). When mapping out climatic change impacts on communities globally, what emerges are intersectional dynamics, what Amorim-Maia (2022) refers to as "differential vulnerabilities" which are compounded by gender, race, class, and gender roles. These vulnerabilities affect the adaptive capacity of communities burdened by climatic stressors (Connolly-Boutin & Smit, 2016). The IPCC (2022) noted the increasing importance of adaptation to reduce risks, particularly in the global south, where climate-related risks are often compounded by the high reliance on climate-sensitive sectors, limited resources, and socio-economic inequalities. Adaptation refers to the measures taken to adjust to current or anticipated climate-related effects to reduce risks or capitalise on potential benefits (IPCC, 2022; Simpson et.al, 2023). There are multiple conceptions of adaptation where scholars define and view adaptation as a process intricately linked to social assets and power dynamics. Adaptation is also defined as the reactive and sometimes proactive measures that people employ as a response to perceived local environmental changes (Adger, 2003; Nightingale, 2009;

O'Neill et al, 2022).

Against the backdrop of climate risks and adaptation, what is also becoming increasingly pertinent are the gendered effects of climate-related risks shaping vulnerability (Denton, 2002; Pearse, 2017; Senja, 2021). Globally, scholars have increasingly highlighted gendered differential vulnerabilities, highlighting the differential impact climate-related risks have had on women and men (Sultana, 2014; Roa et.al., 2019; Call & Sellers, 2019). As a result, this study is also interested in the gendered dynamics posed by climate-related risks in coastal rural communities. Gender is understood as the range of socially constructed roles and attitudes which result from social norms, customs and traditions associated with being a man, woman transman and transwoman in a given society (Bhadwal, Sharma, Gorti & Sen, 2019).

Gender plays a crucial role in shaping vulnerabilities, particularly for women in coastal rural areas who are dependent on natural resources for livelihood sustainability. As opposed to men, the roles tied to women are intricately linked to the domestic space of the household and social reproductive labour, which are further compounded by challenges posed by climate variability (Onwutuebe, 2019; Duba, 2019; de la Torre-Castro, Lindström et.al, 2022). This is because in rural contexts, women typically participate in activities burdened by the effects of environmental change, such as productive and reproductive work (Mokoena & Dolan, 2020). Despite their crucial contributions to rural economies, women farmers – individually managing a small piece of land to produce or harvest for household consumption, mainly relying on family labour - face gender-related barriers that restricts their ability to respond effectively to the effects of climate change (see Assan et.al, 2020 paper on Ghana; FAO, 2012). Globally, the limited access to resources, including land, credit, and technology that decrease labour intensity, restricts people's capabilities to implement resilient farming and fishing practices (Emdon, 2013; Jost et. al, 2016; Ubisi et.al, 2017).

Furthermore, there are intersecting factors like gender roles, women's peripheral location, social stratification, and power dynamics, often marginalising women in climate adaptation decision-making processes, leaving their valuable knowledge and experiences untapped. In light of the gendered, racialised and class-based disproportionate impact, there is a growing need, therefore, to understand how marginalised people perceive, experience and adapt to climatic stressors on their livelihoods. Thus, this study explores how coastal rural people

navigate and try to adapt, notwithstanding social-economic challenges.

In the case of South Africa, which is categorised as a global South country with nearly 70% of its population directly dependent on climate-sensitive sectors, such as agriculture, fisheries, and forests, which supply food, tourism and manufacturing, the impacts of climate change and variability have been devastating (Ogundeji, 2022). The vulnerability of South Africa's rural coastal population, who rely on the above-mentioned climate-sensitive sectors for income and employment, are documented (Rankoana, 2016; Santhia, Shackleton & Pereira, 2018; Pereira, 2017; Duba, 2019; Thindaa et.al., 2020 & Ogundeji, 2022; Ubisi et.al., 2017). In recent years, studies show rural populations have been negatively affected by climate-related issues such as deteriorating health, wellbeing and livelihood (Masipa, 2017; Calzadilla et.al., 2014; Chersich et.al., 2018). Situated in close proximity to the coastline, they depend on fishing, agriculture, and tourism, placing them at the frontlines of climate change's devastating consequences (Wynberg & Hauck, 2014; Duba, 2019). Climatic events such as droughts, sea level rise, storm intensity, changing rainfall patterns, ocean acidification, and other extreme weather events severely and disproportionately impact these poor rural coastal communities (Badjeck et al., 2009; Wynberg & Hauck, 2014:5 & Lottering et.al., 2021). This therefore threatens their agricultural productivity and access to marine resources, disrupting their livelihoods and food security (Ahmed & Eklund, 2021).

While the focus of this study is to understand how people adapt, it is vital first to understand how they perceive and experience the effects of climate-related risks on their lives and livelihoods. Therefore, empirical evidence was collected through qualitative methods, using a case study approach. Interviews and focus groups were conducted with community members. This is elaborated on in the methodology chapter below. To this end, the Tshani Mankosi community in the Eastern Cape emerged as a compelling case study due to its proximity to the coastal zone. The unique geographic characteristics of this region, coupled with its dependence on both land and marine-based livelihoods, make it particularly vulnerable to the multifaceted negative effects of climate-related risk on livelihoods.

The findings revealed a complex interplay between a changing environment, people's perceptions, and socio-economic realities that shaped how the people of Tshani Mankosi adapt to climate-related risks and their shifting livelihoods. Therefore, this mini dissertation argues that climate responses are influenced by how people understand and experience their natural environment and the assets they possess, which reduces their vulnerabilities and

increases their adaptive capacity, ultimately leading to better livelihood outcomes.

## 1.2 Aim and objectives

*Aim*

The aim of this study is to understand the impacts of climate-related risks[2] on their land- and ocean-based livelihoods, and how marginalised rural people on the South African coast are adapting to climate-related risks.

*Objectives*

The more specific objectives of the study are:

i. To document local women's and men's[3] perceptions and experiences of climate-related risks and impacts on livelihood outcomes.
ii. To understand the adaptation strategies employed by local women and men in coastal communities in response to observed and experienced risks, with particular attention to gendered differences in adaptive capacity and practice.
iii. To use the above to understand how the effects of climate-related risks have shifted rural livelihoods and the gendered dimensions imposed by these shifts.

## 1.3 Significance of the study

This mini-dissertation then seeks to understand how rural coastal people adapt to climate-related risks on their livelihoods. A key motivation for undertaking this study is that, in rural livelihood and climate change literature, limited studies are looking at the interface of land and ocean-based livelihoods, particularly in the Eastern Cape. This interface is important as coastal rural communities feel the impacts of climate-related risks on both land and the ocean, pushing them further into the margins and increasing their vulnerabilities. Furthermore, limited studies seek to understand the shifting gendered and labour dynamics imposed by a changing climate. Therefore, this study contributes to addressing a knowledge gap in rural livelihood literature by examining the intersection of land- and ocean-based livelihoods and engaging with debates on the gendered impacts of climate-related risks. This study's inquiry is to understand how people make sense of the changing climatic conditions, and the economic capabilities people possess, as well as how these inform adaptation. The findings of this study also have the

[2] Accounts for both Climate Change and Climate variability.
[3] To demonstrate how one's genders and positionality shapes how they view and understand their lived realities and how their genders influence how they adapt.

potential to inform policies and interventions, such as the National Climate Change Adaptation Strategy (NCCAS), Integrated Coastal Zone Management (ICZM) and the National Coastal Management Programme (NCMP) to enhance resilience and contribute to sustainable development in coastal rural communities.

Furthermore, in trying to understand the dynamics of how rural coastal people are navigating and adapting to the impact of climate-related risks, this study focused on both individual and household strategies that they employ as a means of adapting.

## 1.4 Structure of dissertation

The first chapter provided an introduction to the study, an overview of what the study is about, introduced the aims and objectives of the research and the significance of the study. Chapter two is the theoretical and conceptual framework, which draws from mapping out existing literature on the topic. Chapter three outlines the research design and methods used to collect and analyse the data. Chapter four presents the findings of the study linking to the objectives. Chapter five is the analysis of the findings guided by the conceptual and theoretical framework. Lastly, chapter six concludes the study by giving an overview of what was presented, the limitations of the study and questions arising for future research.

# CHAPTER TWO- LITERATURE REVIEW

## 2.1 Introduction

This literature review explores the intersections of climate-related risks, livelihoods, and adaptation strategies among coastal communities. It aims to critically assess existing literature, identify gaps, and situate this study within the broader scholarship on climate adaptation and rural livelihoods.

Livelihood sustainability, particularly in rural contexts, has been one of the key concerns for many countries in the global South (Mbatha, 2018; Yiridomoh et al., 2021). Coastal Rural livelihood sustainability becomes particularly important when considering the impact of climate-related risk (Garai, 2016). Globally, studies have identified climate change as one of the key livelihood threats to rural people (Shackleton & Luckert, 2015; Yiridomoh et al., 2021). This is due to the degradation of natural resources caused by climate change and variability, leading to coastal communities that have been relying on these resources for their livelihoods to adopt different adaptation practices (Thondhlana et.al., 2012; Wynberg & Hauck, 2014; Shackleton & Luckert, 2015; Yanda et.al., 2019). For example, studies show how natural resources are in rapid decline globally due to increasing temperature, rainfall variability and other extreme weather events (Halder et al., 2012; Connolly-Boutin & Smit, 2016; Popke et. al,2016; Chidakwa et al., 2020 & Ortega-Cisneros et.al., 2021) and in South Africa (Kaminski, 2012; Sowman, 2020; Ortega-Cisneros et.al., 2021; Rankoana, 2021). The depletion of natural resources poses a considerable threat to the livelihoods of people who depend on these resources as one of the forms of human survival, particularly women (Tirivangasi et.al., 2023). Overall, the literature demonstrates how climate-related risks present a considerable threat to rural livelihoods. Therefore, it is necessary to understand the dynamics of how coastal rural people, particularly women, adapt to the impacts of climate risk, which is the aim of this study.

## 2.2 Sustainable livelihoods, livelihood aspirations and social reproduction.

The Sustainable Livelihoods Framework (SLF) originates from development studies, aiming to identify livelihood dynamics and suggest solutions for marginalised groups. This framework is a way of thinking guided by a set of fundamental principles and offers a basis for conceptual analysis. SLF can be traced from the early 1980s from the work of Amartya Sen's (1981) (Small, 2007; Scoones, 2015). However, the foundational work for the framework emerged in

the early 1990s from the work of Chambers & Conway (1992). Their work challenged the dominant narrative of economic growth-led development pushed by capitalistic ideologies, cementing ideas of participatory, bottom-up approaches when looking at and understanding rural livelihoods (Serrat, 2017; Tambe, 2022). The definition of SLF, taken from Chambers and Conway: "A livelihood comprises the capabilities, assets and activities required for a means of living, a livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods opportunities at the local and global levels and in the short and long term" (Chamber & Conway, 1992). SLF argues that natural resource-dependent communities or individuals have the potential and ability to reduce their vulnerability to climate-related risks by using the assets they possess to diversify their livelihood strategies or invest in one livelihood strategy (Antwi-Agyei, 2012).

However, Chambers and Conway (1992) limited consideration of external factors such as power, history, policies, and institutions and how these influence livelihoods, then laid the grounds for Scoones' expansion. Scoones (2015) re-engaged and expanded the SLF in the context of changing global dynamics. He outlines the evolution of SLF, noting that when considering cross-disciplinary livelihood perspectives, it reveals a rich and important history that goes beyond Chambers and Conway's 1992 paper. He argues for a more nuanced cross-disciplinary understanding that extends beyond the simple application. He further looks at the complex ways rural livelihoods intersect and are influenced by political, economic and environmental processes (Scoones, 2015). Scoones highlights that livelihood sustainability should look beyond maintaining capabilities and assets but needs to allow us to consider how people can step up, step out, hang in or drop out (Dorward, 2009; Mushongah, 2009 & Scoones, 2015). SLF focuses on understanding how marginal individuals and communities use various resources and/or assets to sustain and enhance their livelihoods in the face of economic, social and environmental change (Small, 2007). This framework is then used to assess communities and individual capacities to withstand stressors imposed on their livelihoods, including climate-related risks (Antwi-Agyei, 2012). Scholars in South Africa looking at livelihoods have used the fundamental asset categories to identify a variety of stressors that decrease adaptive capacity and increase vulnerability to climate-related risk and other social stressors using the five capital assets (Reid & Vogel, 2006; Shackleton et.al., 2014). The capital assets categories identified by Chamber and Conway include "human, social, natural, physical and financial

capital".

Tambe (2022) argues that this framework recognises that marginal individuals and communities have resources, capabilities and agency. Scoones (2015) then expanded on this framework by detailing and incorporating livelihood assets, strategies and outcomes within the broader vulnerability context, which created a guide in the proper application of SLF in research and policy. This approach is, however, criticised for being overly focused on the micro, household scale and too abstract to be used as an analytical tool for identifying broader patterns and informing policy analysis (Tambe, 2022). This framework has also been criticised for focusing too much on assets, overlooking structural and systemic issues, and limiting the analyses of the root causes of poverty and vulnerability. Given that this study looks at adaptation with socio-economic and gendered considerations, SLF then provides a comprehensive approach to understanding the local realities of how rural people sustain their livelihoods using the assets they have.

While the SLF provides a comprehensive approach to analyse rural livelihoods and adaptation, it has certain limitations, as noted above. To address these gaps, this study incorporates Dorward's livelihood aspirations theory, which offers a deeper understanding of how rural people's future aspirations influence people's livelihood choices, decision making and adaptation strategies in the context of climate-related risks. Unlike SLF, livelihood aspirations highlight the upward, downward and static mobility of livelihoods in the context of environmental change compounded by socioeconomic disenfranchisement.

To further address the limitations of SLF, the study draws from the concept of social reproduction. Feminist scholars highlight the growing significance of social reproduction under neoliberal capitalism (Federici, 2004; Fraser, 2016 & Bhattacharya, 2017). These scholars highlight the unpaid household labour performed by women, which is central in sustaining the workforce for capital accumulation, yet capital does not contribute to its reproduction (Bhattacharya, 2017). While much of the literature on social reproduction looks at the links between capital, workers and the household, scholars in the global south explore social reproduction in the context of absent markets and marginal state support (Ossome & Naidu, 2021). This is the case for this study, highlighting the role of gendered social reproduction in the absence of the market and limited state support for marginal people in the dawn of climate change.

### 2.3 Rural livelihoods in South Africa

Small-scale agriculture and fisheries play a vital role in sustaining rural economies across South

Africa[4][5]. Over the past decade, there has been a rising body of research related to the increasing concerns about the impacts of climate risks on natural resources in Africa (Turpie and Visser, 2013; Rapholo et.al., 2020). Literature suggests that countries in tropical and sub-tropical zones, such as South Africa, are experiencing significant temperature increases, which are projected to increase further in the coming years (Benhin, 2006; Rapholo & Makia, 2020). According to Ziervogel et.al (2014), South Africa is experiencing high heat levels, and this increase in heat will have devastating impacts on food security, particularly for marginalised groups. This is supported by other scholars stating that the ongoing changes in environmental conditions will have a negative effect on natural resources and production, ultimately affecting household consumption with increasing food prices and food insecurity (Blignaut et al., 2009; see also Calzadilla et al., 2014; Cammarano et al., 2020). This will ultimately affect the lives and livelihoods of marginal communities (Benhin, 2006).

According to Tirivangasi et.al. (2023), people are cognisant of the changing climatic conditions and the effects these changes have on their livelihoods (Rankoana, 2018; Mafongoya et.al., 2019). However, the extent of their understanding of climate change and variability differs. Some of the observed changes by marginal communities include changes in the length and timing of crop growing season[6], changes in feed grain availability[7] and quality[8], diseases[9], pests, changes in water requirements for agricultural production[10] and household use, loss and

[4] see Cammarano et al., 2020 for South Africa on rural economy disrupted increase in food security due to decreased rainfall

[5] See Hauck et.al (2014) & Ortega-Cisneros et.al. (2021)

[6] See Feliciano. & Sobenes, 2022 for Guatemala where indigenous people noted the frequency and intensity of extreme weather events stating that they are worried that "the rain may not come" affecting their planting and harvesting patterns, and crop output.See Rhiney, Eitxinger, Farrell & Taylor, 2016 for the Caribbean where we see similar patterns. For example, in Jamaica and Trinidad farmers reported a change in rainfall patterns (timing, duration and distribution) over the last 20 years. See Maponya's et al. 2013 Masinga et al., 2021; Rahayu, Astirin & Susilowati, 2022 Masekoameng & Molotja, 2016; Diniso et al. 2022) for South Africa changes in cultivation patterns due to timing, frequency and intensity of rainfall.

[7] IPCC, 2022 reports economic loss and decrease in forest productivity in 2012,2016 and 2018. See Cheng, McCarl & Fe (2022) Phuong, Biesbroek, Sen & Wals (2018) for Central Vietnam. See Ayeri, Christian, Josef & Michael (2012) for Kenya

[8] The IPCC AR6(2022) increased temperatures affect livestock productivity and fertility resulting in decreased dairy production

[9] See Davis & Ali (2014) for Bangladesh where farmers reported increased crop damage and crop diseases due to lower water table at crucial times of the planting season. Livestock diseases induced by climate change see Mapiya, Chimonyo, Dzama, Raats & Mapekula, 2009; Shisanya & Magonngoya, 2016 Hutter et.al, 2018; Hunter & Cronin, 2020; Diniso, Zhou & Jaja, 2021 for South Africa. see Phuong, Biesbroek, Sen & Wals (2018) for central Vietnam. For Peru see (Altea, 2020). See Ayeri et.al, 2012 for Kanya, Muhonia. See Kimaro, Mor & Toribio, 2018; Kaganzi et.al, 2021 for Tanzania

[10] See study conducted by Popoola, Monde & Yusuf (2019) in the Eastern Cape, farmers perceived poor vegetation and limited grazing, scarcity of water resources, decreased livestock growth rate, weight, milk production and reproduction rates.

decline of fish[11], strong winds[12], strong water currents, ocean warming[13], droughts, hunger[14], increasing temperatures[15], and decreasing rainfall[16] (Calzadilla et. al., 2014; Rojas-Downing et.al.,2017; Mubai et.al., 2023)

While there are studies on the impacts of climate variability, change (as demonstrated above) and adaptation globally and in South Africa, not many focus on the Eastern Cape, coastal rural livelihoods, adaptation and women. Even fewer attempt to bring these issues together. My study, therefore, adds to the existing literature and probes further into the local observations, experiences of climate variability, what role gender plays and how coastal rural livelihoods have been reshaped by a constantly changing climate, especially adaptation strategies used by coastal rural communities, using Tshani Mankosi as a site.

As different regions experience the adverse effects of climate-related risks on their livelihoods, it is essential to note that in marginal communities, how people adapt to the impacts of climate-related risks on their livelihoods is based on their perceptions of changing climatic patterns (Li et al., 2013). This necessitates the collection of context-specific data to fully understand adaptation, as was done in Tshani Mankosi.

When looking at climate-related risks and rural livelihoods, the failure to consider gender and other social identities increases the vulnerability of rural women to climate variability stressors, and one would not be doing justice to climate and rural livelihood literature if differential vulnerabilities are not accounted for (Limuwa & Synnevag, 2018, Shackleton et.al.,2014 & Thindaa, e.al.,2020).

## 2.4 Understanding climate-related risks and links to climate adaptation

I now turn to people's responses to these impacts. With growing global awareness of the serious threat climate change poses both on humanity and ecosystems, international debates have increasingly shifted from prioritising research on the mitigation of climate change, to an

[11] See Mohammed & Uraguchi, (2013 Mafongoya, Naidoo, Sibanda & Muringai (2019), Sowman, 2020; Ortega-Cisneros, Cochrane, Rivers & Sauer, 2021, IPCC AR6 (2022), reduce fish landings

[12] See Duba (2019) where fish folk in Tshani Mankosi, South Africa, stated that sea surface temperature and annual rainfall seem to have decreased
while winds and rainfall related extreme events have increased

[13] See de Melo Virissimo & Robinson, 2023.See Mohammed & Uraguchi (2013) for ocean warming. Similar scenario in South Brazil see Machado Martins & Gasalla (2018)

[14] See Mafongoya, Naidoo, Sibanda & Muringai (2019) where a fisher expressed that the increase of climatic events resulted in increased hunger.

[15] Mexico, Argentina and Chile see ( Sánchez-Cortés & Chavero, 2011; Roco, Engler, Bravo-Ureta & Jara-Rojas, 2015; Fierros-González & López – Feldman, 2021. Li et.al (2013) notes similar patterns in China where farmers report increases in temperatures in the last 30 years

[16] Islam, Tasnuva, Sultana & Rumana (2014) for south- western Bangladesh respondents confirm erratic rainfall patterns leading to increased risk of crop failure, pests and diseases, erosion and dry up water resources

emphasis on climate change adaptation (Adger et.al., 2005; Elum et.al., 2017). Literature suggests that, for decades, rural communities and farmers in different parts of the world have been employing different adaptation strategies to their farming techniques or altogether forgoing participating in certain practices (Rubekie et.al, 2022). The different adaptation strategies people employ depend on how they perceive and experience climate-related risks. This is influenced by varying contextual factors such as access to resources, education, culture, age, gender, and institutional factors (Wiid & Ziervogel, 2012; Phuong et.al, 2018; Findlater et.al., 2018). One main factor that shapes adaptation is access to resources, which rural women often lack, restricting their capabilities. This lack of access is compounded by poverty and gendered structural inequalities that shape how different genders adapt to climate-related risks (Badstue et.al, 2018).

### *2.4.1 Gender and livelihood vulnerabilities to climate risks*

The relationship between gender and livelihood vulnerabilities to climate risks is complex and multifaceted, shaped by varying compounding factors such as socio-economic status, social roles and environmental challenges (Garai, 2016; Bhadwal et.al., 2019; Senja, 2021; Anugwa et.al, 2023).

Climate-related risks are disproportionately felt, influencing the lives and livelihoods of marginal groups in varying ways (Tanny & Rahman, 2016; Bhadwal et.al, 2019). This is due to intersecting social identities that shape people's susceptibility, exposure level and capacity to respond to environmental challenges (Call & Sellers, 2019). Over the past decade, gender has emerged as a key stratifying component in shaping vulnerability to climate-related risks and in influencing access to and use of natural resources (Yadav & Lal, 2018; Daoud, 2021; Anugwa et al., 2023).

Globally, women constitute majority of the labour force engaged in natural resource-based sectors. Despite their central role, the socio-economic status, rights, and livelihoods of women remain under-recognised in their communities compared to those of their male counterparts (Chandra et al., 2017). According to Senja (2021), climate variability and change present a complex and multifaceted threat to rural women globally. This threat manifests in the increase of extreme weather conditions, and this change has been recognised as a global priority by international institutions (United Nations Women Watch, nd). The United Nations (2006) further acknowledges that climate-related risks and gender inequality intersect, resulting in

disproportionate vulnerabilities.

Woodhouse et.al (2022) highlight the importance of addressing gender inequality in biodiversity conservation, particularly to meet the objectives and targets of the Convention on Biological Diversity's post-2020 Global Biodiversity Framework, in alignment with the Sustainable Development Goals (Woodhouse et al., 2022). Biodiversity conservation and rural livelihoods are intricately connected. As a result, Mbatha (2022) highlights that the question of gender equity overlaps with that of access. When considering biodiversity governance, we cannot overlook the lack of participation of women and girls in decision-making processes, as it is central to answering questions about biodiversity governance and policies, access, livelihoods, and vulnerability in the face of climate change (Mbatha, 2022).

Rural women are both caregivers and key food producers, making up the majority of Africa's agricultural labour force and supplying nearly 90% of the continent's food ( Mbatha, 2022; Yeni, 2024). Musinguzi et.al (2018) similarly highlight that both men and women engage in productive activities such as agricultural production; however, women make up the majority of the workforce in this sector as they mostly partake in work that is bound to the immediate homestead, reproducing labour. However, their participation in fishing is relatively low compared to their role in agriculture and post-marine harvesting activities (Akintola & Fakoya, 2017). This is due to the distinct gender-based roles in household livelihoods, leading to differing experiences of the impacts of climate variability. This is also seen in how men and women participate in the fisheries system in distinct ways, engaging in different parts of the fisheries system chain. Women's work tends not to be seen (considered invisible) because their roles are always tied to their traditional household duties, which are also influenced by societal gendered norms and the influence of capitalism and colonialism in placing women in the domestic sphere, shaping social and political power (Tsikata, 2009; Tsikata, 2016; Musinguzi, 2018; Limuwa & Synnevag, 2018; Mbatha, 2022).

#### *2.4.1.1 Intersecting Inequalities and the Gendered Nature of Vulnerability*

The Women's Environmental Program (WEP) (nd) emphasises that men and women have differing capacities to respond and adapt to climatic threats to their livelihoods. Recurring themes in literature attribute gender inequality, land tenure arrangements, lack of climate information, lack of decision-making power and involvement, and a lack of resources for women that exacerbate their already existing vulnerabilities (Duru et al., 2022). This case is

also highlighted by Oxfam International (nd) where they state that in Latin America and the Caribbean, approximately 30% of rural women hold ownership of agricultural land, yet less than 5% have access to "technical" support.

In South Africa, Mbatha (2022) identifies structural barriers that hinder women's active participation in decision-making, which restricts their access to resources. Mbatha (2022) states that women who gain access to the above-mentioned are usually women in male-headed households, and land is central in access debates in rural communities. This is consistent with Shackleton et.al. (2014), stating that male-headed households with adult females are less vulnerable to climatic shocks due to access to monetary resources gained from formal employment in peri-urban areas.

The vulnerabilities of women are not only worsened by the gendered structural barriers, as highlighted above, but also by societal norms, created by systems of colonialism and capitalism, that restrict women to the domestic space and as the primary caregivers (McDowell, 1997). The vulnerability of women is further exacerbated by climate change and variability as women partake in climate-sensitive activities. For example, a previous study done in Tshani Mankosi, Duba (2019) and in Hluleka Emdon (2013) highlights the collection of water, food and firewood as responsibilities tied to women. Another added dimension is the increase in labour-requiring duties. Women explained that the ground spring water had started to dry up, requiring men to assist with collecting water from a nearby village using horse carts (Duba, 2019). This dependence increases vulnerability due to limited access to livestock and land ownership.

The United Nations (2006) observed that women and girls in the global south have long faced the challenge of travelling long distances to access water. However, climate change, particularly during periods of drought, has intensified this burden, making their journeys even longer and more difficult. Walking further for young girls means being exposed to other dangers and (often sexual) violence, and this compounds their vulnerability.

We also observe gendered vulnerabilities in fisheries, where women and men engage in overlapping fishing activities. However, men dominate offshore and long-distance activities, while women are restricted to near-shore activities, which often have access to poor fish quality and sell for their husbands post-harvest. Women dominate fishing only if one largely considers postharvest activities. This may also lead to less food-secure households as the catch might not

be of high value to sell or rich in nutrients to consume.

in Ilorin South, Nigeria, Duru et al. (2022) highlights the vulnerability of women's livelihoods, stating that since agricultural production—which women predominantly engage in—is susceptible to climate fluctuations, even a slight temperature shift can determine crop success or failure. This means that during dry seasons, women often travel long distances, either on foot or using horse carts, to fetch water for irrigation (see above). The more time women spend travelling long distances to fetch water, the less time they have for other livelihood activities such as farming and fishing, ultimately reducing their productivity on both land and in the ocean. This, in turn, impacts household food security, as the time spent searching for water could have been used for tasks such as cultivating land, planting, harvesting, or fishing.

The vulnerabilities of women are shaped by a multitude of intersecting socio-economic and cultural factors that further push women to the periphery, ultimately leading to compromised adaptive capacity. This research will help to unveil the complex dynamics shaping these vulnerabilities (see above), offering a nuanced understanding of how gender intersects with broader social, economic and local structures. The analysis will not only highlight the disparities in access to resources, but it will also help highlight the agency and resistance demonstrated by women in navigating the challenges imposed by climate-related risks on rural livelihoods.

### *2.4.2 Gender and adaptation to climate-related risks on land and in the ocean*

Gender influences people's adaptation strategies due to differing gender dynamics in livelihood practices and the creation of feminine and masculine spaces. Adaptation strategies encompass a range of approaches, including investing in crops and animals that are more tolerant to heat and mixed livelihoods to decrease reliance on one resource (IPCC AR6, 2022). Some of the adaptation strategies suggested in the literature include changing crop varieties, intercropping, staggering planting dates, integration of on-farm and off-farm livelihood activities, irrigation, water conservation and harvesting, building windbreakers, practising Indigenous soil conservation, planting closer to water sources, using manure as fertiliser, channelling of beds and ridges (Nhemachena et.al, 2014, Taruvinga et.al, 2016; Popoola et.al, 2018).

Among the varying adaptation strategies, Assan et al. (2018) highlight that in Ghana, women farmers preferred wells, boreholes, bushfire control, and water harvesting, whereas men primarily opt for irrigation and drought-resistant crop varieties to cope with drought conditions.

This finding is consistent with findings in Limpopo, where it is demonstrated that depending on one's gender, the responses to climatic changes differ. Ubisi et al. (2017) showed that "41% of women farmers adapted by changing planting dates, while male farmers employed crop variety and diversification (35%) and mixed cropping (15%)".

In coastal communities, adaptation extends to marine resources. Duba (2019) documents how men and women fishers employ different techniques depending on the marine activities that they partake in. For example, mussel-collecting women adjusted their traditional mussel storage techniques by digging a hole in the intertidal splash zone. With changes in climatic conditions, they do not dig their hole as deep (Duba,2019). This is because water is cooling, and the shallow graves where mussels are stored are sufficient to keep them fresh for extended periods. Other adaptation techniques employed by fishers include increasing fishing rate by fishing twice or more per day and participating in off-farm activities (Rubekie et.al, 2022). Fishers also use technical resource-intensive strategies such as lengthening fishing gears to access deeper waters and using outboard motors as opposed to canoes. This allows them to travel further offshore and reduces the challenges posed by strong winds and waves; ultimately leading to greater fish catch (Rubekie et.al, 2022).

These gendered adaptation strategies reflect different roles and access to resources. While adaptation is evident, unequal access to assets and decision-making opportunities continues to shape who adapts, how, and with what outcomes.

### *2.4.3 Climatic conditions and adaptation techniques in the ocean*

Other major factors in marine harvesting include wind conditions, such as strong winds, which can cause irregular tides and altered wind patterns. These interfere with the monthly fishing days (Rubekie et.al, 2022). Seasonal wind conditions, therefore, play a huge role in how people adjust their techniques. Also, at specific times of the year, people harvest more of a particular type of food and this is highly dependent on seasonal abundance and conditions. A similar scenario is observed by Sowman (2020) in South Africa, Namibia and Angola.

### *2.4.4 Generational knowledge and adaptation to climate-related risks*

Literature also shows that farming knowledge in relation to adaptation is largly dependent on age (Ubisi et.al., 2017 & Rankoana, 2021). For example, in a study conducted in the Eastern Cape Garutsa & Nekhwevha (2019) speak on "indigenous" knowledge that is passed down from generation to generation such as, soil conservation, mulching, organic manures application,

winnowing, fermentation, drying, pounding, and crop storage-methods commonly employed by older women in Khambashe. People also employ other "indigenous" knowledge strategies to predict rainfall for farming. They rely on the appearance of what community members call "Sekgopetsana" which is a morning star coupled with strong winds. This was associated with high rainfall probability, while wind blowing from the southeast was an indicator for a drought season (Rankoana, 2021).

### *2.4.5 Adaptation, resource-intensive strategies and diversification*

Resources play a huge part in capacitating people to adapt. The use of resource-intensive adaptation strategies, such as outboard engines, raises questions of resource availability, differential vulnerability and access (to knowledge and finances), especially for marginal communities who employ short-term and less resource-intensive adaptation strategies (Sowman, 2020). For example, in the previous research done in Tshani Mankosi community, tourists and "white" fishers are the ones who can partake in inshore and deep diving activities as they have resources and access (Kaminsky, 2012). Locals, on the other hand, struggle with catch as they participate in near/onshore fishing activities where there are fewer fish. These differences in access to resources necessitate government interventions and/or policy-based adaptation and a resource capacity approach, which is cognisant of local marginal fishers.

Another adaptation strategy that coastal communities participate in is livelihood diversification. Diversification refers to the participation of individuals in multiple livelihood strategies to minimise risks, and livelihood dynamics includes individuals completely shifting to other types of livelihood strategies to enhance livelihood outcomes (Alobo Loison, 2015). While there is existing data and literature on how coastal communities are adapting to climate change. There is a need to highlight context-specific adaptation strategies employed by coastal rural communities at the interface of land and ocean-based livelihoods, and how these adaptation strategies are changing over time.

# CHAPTER THREE- RESEARCH DESIGN AND METHODOLOGY

## 3.1 Introduction

This chapter outlines the research design and methods, it is divided into three sections. The first section is a synopsis of the research case study site, including the ethics process and how access to the village was negotiated. The second section presents the research design, followed by the sampling strategy, which outlines how the respondents were identified and the data collection methods employed. The third section demonstrates how the data was analysed, followed by a section on reliability and validity, ethical considerations, and the study's limitations.

## 3.2 Research site: Tshani Mankosi

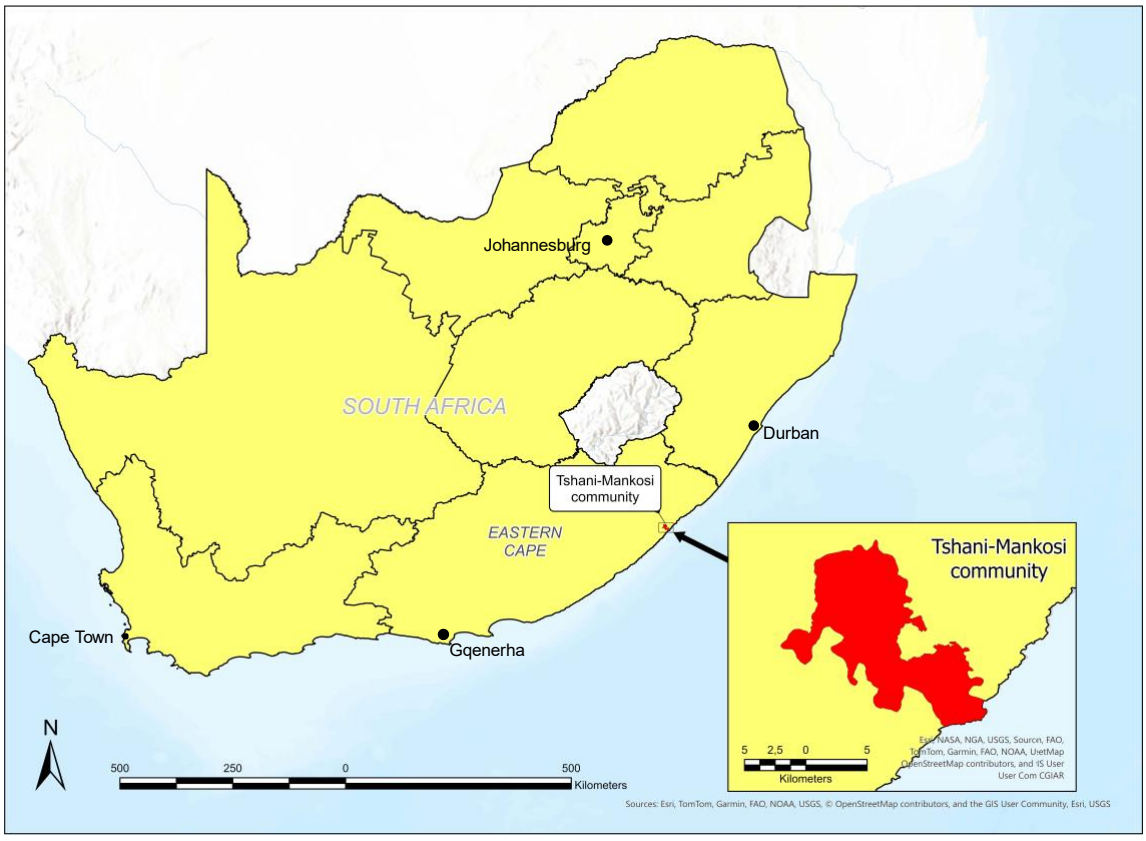


*Figure 3.1 Map of the study site by Tariroyashe Marufu*

### *3.2.1 Background on the study site and why it was chosen*

The study was conducted in Tshani Mankosi, a coastal village nestled between the Mdumbi and uMthatha rivers along the Wild Coast in the Eastern Cape. This village is in the Nyandeni municipality within the OR Tambo District Municipality. The selection of this site was a deliberate process of theoretical and practical considerations. These considerations include Tshani Mankosi's high exposure to climate-related risks due to the communities' reliance on both land and ocean-based livelihoods, making it compelling for analysing how assets, capabilities, livelihood strategies and gender labour are shaped by climate-related risks and socio-economic conditions.

The interface of land and ocean-based livelihoods proved to be an interesting point of exploration as it is currently an under-researched nexus in South Africa. Studies often look at land-based livelihoods in isolation from the ocean and vice versa; often, the other is framed under findings (Cartwright, 2011; Williams, 2023). Furthermore, studies on coastal rural livelihoods tend to zoom in on tourism, displacement and conflicts between conservation and livelihoods which are important issues along the South African coastline (Mahlangabeza-Piliso, 2016; Kimbu et.al., 2019). Bhattacherjee (2012) states that "Exploratory research is conducted in new areas of inquiry with goals such as scoping the extent of a phenomenon or problem, generating initial ideas, or assessing the feasibility of more extensive studies on the topic ". The exploratory nature of this study provided key insights into how coastal rural people in Tshani Mankosi navigate intersecting environmental challenges across different ecosystems. Tshani Mankosi proved to be a great starting point because of its historical context in relation to natural resource extraction for livelihood use, especially its historical reliance on the ocean (Mbatha, 2011; Hauck and Wynberg, 2014).

The interest in the eastern seaboard was due to its unique climatic conditions, as this province is experiencing increasing aridity and rising temperatures, making adaptive strategies in livelihood activities crucial. This community's history of ocean-based sustenance, coupled with the active involvement of women, offers valuable insights into livelihood practices and how rural coastal people are navigating the impact of climate variability (Amoah & Simatele, 2021). Furthermore, the village's socio-economic structure, where women play a central role in both productive ocean harvesting activities, collecting crayfish and gathering mussels and oysters, moves from cases where women are often confined to the role of market sellers in post-

harvest activities within the fisheries system, highlighting their multifaceted engagement in both ocean and terrestrial resource harvesting (Fitriana & Stacey, 2012; Frangoudes et.al., 2018)- and reproductive work, provides an ideal context for investigating the intersections between livelihoods, climate variability, and adaptation.

Another contributing factor to Tshani Mankosi being of interest is that a vulnerability assessment conducted by the OR Tambo district municipality highlights the high vulnerability (high exposure, sensitivity and low adaptive capacity) of the Nyandeni local municipality, where Tshani Mankosi is located (OR Tambo District Municipality, 2018)[17]. In the vulnerability assessment, the grassland and Indian Ocean coastal belt are identified as "Highest priority for action" (OR Tambo District Municipality, 2018). This area is characterised by changing weather patterns, rising sea levels, and associated social and environmental challenges (OR Tambo District Municipality, 2018).

In this region, climate conditions are characterised by a warm, rainy summer season in the months of December, January, and February (DJF), and the winter season starts in June, July, and August (JJA), characterised by cool and dry days (Duba, 2019). During summer, the temperature averages 28°C, with lows reaching 17°C. In winter, the average temperature drops to 21°C, with minimums as low as 10°C (ibid). Between 1991 and 2020, the average mean surface air temperature in this region was 18.23°C and precipitation, 464.28mm (Climate Change Knowledge Portal, nd). The high vulnerability of the area, the rapidly changing weather patterns and sea level rise, amongst many other climatic changes, make this site ideal for studying adaptation practices employed by men and women in coastal rural communities.

Additionally, this site selection provided substantial insights into climatic dynamics within a limited time frame. An equally important consideration in selecting the site was avoiding research fatigue among respondents and minimising the risk of overburdening the community with repeated academic inquiries.

[17] Tshani Mankosi is situated along the Eastern side of the wild coast of South Africa, placed between two (Mthatha and mdumbi) estuaries ( Kaminski, 2012; Hitchcock, 2013) . This village falls under ward 26 in Nyandeni local Municipality in the former Transkei region (Mbatha, 2011; Rey-Moreno, Roro, Siya, Simo-Reigadas, Bidwell & Tucker, 2012; Hitchcock, 2013).

## 3.3 Ethical clearance

Prior to commencing with the study, the researcher obtained ethical clearance from the university ethics committee (eRA). This process included taking an online module, which took 12 hours, preparing detailed documentation outlining the study's objectives, methods and the measures taken to protect the rights, privacy and well-being of the study's respondents. This process also involved submitting a semi-structured interview, a focus group and an informed consent protocol. The study was approved on the 7th of June 2024 after the revision of minor corrections requested by the ethics committee. The approval took 3 months to be granted from the date of submission, after which the researcher began contacting the entry point in the village.

## 3.4 Access

After identifying Tshani Mankosi as the appropriate site, my supervisor introduced me to a PhD student in the department who had previously conducted her master's research in the village. She facilitated initial contacts, including the chief's wife and a local villager who had assisted her in the field. Engaging with these contacts was instrumental in establishing an entry point into the community and building trust before my arrival.

Upon the researcher's arrival in Tshani Mankosi on the 21st of July 2024, the researcher visited the chief to introduce themselves formally, explain the objectives of the study, and secure his permission to conduct research. This step was essential for establishing respect and rapport, aligning with local protocols. Additionally, the gatekeeper recommended that the researcher engage another individual to accompany them on daily visits to ensure safety and facilitate smoother interactions with community members. The entry point introduced the researcher to the field assistant on the 22nd of July, where they had a brief conversation and spoke about what the researcher came to do and what assistance they would need from him. Throughout the fieldwork, the researcher noted how the presence of a known community member reassured respondents, as the researcher had little time to create rapport with community members besides the chief informing community members about the researcher's arrival before commencing with the fieldwork.

## 3.5 Research design

A qualitative research design was employed, particularly a case study approach, which allowed for an in-depth, context-specific exploration of the lived realities of the people of Tshani Mankosi, within the broader socio-ecological, environmental, economic and gendered context. Qualitative research entails the collection of data through direct observations made by the researcher (Ajayi,2017). Qualitative research allowed the researcher to gain a detailed and comprehensive understanding of the case. Employing this method provided a rich, nuanced and holistic understanding of the experiences, challenges, and adaptation strategies employed by people in Tshani Mankosi. The study used semi-structured interviews and focus groups as tools for data collection. This approach was chosen as it allowed for an in-depth and nuanced understanding of the context relayed by the respondents themselves. In the semi-structured interviews and focus groups, the researcher had minimal control over the conversation as the respondents led, answering using the general plan of inquiry relayed by the researcher (Babbie, 2020). This will be expanded on in sub-sections 3.7.1 and 3.7.2.

## 3.6 Sampling strategy

A nonprobability sampling method was employed, specifically using purposive and snowball sampling techniques. Purposive sampling is a non-probability sampling method where the researcher intentionally selects respondents based on their judgment, ensuring they best represent the study's objectives (Babbie, 2020). Purposive sampling was chosen to deliberately select respondents who are engaged in both or either land- or ocean-based livelihoods. This technique allowed for the intentional inclusion of respondents whose experiences provided critical insights into the research questions. Snowball sampling was used as a supplementary method to expand the participant pool through referrals from initial respondents. This approach is especially effective in community-based research, where trust and social networks play a key role in accessing respondents who may not be easily accessible through conventional sampling methods (Acharya et al., 2013). This was crucial in ensuring the participation of women who are often marginalised and whose voices are typically underrepresented. It was also useful in identifying key respondents who had not been initially identified due to minimal information on the social context of Tshani Mankosi.

## 3.7 Data collection methods

Data collection involved a combination of semi-structured interviews, focus groups, and observations made while living in the community. These methods were chosen to provide a holistic understanding of the social, economic, and environmental factors shaping the communities' adaptation strategies to climate-related risks in the context of dynamic and evolving livelihoods. Table 3.1 presents the data collection methods used, along with the number of respondents.

Table 3.1: Data collection method and number of respondents

| Data collection method | No of respondents |
|---|---|
| Semi- structured interviews | 14 |
| Women Only Focus Group 1 | 5 |
| Mixed Gender Focus Group 2 | 16 |

### *3.7.1 Semi-structured interviews*

Semi-structured interviews are a conversation between the researcher and respondent where the researcher has a general plan of inquiry, including themes to be covered (Babbie, 2020). Semi-structured interviews were conducted with 14 respondents; 10 semi-structured interviews were with women and four with men (see Table 3.2). These semi-structured interviews were designed to explore the respondents' personal experiences of climate-related risk on their livelihoods and their adaptation strategies. Table 3.2 is a list of all respondents who participated in this study and the dates on which the semi-structured interviews took place.

Table 3.2: Semi-Structured Interviews Schedule and Codes

| Date | Respondent | Code |
|---|---|---|
| 23 July 2024 | Woman From Tshani Mankosi – mussel and oyster Harvester used to grow vegetables for household consumption. Casual worker at the cottages and local hotel. | WTM1 |
| 23 July 2024 | Woman from Tshani Mankosi – mussel and oyster Harvester & Fisher-Crayfish | WTM2 |
| 23 July 2024 | Men from Tshani Mankosi - Farmer (vegetables, Maize, banana, sugarcane & grows marijuana) for household consumption and to sell. Owns Livestock (pigs, cattle and chickens) | MTM1 |
| 24 July 2024 | Elderly woman from Tshani Mankosi- wood and reed collector and mud brick maker used to grow vegetables, maize for household consumption & Has chickens. | WTM3 |
| 24 July 2024 | Elderly woman from Tsani Mankosi- Grows vegetables, maize and reed collector & has chicken. | WTM4 |
| 24 July 2024 | Man from Tshani Mankosi- Fisher, sells beer, owns goats | MTM2 |
| 24 July 2024 | Woman from Tshani Mankosi- Mussel and oyster Harvester, maize, own chickens and pigs also sell ginger beer. | WTM5 |
| 24 July 2024 | Woman from Tshani Mankosi- Mussel and oyster harvester, grows vegetables, maize and owns chickens. | WTM6 |
| 24 July 2024 | Woman from Tshani Mankosi- reed collector, grows vegetables and maize, mussel and oyster harvester, owns chickens and pigs used to have cattle. | WTM7 |
| 25 July 2024 | Man from Tshani Mankosi Fisherman, occasionally harvests intertidal | MTM3 |

| | | |
|---|---|---|
| 25 July 2024 | Young man from Tshani Mankosi- Fisherman who also grows and sells marijuana | MTM4 |
| 26 July 2024 | Young Woman from Tshani Mankosi- Mussel and oyster harvester, fisher for crayfish and also works at the local backpackers | WTM8 |
| 26 July 2024 | Young Woman from Tshani Mankosi- Wood collector, grows vegetables and maize for household consumption and casual worker at the cottages and hotel in the village. | WTM9 |
| 29 July 2024 | Woman from Tshani Mankosi – oyster and mussel harvester | WTM10 |

Despite initially planning for a more structured day-to-day fieldwork plan for the semi-structured interviews and focus groups, the researcher had to adopt a more flexible schedule due to time commitments and community members' daily duties, particularly women. This then required more flexibility. Interviews took place at the respondents' homes, while walking, by the ocean or at the local backpackers. Most of the time, the researcher arrived for a planned semi-structured interview, and respondents had forgotten about the interview. This resulted in adjustments to the semi-structured interview schedule, where the researcher had to walk around the village to see if respondents scheduled for later interviews were available. Most of the semi-structured interviews were conducted in pairs because the most ideal way for respondents to engage was to interview them before they left their homes or when they had just returned from their morning responsibilities and duties. This meant that the researcher had to adapt to local preferences and changing dynamics that suited the study's respondents.

The researcher had informal conversations with people in such cases and ensured that informed and prior consent was obtained. Some individuals who were willing to engage further, the researcher would end up conducting semi-structured interviews with them. These semi-structured interviews, on average, took 45 minutes. The researcher would give an overview of the study and state the aim and key objectives through conversation. In most cases, once the respondents understood the study, the semi-structured interview would commence, asking the respondents questions through a conversational format. The respondents further elaborated on themes, relaying their story by telling the researcher their livelihood strategies, what changes they have seen in the current environmental conditions of Tshani Mankosi, how climate-related risks affect them, how they endure or try to adapt to these changing environmental conditions and what they attribute this change to- which was most interesting. The open-ended nature of the questions allowed for a flexible, reflexive approach, enabling respondents to narrate their own experiences without being constrained by predefined categories. After this, the researcher would ask questions through probing to gather more details and inform respondents about the focus group and people they knew who might be interested in joining.

The semi-structured interviews provided rich data on how Tshani Mankosi rural people navigate productive and reproductive work in response to climate-induced changes. For women, the interviews highlighted how they balance agricultural work, fishing, and household responsibilities under increasingly challenging environmental conditions.

### *3.7.2 Focus groups*

A focus group is when a researcher brings five or more people together in an environment where the subjects are comfortable to engage in a guided discussion of a particular topic (Babbie, 2021). Two focus group discussions were conducted (see Table 3.1 and Table 3.3). The first focus group was with five women, which happened through snowballing on the 26th of July 20204 as there were struggles in gathering women in a time they were all comfortable with. The second focus group consisted of a mixed-gender group with 16 respondents. The two focus groups conducted in Tshani Mankosi were both in comfortable settings where the respondents could engage in the themes of the study. During the focus groups, the researcher had semi-structured conversations where the respondents elaborated on themes the researcher had identified during the semi-structured interviews.

Table 3.3: Focus Group Schedule and Codes.

| Date | Focus Group | Code | Respondents |
|---|---|---|---|
| 26 July 2024 | Women Only Focus Group One | WFG1 | Five women- four elderly women and one mid age women |
| 31 July 2024 | Mixed Gender Focus Group two | MGFG2 | 16 Respondents – nine men and six women |

On one of the days, the researcher was conducting semi-structured interviews. A community member recommended visiting a local woman who depends on terrestrial resources, brickmaking, reed collection and crop farming. The researcher went to see her for a semi-structured interview. However, on arrival, there was a group of women. This gathering included a group of older women (aged 55-79) with a wealth of knowledge on land- and ocean-based livelihoods and the challenges posed by climate variability. Although some women were no longer actively engaged in land- or ocean-based work, they remained knowledge custodians, passing down essential skills and insights to younger generations. This discussion thus evolved into a de facto focus group, offering valuable historical and intergenerational perspectives on the shifts in climatic patterns, livelihoods and adaptation practices.

*Figure 3.2 Mixed Gender Focus Group*

The second focus group was a mixed-gender group, which helped me further explore community-level adaptation strategies to climate-related risks and have a bird's-eye view of the contextual experiences of the broader Tshani Mankosi community. The mixed-gender focus group facilitated a broader understanding of community-level adaptation strategies and the role of gendered power dynamics in shaping these responses. In this focus group, there were nine men and six women. Men were dominant in expressing their challenges and adaptation strategies, whereas women were more reserved. As a result, the researcher had to continuously be mindful of balancing the power dynamics to have balanced views. This focus group was held at Mdumbi Backpackers at the community church in the backpackers' yard, which is leased from the chief and community. Respondents suggested this at the end of the semi-structured interviews. Even after managing to have a mixed-gender focus group, the number of women was low due to the abovementioned reasons, such as time constraints, duties, and responsibilities. When looking at the dynamics of the two focus groups, the women-only focus group allowed for a "safe" space where women could freely express their concerns, challenges, and strategies for climate adaptation without male dominance in the conversation, as opposed to the mixed-gender focus group.

### *3.7.3 Living with the community: observations*

During the fieldwork period, the researcher took morning walks on the stretch of the coast to observe the day-to-day activities of the village and connect the observations to what the respondents were saying in semi-structured interviews. As a result, every night and morning, the researcher would observe the moon's stages and when it was set to predict the ocean

dynamics of the following day, and whether women could go harvest or men could fish. On days when the ocean was not rough and conducive for fishing activities, people were out fishing, particularly men, and the researcher used the opportunity to have informal conversations with them and to record observations.

During the 2 weeks in Tshani Mankosi, the ocean was mostly high tide, not giving women many opportunities to go harvest; in such instances, women tried to go to the sea to see if they could potentially get oysters that were in the sand and check for ones that they could still sell to the visitors. As such, there was no opportunity to go harvest during the researchers' time in the village. The researcher would then observe fishing activities while men were fishing and conduct some impromptu interviews. Furthermore, during this time, observations were made regarding people's relation to the ocean and their activities on days or weeks when the sea is not conducive for harvesting, fishing and diving, an occurrence due to high tides that respondents mentioned has increasingly become common in recent years.

The researcher also dedicated time to building rapport, an open and trusting relationship between the researcher and the respondents, by engaging with community members in their daily lives and routines. The researcher would walk through the village and coastal stretch, visiting individuals and speaking to individuals previously spoken with or new people who were identified during the walks. During that time, the researcher actively participated in the villagers' day-to-day activities, whether in the yard or the ocean. Two memorable days were spent with an elderly woman who crafted mats, baskets, and breadboards from reeds. The woman graciously shared her time with me as she taught me the basics of making *ingobozi* "reed *basket*" (see figure 3.3). The second memorable moment was spent fishing with two men who were interviewed, and they shared the different techniques and strategies they use to maximise their ability to get their catch for the day (see figures 3.4 and 3.5). Also, speaking isiXhosa allowed the researcher to connect and communicate easily with community members. In line with the village's values- "it takes a village to raise a child", the researcher was often regarded by residents as one of their own, akin to being seen as a child of the community. This helped to hone trust and facilitate easy interactions with community members.

*Figure 3.3 Spent time learning how to make reed baskets with a local elderly woman.*

*Figure 3.4 Spent time with two local fishermen.*

*Figure 3.5 A picture of me holding a fish I caught with the help of one of the fishermen interviewed.*

## 3.8 Data analysis

Throughout the fieldwork, the researcher was able to take audio recordings of the semi-structured interviews and focus groups, as well as the researcher's reflections, observations of the day, and pictures of specific activities and equipment that women and men used in their daily activities. These served as supplementary data, providing contextual richness and helping to triangulate findings during the analysis.

Data coding was undertaken in two phases: initial open coding to identify recurring ideas and patterns emerging from the data, followed by focused coding to refine key themes relevant to the research objectives, which were generated inductively from the identified codes. The thematic analysis was informed by the sustainable livelihood's framework, livelihood aspirations theory and the concept of social reproduction. Each framework shaped how data was interpreted and how themes were constructed.

The Sustainable Livelihoods Framework informed the identification and coding of the livelihood resources, such as natural, social, human, physical and financial capital, and helped contextualise these within broader vulnerability contexts and institutional dynamics. It also shaped the analysis in highlighting how local women and men respond to climate-related risks and shocks through

various adaptation strategies and livelihood decisions.

Dorward's livelihood aspirations theory contributed a future-oriented lens to the probing and analysis, focusing on the long-term sustainability of adaptation decisions taken by respondents, contextualising livelihood mobility or stagnation relating to the socio-economic status of people, assets and environmental degradation. This framework enabled the study to move beyond looking at how people adapt, but also explore the ambitions and constraints that ultimately shape people's livelihood outcomes over time and the decisions people make in response to uncertainty.

Social reproduction, grounded in feminist political economy, brought attention to the often invisible labour that sustains households and community life. This concept informed the coding of unpaid care work, intra-household labour division, gender norms in fisheries and farming and the structural conditions that shape everyday experiences of women in the context of climate vulnerability. By applying these frameworks, it further revealed how intersecting structural constraints shape the gender differentiated vulnerabilities in coastal rural communities.

Together, these enabled the analysis to account for both individual agency and the structural conditions that constrain or enable adaptive capacity. This approach allowed for a deeper understanding of how climate-related risks intersect with livelihood practices, social identities and gendered power relations in marginalised rural coastal communities. The use of thematic analysis further enabled the identification of key patterns across the data, ensuring the study's analytical lens remained attuned to livelihood resources and strategies, institutional contexts, resilience, and gendered adaptation in the broader frame of climate-related risks.

### 3.9 Validity and reliability

Ensuring the validity and reliability of the research was a key component in generating credible and trustworthy data. Validity refers to how well the measure accurately reflects the actual meaning of the phenomenon being studied (Babbie, 2020:149). In contrast, reliability refers to the consistency and dependability of the particular technique applied to the same object (Babbie, 2020:151). Reactivity, as discussed by Babbie (2020), presents a challenge to validity when the behaviour of the subjects may react to the idea of being studied, thus altering their behaviour from what it would have normally been. This was carefully considered during data collection, where the researcher was intentional about the strategies to minimise the potential of distortions.

Babbie (2020) notes that implicit differences in power and status separate the researcher from the subject, and noting the influence of power dynamics and hierarchies in the field is of utmost

importance as it can impact responses and overall research reliability. The researcher was completely aware of their positionality as both an outsider and a woman researcher in Tshani Mankosi and how this may have shaped the interactions and responses received. To mitigate these effects and reduce reactivity, the researcher stayed in the village for two weeks. During this time, as short as it was, managed to form meaningful connections with community members. Four aspects that made it less challenging were that (i) the researcher spoke isiXhosa, (ii) engaged informally with respondents, (iii) adhered to local norms in engaging with people, and (iv) spent time with the villagers in informal settings. This allowed the researcher to build trust and create a more natural and less reactive setting for data collection.

## 3.10 Ethical considerations

Ethical considerations were central in this research; this includes the emphasis on relational accountability, informed consent, and the non-exploitative and non-extractive nature of the research process in how it was framed. The researcher continuously extended respect to the community members who took part in this study and the broader community of Tshani Mankosi.

Informed consent was obtained from all respondents prior to conducting the semi-structured interviews and focus groups. In the process, the researcher ensured that the respondents understood the purpose of the study, how the data would be used, and what benefits or limitations could realistically be expected in terms of community-level outcomes and the voluntary nature of their involvement.

In instances of informal conversations, verbal consent was also secured to respect the participant's autonomy and confidentiality. During the semi-structured interviews and focus groups, the researcher continuously emphasised that respondents could withdraw at any point and made efforts to have the semi-structured interviews in spaces that respondents felt comfortable in. Additionally, to protect the participants' privacy, the researcher assured the respondents that their confidentiality and anonymity would be maintained throughout the research process.

While no material incentives were offered, reciprocity was fostered through knowledge exchange, respect for community protocols, and the return of preliminary findings in the form of a feedback discussion with community representatives via telephonic engagements.

Throughout the research process, the researcher remained reflexive about their positionality as a researcher, acknowledging the power dynamics inherent in the research process, particularly given that they were only in Tshani Mankosi for two weeks, which did not afford sufficient

time to establish a strong social network and trust relationship with respondents. The researcher made efforts to mitigate these dynamics by prioritising and acknowledging the participant's agency in the co-creation of knowledge.

### 3.11 Limitations of the study

This study used a case study approach using nonprobability sampling techniques to provide an in-depth understanding of the study's aim and objectives. However, because it was context-specific to Tshani Mankosi, it may not be generalisable to other regions and communities or give an accurate and precise representation of the Tshani Mankosi community. Furthermore, time and resource constraints inherent in a mini dissertation limited the scope of the study, restricting the number of respondents.

## CHAPTER FOUR- FINDINGS: THE LIVED REALITIES OF THE PEOPLE OF

## 4.1 Introduction

Below, the findings of this study are presented, focusing on the following themes: Livelihood strategies employed by the respondents. The experienced and observed changes in the ocean and on land, as well as gendered labour dynamics, changing livelihood practices, and adaptation strategies.

The majority of the study's respondents are involved in land and ocean-based livelihoods as one of their primary sources of income, amongst others, such as government grants, remittance from family members and employment-tourism. This is consistent with other studies in the area (see Mbatha, 2011; Hitchcock, 2013). Land-based activities involved agriculture (i.e., crops, marijuana, grass reeds, wood and livestock). The crops that were farmed included maize, spinach, cabbage, pumpkin, carrots, beetroot and herbs (see table 4.1), and livestock included mainly goats, pigs, chickens, a few respondents had cattle and sheep, mainly men. Ocean-based activities included fishing and harvesting of mussels and oysters, as shown in Table 4.2. Women in the village were mainly harvesters, collecting mussels and oysters, a few fish for crayfish, and some partake in casual work in the village. Women also highly relied on government social grants for livelihood support. On the other hand, men mostly participate in fishing, diving for crayfish and casual work in the village and neighbouring towns.

## 4.2 Livelihood strategies

### *4.2.1. Land-based livelihoods*

The community's dependence on agriculture for livelihood support is constrained by limited and degrading capital, such as the lack of financial assets to buy agricultural input or install tanks. One respondent explained how she used to plant a wide range of crops but stopped due to lack of water and old age (WTM3). Respondents also noted that crops like pumpkins and maize are typically grown for household consumption rather than sale, making it difficult to supplement their diets during tough times when they do not have other sources of income (WFG1 & MGFG2). Various respondents highlighted how changes in land use and flash floods have been detrimental to their farming for the past few years. One respondent stated that the reason people rarely planted in the field in the past five years was because community members cut the trees that were vital in regenerating soil nutrients, now they stop farming at the open

fields as they end up reaping nothing due to soil degradation (MTM2). The reduction of arable land in Tshani Mankosi has threatened the food security and the livelihoods of rural communities. According to respondents in semi-structured interviews, this has also resulted in the increased reliance on purchased foods, which focus group respondents stated that " we now have to rely on buying food, and when you buy food, you need to buy i*sishebo*[18] and our elderly grant is not sufficient for that" (WFG1). MTM1 and WTM8 also highlighted how flash floods and hailstorms are detrimental to their livelihoods, this will be elaborated in section 4.4. Table 4.2 below illustrates land-based resources and their use. Respondents also harvest forest resources for household use or herbs for medicine (WTM7, WTM 9 & MGFG2). See image 4.1.

*Figure 4.1: Women from collecting wood for household use.*

[18] isishebo - meat or soup. Food used to supplement the main dish

Table 4.1: Land-Based Resources and use.

| **Farmed crops** | **Use** |
|---|---|
| Red and White Maize | Household consumption |
| Pumpkin | Household consumption |
| Spinach | Household consumption and income |
| Cabbage | Household consumption and income |
| Beetroot | Household consumption and income |
| Carrots | Household consumption and income |
| Banana | Household consumption |
| Sugarcane | Household consumption |
| Marijuana | Income |
| Grass Reeds | Income and fixing household roofs |
| Herbs | Household use and Livestock use |

| | |
|---|---|
| Wood | Household use for fire |

### *4.2.2 Ocean-based livelihoods*

Women respondents described how their households were dependent on the ocean not only for food, but also for income (WTM1 and WTM2). Some women respondents in both interviews and focus groups explained that when they sell marine resources to tourists, they use the money to buy food for their children and send support to children at boarding school. This dependency on the ocean as both a food source and economic resource is central to the livelihood sustenance of many households in the community (WTM2 & MGFG 2). However, findings from focus group 2 reveal that the contribution of marine resources to livelihoods can also be precarious due to changes in ocean dynamics over the past 10 years. Stating that "We depend on the ocean for our livelihood...when the tide is high like today, we can go to sleep without eating" (MGFG2). Table 4.2 below illustrates the Marine Living Resources (MLR) that respondents obtain from the Tshani Mankosi stretch of the coast, including their use and harvesting practices. Women respondents who participate in ocean-based livelihood activities stated that their daily routines are structured around the tides and ocean dynamics (WTM1 and WTM2, 23 July 2024).

Table 4.2: Ocean-based resources, their use, harvesting and fishing methods/ techniques.

| **Marine resources** | **Use** | **Harvesting method** |
|---|---|---|
| Mussels | Food and Income | Hand gathering during low tide using what is locally referred to as *umnqala* (a metal rod) |
| Oysters | Food and Income | Hand gathering during low tides using *umnqala* |
| Limpets | Food | Hand gathering |
| Linefish and crayfish (East Rock Lobster), elf/shad, White musselcracker, Garrick Galijoen, brama, Yellowbelly rockcod,kob, blacktail) | Food and Income | Handmade fishing rods, Fishing rods and diving |
| Octopus | Income | Manual Harvesting using a stick or ones hands |
| Redbait | Bait | Harvested manually |

### *4.2.3 Tourism-based livelihoods*

Tourism plays a huge role in the sustenance of livelihoods in Tshani Mankosi. Respondents highlighted selling marine and land-based resources such as fish, mussels and wood alongside selling beadwork (WTM1; MTM2; WTM3). See figures 4.1 and 4.2. With the high competition for tourists' business in Tshani Mankosi. One respondent stated how she is forced to prioritise her family's needs, stating, "when I see there are visitors, I run to Mdumbi and I don't tell my neighbour. I always put myself and my family first because I look at the next person and think that they are better off than me" (WTM2).

Many of the respondents noted that they rely on tourism as one of their primary sources of income. One respondent explained, "I harvest so I can sell at the cottages in the village," while another respondent discussed how she prioritises selling mussels to new tourists before anyone else in the community because of the immediate income it generates (WTM1 & WTM2). From informal conversations with people at the backpackers where I stayed, one of the great concerns for respondents is a decline in the number of tourists who visit the area. Some respondents noted that the decline resulted from COVID-19 and that local tourism has not recovered since 2020. Other respondents in the focus group also noted that the decline is not solely due to Covid-19, but also to infrastructural issues such as poorly maintained gravel roads, the increasing crime rate, and the growing danger for visitors during heavy rains (MGFG2). One semi-structured interview respondent outlined how the increasing crime rates have impacted tourism, "There have been two robberies and attempted kidnappings of tourists when travelling on the gravel road coming to Tshani Mankosi at night" (WTM7). This decline in tourism has also put pressure on community livelihoods and created the competition alluded to in the quotes above. Many of the respondents expressed discontent over the decline in tourist visits, which has left them without buyers for their produce and products like reed mats, handcrafts and marine resources, fish and oysters (MGFG2).

*Figure 4.2: Women selling beadwork to tourists*

### *4.2.4 Other sources of income: employment, wages and government social grants*

Outside of harvesting and selling marine and land-based resources, handcrafts, which mainly target the declining tourists, respondents also rely on piece jobs. Some respondents noted how they engage in temporary work, such as washing dishes or laundry for tourists, while others engage in local construction or plastering jobs (WTM1 & WTM9). These jobs are also precarious as they are not always available, pay low wages, and have irregular working hours, which also affects other livelihood activities people engage in. For example, some respondents highlight how one has to decide what they want to focus on in a day, making considerations of what will bring food to the table (WTM5 & WTM8). One respondent states that every day, she wakes up early in the morning to either go to the ocean or finish other tasks from the previous day that she didn't manage to complete due to consistently checking ocean dynamics (WTM5). Another respondent highlighted how she had to choose which job to focus on depending on the money it brings and the security of income (WTM8). She stated that she chose to focus on her job at the backpackers, where she knows she will get a standard income, and only harvests or fish when there is a tourist or someone who requires her service.

Various elderly respondents continued to rely on manual labour for their livelihoods. Despite old age and health challenges, they plough fields for their neighbours. One respondent explained how she is often paid in money or in-kind for assisting others with agricultural tasks. Stating that "I sometimes plough for people and they pay me either with money or offer me something small as a thank you" (WTM3).

Piece jobs are not the only way in which Tshani Mankosi respondents supplement their livelihoods, they also rely on social grants. All the respondents, particularly women, stated how they received social grants at some stage in their lives, whether for grandchildren, disabled family members or old age grant for parents and in-laws. Respondents highlighted the high reliance of the community on social grants as a buffer. Respondents in the focus group discussions and semi-structured interviews mentioned how social grants provide crucial financial support, even though precarious, as one stops receiving it when the child reaches the age of eighteen or an elderly family member passes on (WTM3; WTM2; WFG1). One respondent stated that the grant her younger child receives helps alleviate some of the financial burden caused by the irregularity of her income from selling marine resources (WTM2). Similarly, another respondent explained how she depended on selling wood and ploughing fields before receiving her South African Social Security Agency (SASSA) grant at the age of 65, which has become a key source of her livelihood (WTM3). Many others in the focus groups expressed similar dependency on the grants (WFG1).

As already demonstrated above, many households in the study diversify their livelihood strategies to reduce vulnerability. A woman respondent described how she combines ocean harvesting with grass collection and selling ginger beer, while her husband noted that he does construction work (plastering) alongside fishing and selling beer (WTM5 & MTM2 ). Other respondents also supplement their livelihoods by selling beads, collecting and selling wood to the locals and visitors at the backpackers (WTM 3 & WTM 9). This is seen in Image 4.2 and Image 4.3 above. This diversification is crucial in a context where both land-based and marine-based livelihoods are vulnerable to environmental and economic fluctuations. In this section, I have shown the varying livelihood strategies that the respondents of the study participate in. In the following section, I delve into the experienced and observed changes respondents noted in the ocean.

## 4.3 "*Siphila ngolu lwandle*[19]" – perceptions and experiences of ocean changes and their impact on coastal livelihoods

### *4.3.1 Changes in ocean conditions and the abundance of marine resources*

The respondents of this study shared mixed experiences regarding changes in the ocean over the past few years. Out of those who were interviewed, most of the respondents (WTM1, WTM2, MTM2, WTM7, WTM8 & WTM10) expressed that various changes have been observed over the last two decades, especially in terms of the abundance and availability of marine resources. Similarly, the majority of focus group respondents (MGFG2) stated that they have noticed changes in their coastline over the period of 20 years. For example, respondents noted the decline in mussel stocks on the coastline adjacent to Tshani-Mankosi, which they attributed to the spread of red bait, an ascidian locally referred to as "*amasenene*.". They went on to describe how red bait is a destructive organism that grows on the rocky reefs and colonises the habitat, hindering the growth of marine life. One young, female respondent asserted that where red bait thrives, mussels and other intertidal marine species struggle to grow. Most of the interviewed respondents highlighted how mussels have become smaller over time, and their once abundant stocks have now diminished significantly (WTM1, WTM2, WTM5, WTM7, WTM8, WTM10). They also highlighted how ocean dynamics have changed, resulting in rough ocean conditions, which not only affect their ability to fish but also influence the behaviour of marine species, hindering them from engaging with the ocean as they used to. For example, one respondent emphasised climatic effects of ocean dynamics in terms of how winter now brings more frequent high tides in contrast to 2002 when low tides were more common, and the ocean moved far back that they would be able to harvest on rocks that now don't show. Stating that "The ocean used to have more low tides in winter, but now it's mostly high tide, which makes it hard for us to go to the ocean… We used to get plenty of mussels and fish, but now we don't" (WTM7). An elderly woman who was born in the nearby village and married a man from Tshani Mankosi stated that "see, years back, there were a lot of fish and they were big, but now you can stay the whole day at the ocean and not get anything, coming home empty handed" (WTM 10). Another respondent who started harvesting at a young age and started selling marine resources at age 12 stated her frustration that "*asisenabo ubutyebi bolwandle*", We don't have the abundance we used to. It's not like before. I would actually say there is none (WTM 1). The

[19] This means, "Our livelihoods depend on this ocean" or "We rely on the ocean"

respondent went on to say, "I wish we could get mussel farming "*utyalo mbaza*" like other places, but we have never gotten that here" (WTM1). In addition to these changes, seasonal variations in ocean temperature also play a role in the abundance and size of marine living resources. Some respondents observed that mussels grow larger in the summer season when the water is warmer and more nutrient-rich, while during the winter, the colder ocean waters stunt their growth (WTM2; WTM5; WTM10). The impact of these temperature fluctuations is critical, as it directly affects the growth cycles and availability of key intertidal and other MLR.

On the other hand, focus group respondents, mostly individuals who used to harvest marine resources, indicated not seeing any changes in the ocean MGFG2. Most of the MGFG2 respondents who used to fish noted that "things are the same because they are still getting the same things from the ocean." Further stating that the reason for fewer species is seasonality. An elderly man in MGFG2 stated that "I don't see any changes because all of these things have their own seasons. With regards to size, things go by their seasons". Furthermore, they attributed the decline of mussels to the type of rocks that are present in the coastline between the Mthatha river and the Mdumbi river and how they are not conducive for mussel growth, as the flat rocks in this area are more suited for oysters. In contrast to other coastal areas, such as Coffee Bay, with black rocks and seaweed, which are considered ideal environments for mussel growth. When the respondents described this, they stated that "you get rocks that are conducive for mussel growth beyond the Mthatha river, in Coffee Bay. Mussels don't grow on our rocks. Our rocks are cement-like rocks and mussels do not like that" (MGFG2).

### *4.3.2 Increased frequency of heavy rains and storms*

Heavy rains and storms were also frequently mentioned in semi-structured interviews and focus group discussions as contributing stressors affecting the ocean and the surrounding ecosystems. Respondents widely shared this observation. They noted that rainfall and floods have caused their local river water, the Mthatha river, along with debris and dirt, to flow into the ocean, making it dirty and difficult to use the ocean (MTM2; MTM3; MGMF2). The contamination of ocean waters from river debris and dirt affects their livelihoods as it disrupts fishing and harvesting activities, which are crucial for both subsistence and income generation. This forces people to limit their reliance on marine resources or seek alternative strategies, such as shifting to land-based livelihoods, travelling to nearby coastlines or sitting and enduring. This increased people's labour burdens and vulnerability to economic and food insecurity. This finding is

consistent with Duba's (2019) finding stating that "In the event of flooding, fishers described that the sea was polluted with all the debris from surface runoff, affecting life at sea". Focus group respondents describe how the ocean reacts to debris, stating that "the ocean does not like anything dirty so it will 'fight' till it spills out whatever is dirty" which then impacts Tshani Mankosi communities' interaction with and reliance on the ocean (MGFG2). Respondents also highlighted how heavy rains have become more pronounced in recent winters, whereby weeks go by without the community being able to access the ocean for harvesting (MGFG2). High tide, exacerbated by wind and rainfall, has increasingly become a barrier to fishing and harvesting, impacting the community's ability to gather mussels, crayfish, and other marine living resources. Focus group respondents recounted how thunderstorms not only make the ocean rough but also affect the behaviour of marine species like crayfish, which let go of fishing rods during lightning strikes (MGFG2).

Men respondents in the study mostly partake in fishing livelihood activities. During high tides, they state that it is impossible for them to get anything from the ocean as the ocean comes close to the rocks they stand on when fishing. This has directly impacted their livelihoods by reducing the number of days they can access the ocean, limiting their income and food supply. This challenge is most pronounced in winter, the peak tourist season, pushing them to risk fishing in undesirable conditions in order to sell to tourists and sustain their earnings. The frequency of high tides and rough ocean conditions has increased, especially during the winter months. Focus group and semi-structured interview respondents noted that, in contrast to previous years when low tides were more common and allowed for easier harvesting, the ocean now stays high tide for more extended periods, often driven by strong winds (MGFG2).

*Figure 4.3: Umnqala metal rod used to harvest mussels and oysters.*

### *4.3.3 Wind conditions and the contribution to ocean changes*

One other major factor in marine harvesting is strong wind conditions, which have caused irregular tides and wind patterns. This has interfered with the community's monthly fishing days. One respondent stated how wind shapes their ability to fish and harvest marine resources (MTM2). Another respondent who is a fisherman and also plants marijuana stated that "September is particularly a windy month, and it is hard to fish during this time, but by the end of the month, conditions improve, allowing me to access the ocean more easily" (MTM4). He further stated that "I don't know why now it has been so windy because it's July", meaning the seasons were no longer what they used to be. Another respondent who lives off the ocean stated that "the wind restricts our chances of benefiting from the ocean…it just moves everything to the inner ocean (MTM3)". All respondents interviewed and in focus group 2 highlighted how wind direction plays a vital role in ocean dynamics and fishing patterns. In recent years, there have been frequent strong winds coming from the Port St Johns direction, which is northeast of their coastline (WTM2; MTM2; MTM3; MTM4; MGFG2). Frequent strong wind conditions have caused high tides, which have restricted respondents' access to the ocean. Respondents in both interviews and focus group 2 explained how winds coming from the Coffee Bay side, the southeast of their coastline, help calm the ocean, allowing for fishing activities. Seasonal wind conditions, therefore, play a huge role in how the respondents adjust their techniques.

As highlighted above, wind direction and frequency play a crucial role in ocean-based livelihoods and community members' interaction with the ocean. A fisherman also states how wind direction also influences ocean temperature, stating that "When wind comes from the Port St. Johns side of the ocean is high tide, with endless waves and extremely cold but we try fish even in these conditions in as much as fish do not come close to the rocks when water is cold. But we sometimes manage to get blacktail and kob" ( MTM2). When water is cold and high tide, for fishermen respondents in Tshani Mankosi, this means fewer fish to sell and more hours spent at the ocean, taking time for their other responsibilities. One respondent who is a father to five children, further explained how he spent most of his day at sea when the ocean water is cold (MTM2).

### *4.3.4 Physical changes to the coastline: coastal erosion*

Another common theme noted by respondents in MGFG2 and semi-structured interviews was the physical changes to the coastline, particularly the loss of trees and increased erosion. Trees that once acted as natural barriers to protect the coast from the encroaching ocean have fallen, allowing the sea to come closer to the cottages and homes. This has caused flooding during heavy rains and high tides. Focus group respondents stated that "the trees that used to hold the ocean back are gone now, and the ocean is coming closer to the cottages. The cottages near the coast are flooding" (MGFG2). Another focus group respondent extended on this, stating that "what also causes the ocean to come close to the shoreline are winds. When it rains heavily, the wind moves sand, so the trees use the sand to be steady. Once it rains heavily, that's when the ocean comes close, and the trees fall" (MGFG2).

### *4.3.5 Religious and spiritual beliefs shaping perceptions on the ocean*

On the other hand, focus group respondents also attributed what others saw as changing ocean dynamics to God protecting his creation, stating that "When the ocean is rough, it just moves everything to the inner ocean. Which shows that God is looking over what he created in that way" (MGFG2).

Cultural and spiritual beliefs about the environment further shape how community members perceive the changes they are experiencing. Many women attributed environmental disruptions, such as the increase in storms, to both spiritual and physical causes. As noted, "It's because when there are storms, you are not supposed to go close to the ocean. It's our cultural belief" (WTM2; WTM7 ;WTM10). The connection between spiritual beliefs and natural phenomena underscores the holistic ways in which the Tshani Mankosi community understands and navigates climate-related risks. For some, these beliefs provide a framework for understanding the unpredictable nature of the environment, though they also constrain their ability to access certain resources during specific environmental conditions.

## 4.4 "*Kubalele*[20]" - perceptions and experiences of changes on land and their impacts on livelihoods

### *4.4.1 Changes in rainfall patterns and the frequency of storms*

This section outlines the changes in land-based livelihoods that people in Tshani Mankosi have noticed in the past years. Below, I give more nuance to these observations reported in interviews and focus group discussions. The intention is to illustrate how respondents in Tshani Mankosi make sense of changes to their land-based livelihoods. As opposed to the ocean, where respondents had differing perceptions, when it came to land changes, respondents had similar views, and they noted significant changes in land-based activities, largely driven by environmental degradation, deforestation and climate-related risks.

Most of the respondents in the semi-structured interviews and focus groups noted changes in rainfall patterns, temperature fluctuations and increasing frequency of extreme weather events. Respondents expressed that "Where we usually see a change of nature, as years are going by, we see the change when it comes to planting crops and generally in what we get from the land." (WFG1; MGFG2). The respondents went on to state that "The changes we see are the rain. Another common theme highlighted by respondents was erratic rainfall and prolonged dry periods as the main reason for crop failure. One respondent who is a mother and wife explained that while they still plant maize and other vegetables, they often do not get to harvest due to unpredictable weather patterns (WTM9). Another respondent mentioned that in some years, despite planting crops in September, they fail to reap any maize due to lack of rain during the blooming stage of the maize (WTM7). Respondents state that the changes in rainy days and seasons have affected the planting process and also increased food insecurity, as they now have to rely more on purchasing food. Focus group respondents stated that "we now have to buy food, we don't have the money, and this mielie meal that you young people came with doesn't make us full, we need to buy a lot of things to eat it with. When I was growing up in the 50's, we would grind corn and make mielie meal that was filling and didn't need "isishebo" (WFG2).

The changes in climatic conditions have disturbed the whole farming process. A respondent highlighted this, "The first problem is that there is no longer short rains in July to help with the process of fertilising the soil with maize stocks till August, *intwasahlobo"*. It then rains a little

[20] Kubalele and/or imbalela means drought.

in August but the rain is no longer the same… Here along the coast, there is moisture but when you look at our soil and grass it's dry… On the coast we used to get a lot of showers but that's no longer the case." (MTM1). Focus group respondents detailed how planting seasons have been changing for years and now they are changing again. They reflected that "When I was growing up in the 80s, we used to plant in August and in December we would have harvested, and we were eating maize on Christmas Day. Nowadays, people plant in September – December (SOND)…" (WFG1; MGFG2). An interview respondent shared the same sentiments where she stated that "rainy seasons keep on changing, for a few years we plant at the same time then all of a sudden things just change and there's no rain when you expect it. Like now, things are changing. It looks like we have to go back to planting in August. I know it will change again in the coming years" (WTM7).

Respondents highlighted a new phenomenon occurring where there is an increased frequency of thunderstorms in times they are not used to as they are used to thunderstorms in summer and spring. Stating that "we just get thunderstorms in winter now. We also just had hailstorms in a time we are not used to, in summer" (WTM 7; WTM10; MGFG2; WFG1). Respondents in WFG1, highlighted how excessive rains and hailstorms have caused damage to homes and crops, making it difficult for the community to cultivate as they used to. Focus group respondents added, "These hailstorms destroy everything that grows above and below the ground, and we end up not being able to plant or harvest anything." (MGFG2). One respondent shared their shock and frustration at returning home and finding her house flooded during heavy rains and hailstorms (WTM7). She described the events, "Do you see this tunnel on the floor? It was caused by the heavy rains coming into my rondavel and I had to dig a tunnel to divert the water out." She also stated that "it rains so heavily that you think you will die and we can't even plan for planting or fish on those heavy rainy days" (WTM7). Another respondent stated how the hailstorms also result in landslides and nutrient-rich soil depleting, "the soil got flushed away. The layer with nutrients has been flashed away, now we have a lot of rocks on that side, so I cannot plant there anymore." (MTM1). He went on to describe "the time I had put manure to prepare the soil to plant, we got heavy rains… all nutrients from the manure got washed away". This highlights another added stressor, while rain is necessary for growth, it can also destroy the very crops it is intended to facilitate growth.

### *4.4.2 Soil erosion and frequency of wind conditions*

Respondents highlighted how soil erosion has been an added stressor to their farming and utilising traditional farming fields "*amasimi*". Stating that "dry soil and strong winds have destroyed their gardens, leaving them without sufficient produce." Focus group respondents also discussed the link between deforestation and soil fertility, sharing how the cutting down of trees to open land for planting has reduced soil nutrients, resulting in less yields (MGFG2). One respondent stated,"we moved from farming in our home gardens to the fields. But people cut down the trees that used to feed the soil" (WTM1). Another respondent described, "We are now left with the same problem of lack of soil nutrients due to trees being cut down the trees that provide nutrients to the soil. Now, we have abandoned the fields to go back to our home gardens" (MTM1).

### *4.4.3 Emergence of new diseases on livestock*

Focus group respondents noted the scarcity of grazing land, and the spread of livestock diseases have made it harder to sustain traditional farming practices. Respondents in both focus groups and interviews highlighted the rising cost of livestock care due to emerging disease, particularly the introduction of a new tick locally referred to as "*uqwelagqibe*", was a recurring theme in both focus groups and interviews. One respondent who owns pigs and chickens, stated that forest herbs don't work on livestock anymore with the emergence of new diseases (WTM5). Focus group respondents also stated that "cows nowadays need injections. Back in the days, cows didn't need such we used herbs from the forest. These herbs don't work anymore." A new tick "*uqwelagqibe*" has been devastating livestock, forcing farmers to purchase expensive medications and injections (MGFG2). One respondent noted, "Livestock is now dependent on injections... but injections are expensive, and only certain people can afford them". The respondent described "a person has to have a deep pocket". This high cost of livestock care has resulted in a significant decline in livestock ownership in the Mankosi village, as MTM1 remarked, "now only three people in the village have sheep" ( MTM1). They went on to explain the effect this tick has on sheep, cows and goats, stating that with cows and goats you see the symptoms early and you try to attend to it. However, with sheep, it finishes them off "I don't want sheep at all because they would die from this tick since sheep have very soft skin, goats don't have soft skin.". An interview respondent highlighted how they only rest in winter, noting that "In Summer it's hard… we only get to rest in winter (May, June, July). Once there is rain,

even if it's just moist, that tick returns. In short grass you won't really find it but in long grass you find it." (MTM2). Focus group respondents attribute the emergence of this tick to the introduction of new cattle breeds such as Brahmans, which they stated are not suited to the coastal environment (MGFG2). The mix of local cattle "*inguni*" and Brahman has led to weaker resilience to the environment, as one focus group participant stated that "… we are by the ocean, when you go to villages up top, you won't get this. It is only here… people say it's the ocean and rivers that cause this. Places that are moist…When we were growing up, cows used to be milked, and we also only had one breed of cows, "*inguni*". As time went by, our fathers brought Brahmans. They were saying they are coming with Boer cows. They saw these big, beautiful cows from Gauteng. They brought those cows here. Now these cows came with this tick, they cannot endure the climate here and they are not used to the grass here. Now we mixed these cows with the inguni now we have a different breed." Locally described as "*amalegon*".

Some respondents also noted the new disease that chickens and pigs are getting, an elderly woman who sells wood, makes bricks and ploughs people's gardens stated that "chickens now have pimples around their mouth and sometimes you just start hearing your chickens' cough (WTM3). We use medications from the pharmacy and also sometimes wash the chickens… but we don't know for sure what is causing these new diseases." Similarly,' respondents noted that pigs are getting pimples, and because they don't know what is causing these diseases, they stated that " they get sick. I just get ocean water and put it in their food to kill the pimples that grow." (MTM2).

### 4.5 Gendered labour and the implications of environmental change on livelihoods

The observations between men and women were similar, but the impact and experiences seemed different based on gender, economic options available to households, roles and responsibilities and age of respondents. The majority of women interviewed and had informal conversations with emphasised how most of these changes have created an even more precarious life as they struggle to feed their families, and also how they are burdened with more work due to having to alter their lives around environmental conditions. While men tend to talk mainly about resources and the government exploiting them and governments marginal support in enhancing their livelihoods.

The findings presented in this section help answer questions on the gendered implications of climate-related risks, cementing the ideas presented by scholars on the gendered vulnerabilities

due to changing climate and its impact on marginal communities, particularly coastal communities. This section highlights how marginal livelihoods are dynamic and are reshaped by climate-related risks.

In addition to fishing, agriculture, and tourism-based income, social grants play a critical role in supporting families, especially the elderly and households with children. The gendered division of labour in Tshani Mankosi places a disproportionate burden on women, who must balance household duties with increasingly difficult agricultural and fishing work. Women are now relying on multiple sources of income, including piece jobs, social grants, and informal trade, but these sources are often insufficient to ensure food security.

*Figure 4.4: Handmade fishing rod that women use when fishing for crayfish at night close to the rocks.*

For many women, the unpredictability of the ocean has created a precarious existence and one where they have to now balance reproductive work with productive work. As respondents shared, “I now can only go to the ocean... my time is dependent on ocean dynamics.” (WTM1).

Other respondents expanded on this by stating that “everything is on hold. I spend most of my day and night trying to see if I can get a chance to go to the ocean either to harvest or catch crayfish and now even when I go, I stay there from 7 pm till early hours of the morning moving along the coast to try get crayfish to sell the following morning” see image 4.5 (WTM2; WTM7). Women are forced to closely monitor the tides, often working in unsafe conditions, including at night, to gather resources such as mussels, oysters, and crayfish. This reflects how care labour becomes a significant part of women's unpaid work, exacerbating the gendered

labour burdens. The woman further explained that “When I get home, I have to prepare the children for school, while constantly checking if there is a car driving down to Mdumbi backpackers with visitors”. This was a consistent theme, particularly for households with no men to “assist” or older children. Women’s workload extends late into the day, with respondents noting that, “I wake up at 5 am and come back from the ocean at 12 pm... at 7 pm I go back to the ocean to fish for crayfish and return at 1 am.” ( WTM2). Another respondent described how her work at the ocean often delays her household chores, stating, “When the ocean has been rough, I end up not having time for other stuff... that affects the money I make” (WTM5). The interruption of paid labour by unpaid domestic responsibilities is a recurrent theme, where women’s income potential is constrained by their need to attend to household duties, such as preparing food or collecting grass. This labour- intensive schedule illustrates the physical and emotional toll of balancing harvesting with domestic responsibilities. The long hours spent working both at the ocean and in the household underscore the unpaid social reproductive labour women engage in, balancing the need to generate income with domestic duties like preparing children for school and cooking. This pattern of labour reflects how women's economic activities are heavily reliant on the ocean’s cycles and market demand. A respondent shared how harvesting sometimes prevents her from collecting grass or completing other household chores: “It becomes hard to even cook when the ocean has been rough... I have to do everything else the following day and wake up extra early” (WTM5). This highlights the tension between different forms of labour and the necessity of prioritising one task over another, depending on environmental conditions.

## 4.6 Changing practices and adaptation strategies in the Tshani Mankosi community.

### *4.6.1 Ocean based adaptation strategies*

The adaptation strategies noted by the Tshani Mankosi community members range from community members taking proactive steps, enduring and waiting it out. The two key findings apart from the ones mentioned above were that the respondents also noted the role of local knowledge that has been passed down and how that has now evolved and eroded due to changing climatic conditions. Respondents also noted how resources play a huge role in capacitating them to adapt to the current climatic conditions of their area.

The respondents for this study highlighted the growing concern about the long-term sustainability of the community’s interaction with the ocean. The depletion of resources,

combined with the physical changes in the ocean and climate variability, has led to a sense of uncertainty regarding future livelihoods. Some respondents suggested that interventions such as mussel farming (*utyalo mbaza*) could help address the shortage, but they noted that such initiatives have not been implemented in their area, unlike in other coastal areas like Coffee Bay. This lack of external support, marginal government support and infrastructure to mitigate the impacts of ocean changes complicates the community's ability to adapt in the ocean. Focus group respondents in Tshani Mankosi noted that there is not much they can do in relation to the ocean, noting that "we sit and endure… we wait for things to settle" (MGFG2). This reactive stance reflected in interviews and the focus group highlights the lack of resources and institutional support to develop more proactive adaptation measures, revealing the vulnerabilities of marginalised communities in the face of climate variability and marginal state support. One respondent stated that "… as you can see there is not much I am doing cause it's still high tide."(WTM1). However, there are small-scale adaptive measures that community members employ as a means of sustaining their livelihoods. A respondent noted how now they have electricity so they can use their fridges to store fish for future sales (MTM4). Despite this, most of the respondents expressed frustration over the inability to cope with the changes they note in the ocean.

### *4.6.2 Land-based adaptation strategies*

On land, faced with environmental challenges as noted by respondents, the community has adopted a variety of adaptation strategies, though many remain reactive rather than proactive due to lacking resources and not fully understanding the changes.

One key adaptation method employed in the Tshani Mankosi community has been adjusting planting times to align with changing rainfall patterns. However, this strategy is not always effective due to the continued unpredictability of weather. Focus group respondents noted, "it's hard to predict anything now…farming is win and lose" (WFG1; MGFG2). The respondents explained that some people plant in August while others wait until September or November, but the success of these decisions is largely dependent on when the rain comes. This shift is a result of the increased uncertainty people face in predicting the best time for planting. One respondent stated that "if it rains today, we will start planting" (WTM7).

Some farmers have also begun to rotate crops to manage soil fertility and reduce the impact of pests. A respondent described how he plants different crops each year to prevent pests from becoming familiar with the soil (MTM1). Also, the large reliance on livestock manure and corn

stocks for soil nutrients. However, these efforts are often undercut by the extreme weather events, such as the hailstorms and flash floods, which wash away soil nutrients, manure and damage crops further, diminishing harvest or lack of resources. A male respondent describes, “We stopped planting in the fields because of soil erosion. In the fields, we are supposed to do what white people do, where they fetch soil from the mountains and pour soil there, and then turn the soil around to help the soil regain its nutrients. Now we do not do that process because of resources. We only use cow, sheep, goat and chicken manure.” (MTM1). When it comes to hailstorms and flash floods, respondents stated that they try to create small irrigation trenches to manage such events.

Respondents have developed local adaptation techniques, such as reusing water from laundry to irrigate small home gardens or creating furrows to manage flash floods. However, these strategies are often insufficient to address the scale of the environmental challenges they face. An elderly woman respondent who stays with her young grandchildren pointed out, “Because there’s no water and also old age, I have no strength anymore... I didn’t plant anything this year.” (WTM3). This highlights how climate change impacts intersect with other social identities, such as age, and further exacerbate already existing vulnerabilities, where older women, in particular, face greater difficulty in adapting to these shifts. The respondent also highlighted how she gets help from community members as her grandchildren are still young to assist with household duties. She states that “I make African beer and ask young men in the village to get water for me or help me in any way I need.” Two other respondents highlighted that this is one of the strategies they use since they don’t have money (WTM3). Despite these challenges, there are community-based adaptation strategies, where neighbours assist each other. A respondent who is a young woman who didn’t grow up planting crops but started when she got married to her husband who was part of the transcape project stated that, when I did not manage to produce any yields the following farming season, I purchase seeds from my neighbour or anyone who has a few seeds left. People that had small harvests stored seeds, and we purchase them for the next season” (WTM9). She shares this after a failed planting season for her household. She also shared how elderly women in the community helped her with the planting process since she didn’t know when to plant and what weeds to remove from maize to help facilitate growth.

*Figure 4.5 Grass reeds are used to make roofs, mats, and baskets to sell to tourists or locals. On the left, a picture of dry grass reeds. On the right, a picture of freshly harvested grass reeds.*

*Figure 4.6: Reed mat sold to tourists and locals*

### *4.6.3 Diversification of livelihoods as a response*

For many community members in Tshani Mankosi, the response to climate change has been to diversify their income-generating activities. Aside from harvesting marine resources, women also engage in small-scale agriculture, selling traditional crafts like reed mats and beadwork to tourists, though opportunities for the latter have diminished significantly since the COVID-19 pandemic. One semi-structured interview respondent highlighted, “Since COVID, there are no longer visitors... that really changed things for us.” (WTM1). The pandemic has not only reduced their opportunities to sell marine resources and crafts but has also exacerbated the

community's economic precarity, forcing women to rely even more on social grants as a buffer against poverty and food insecurity.

### *4.6.4 Shifts in local knowledge and practices in Tshani Mankosi*

Respondents highlighted how local knowledge and practices are central in predicting rain seasons and also ocean dynamics. However, with the changing climatic conditions in Tshani Mankosi, this has proven to be more difficult for them to use local knowledge and need to adapt new ways of doing and being. This section helps us answer objective two of this study, as local knowledge has been central in rural livelihoods and how people predict seasons.

Majority of the respondents highlighted how, due to erratic weather conditions, traditional/ local knowledge has become less reliable as they indicated that "Local/Traditional knowledge does not work anymore. *Ihemu* (a bird) and *intsingisi/ ntsingizi* (a bird) …people would take this bird and place it in the kraal or tie it up by a river and kept till it rains not even a feather has to fly away from the bird…Not everyone would be able to do this, only certain clan names would be able to do this ritual. Once it has rained enough, then the people would remove the bird to stop the rain. Now here in Tshani Mankosi, actually, in the whole of Nqeleni we don't have the bird anymore. I usually see it in villages above." Focus group respondents went on to also describe the erosion of traditional practices and beliefs, stating that "The person that would go to the mountain to pray for rain passed away, and once he started getting sick, we just stopped getting rain." (MGFG2).

When it comes to local knowledge on planting dates, respondents stated that "you end up seeing that you don't even know the actual month you can start planting because times have changed". However, some respondents stated that one other method they use in order to predict rain is a frog, the sharp-nosed grass frog locally known as "*uvete*" stating that "once we hear it, we trust that we will be getting some rain soon… can you hear *uvete*, rain is coming" (WTM7 & WTM10). A respondent also highlighted how the increase in people burning fields for grass has also had a negative impact on rain patterns, stating that "we were told by our elders that when we burn fields all the time, rain becomes scarce. So, you need to limit the pollution, so you need to cut the grass yourself and not burn the grass because the smoke from burning the grass pollutes the air" (MTM1).

Respondents in both interviews and focus groups indicated that when it comes to the ocean, they rely on the moon, stating that "The moon is the only thing we depend on." (WTM2;

WTM8; MTM2; MTM3;MTM4; MGFG2). The moon plays a significant role in the local knowledge and practices related to the ocean, this is highlighted by respondents in both interviews and focus groups. The connection between the moon and the tides is essential for Tshani Mankosi community members, particularly those who engage with the ocean for their livelihoods. Respondents describe how they observe the phases of the moon to predict ocean dynamics, noting that during a full moon, the tide is usually low, which is ideal for harvesting but not for fishing. On the other hand, during a half-moon, conditions are more favourable for fishing since the tide is neither too low nor too high, allowing for safer and more productive work.

The moon is not just a scientific phenomenon but is deeply integrated into the cultural and traditional practices of the community. Several respondents highlighted that their knowledge of when to fish, gather marine resources, or stay away from the ocean during rough conditions is guided by the moon. A respondent stated that "you see now, this past week has been high tide so I haven't been able to go to the ocean. I am constantly checking the moon every night and morning to see if I will get any chance to go to the ocean" (WTM2).

### *4.6.5 Socioeconomic disparities and their impact on adaptive capacity*

One of the key findings in this study was resources and the role resource access plays in adaptation. Respondents noted how they have forgone certain livelihood strategies due to the lack of resources. This section helps answer the core objective of this study on how rural coastal communities are adapting to the adverse impacts of climate variability on their livelihoods.

Lack of resources was one of the recurring themes highlighted by respondents in both focus groups and interviews (WFG1; MGFG2). This lack of resources for marginal people in rural areas means that only a few can deploy resource-intensive adaptation strategies. This point is noted by a respondent stating that the change in rainy seasons has affected them as they plant using their hands and don't have the resources to plant again after one harvest has been ruined. This then ultimately leads to people in Tshani Mankosi having to buy food from the local markets or from the one farmer in the village that has the resources -labour and water to plant at any time of the year.

#### *4.6.5.1 Water as a key livelihood resource*

Water availability is one of the pressing issues that respondents highlighted. Respondents noted that water scarcity is a crucial barrier to agricultural productivity. Focus group respondents expressed concerns that "rain is scarce and people don't get water to water their vegetables" (MGFG2). This has also contributed to Tshani Mankosi respondents' dependence on the ocean and fishing for sustenance. Respondents highlighted the large reliance on municipal water, stating that taps often run dry, "water is now really scarce… years back it was a bit better because we could get water from dams". A respondent highlighted how it's hard to get water for crops and one needs resources to make sure that they have enough water for their crops (WTM5). Another respondent noted that unlike other community members he has the resources to pull water from the municipality taps allowing him to plant at any time of the year, once during the dry season and relied on irrigation systems and plants again during the rainy season as they also relied on hiring community members for labour, which only a few can afford (MTM1). This also highlights how access to resources is an enabling factor for smallholders to adapt to changing climatic conditions. Focus group respondents further emphasised this, "Even the person we say has already started planting, that's because they have the means to get water" (MGFG2). One respondent stated that the proximity to the ocean has impacted her ability to farm, as fencing rusts quickly and they often lack funds to replace it (WTM1). She went on to explain that due to this, she has had to rely more on ocean resources for her livelihood.

#### *4.6.5.2 Emerging livestock diseases and financial capital constraints*

The emergence of new diseases has also been another factor that has resulted in most households forgoing animal husbandry, a woman respondent and her husband explained, "Livestock is now dependent on injections and deep as forest herbs don't work anymore. But injections are expensive, and only certain people can afford them". (MTM2; WTM5; MGFG2). Respondents also highlighted how the loss of cattle for ploughing has significantly hindered agricultural output (MGFG2 & WTM5). Focus group respondents stated that ideally, they would also like to plant twice to increase their odds when it comes to output. However, they do not have the funds to pay people or pull water from government taps. They only rely on household labour and also use their own hands to plough as they cannot afford to hire cattle, they explained, "we use our own hands to plough, planting, removing weeds and harvesting. We don't use cows or a tractor. we use our own hands." (MGFG2). Climate change has also exacerbated social

inequalities within the community, as wealthier households are better positioned to adapt by accessing more reliable water sources or investing in livestock and farming tools.

# CHAPTER FIVE- DISCUSSION

## 5.1 Introduction

This chapter discusses the findings of this study. This chapter draws from the sustainable livelihoods framework to discuss the different assets people possess that facilitate adaptation. The study also draws from the livelihoods aspirations theory to highlight the decisions and aspirations that result in upward, downward and static mobility of people. To further understand the findings, a gendered lens, particularly the concept of social reproduction (Ossome & Naidu, 2021, Yeni, 2024), is employed as climate risks and adaptation are experienced differently due to social identities and the roles and responsibilities tied to individuals (Shackleton, Cobban & Cundill, 2014; Thinda & Ogundejib, Bella & Ojo 2020).

The three themes that emerged from the findings show the interplay between environmental and socio-economic factors. The first theme looks at the valuation and meaning of climate-related risks on livelihoods, which is about the cultural and spiritual beliefs of individuals and how people experience and respond to climate-related risks. The second theme is on adaptation, which is concerned with how people structure their responses, what they choose to respond to, and how their responses to climate-related changes are tied to varying assets/capitals, gendered roles and responsibilities. The third theme concerns the shifts in livelihood dynamics due to climate-related risks. This is where the study unpacks the nexuses of livelihood diversification, gender and local knowledge. This research argues that climate responses are influenced by how people understand and experience their natural environment and the assets they possess to reduce their vulnerability and increase adaptive capacity. Ultimately leading to better livelihood outcomes.

## 5.2 Perceptions and experiences of climate-related risks on livelihoods

### *5.2.1 Values and beliefs shaping climate-related risk perceptions*

Respondents' perceptions and understanding of climate-related risks provide a nuanced understanding of both the manifestation of climate-related changes and their outcomes for livelihood sustainability (Becken et.al., 2013). The findings presented above suggest that people are aware and understand changing climatic patterns and how they affect their livelihoods as these changes are intricately intertwined with their daily lived realities. However,

what they attribute these changes to, and how they understand their environment is highly influenced by social factors such as cultural and spiritual beliefs. Studies and our interviews show how perceptions of climate-related risks are largely influenced by individuals' contextual and natural environment, including their values, beliefs, social identities the livelihood strategies individuals partake in and the assets people possess (Slegers, 2008; Shahi, 2011; Tirivangasi et.al, 2013; Ejembi & Alfa 2012; Mafongoya et.al, 2019; Nyang'au et.al.,2021). That means, rural coastal people conceptualise and attribute climate-related risks to the complex interplay between environmental changes, spirituality and/or culture and the socio-economic realities.

People often turn to religion and spirituality in times of distress to find meaning in life and understand "unnatural" events (Omoyajowo et al., 2024). In the case of the Tshani Mankosi community, this is clearly depicted in how people relied on spirituality and religion to explain and understand the increase in the depletion of natural capital, often articulated as God protecting their creation and a way of sustaining and preserving natural capital for future generations (Mnimbo et.al., 2016; Haque et.al., 2023). The above emphasises three factors, (i) The links between climate change and protection of environmental sustainability, (ii) the interconnected ways in which people view nature and (iii) how economic inequalities push poor people further to the margins in the face of climate change. The above then demonstrates how people, particularly marginal resource-poor people, deal with external stressors where they have limited control, assets, and marginal institutional support, resulting in the reliance on hope and faith in understanding and coping with climate-related risks (Omoyajowo et al, 2024). The reliance on spirituality and religion highlights the material realities of people, where the state is marginal and drenched in systemic constraints, restricting people's abilities to sustain their livelihoods, which ultimately increases vulnerability to climate-related risks. The respondent's sentiments also drew on African spirituality, rooted in questions of being and existence, which views nature as interconnected to tangible and intangible things, instead of as a separate entity or impersonal space completely detached from one's own reality (Mbiti 1990). For people, their perceptions of changes in their natural environment cannot be separated from their social, economic and cultural context as these anchor their daily lives and decisions, particularly in the dawn of environmental change and economic disenfranchisement (Becken et.al, 2013). Therefore, it is argued that people's socio-economic and cultural context influences understanding and experiences of climate change and adaptation.

Dominant literature largely focuses on mainstream climate change adaptation research and policy which often focuses on the material aspects of climate change- including lives and livelihoods, however, it often overlooks the importance of culture in understanding how people perceive and respond to climate-related risks (Adger et.al., 2013; Rühlemann & Jordan, 2021). Culture and beliefs shape rural livelihoods in ways that people interact with ecosystem services and how they perceive their natural environment. The consideration of cultural capital and viewing it as an asset with value is important when seeking to understand livelihoods. This helps in understanding why marginal peoples rely on culture and brings in questions around the socio-economic marginalisation of people. Furthermore, this reflects the constraints in accessing capital, such as financial and physical capital (Daskon & McGregor, 2012). This assertion is also highlighted by Krauss & von Storch (2005) in how they state that culture is inherent in the varying ways people perceive and connect climate-related phenomena. This highlights the need to incorporate cultural, spiritual and religious beliefs into climate change adaptation education and the formulation of policies as belief spans every aspect of people's lives (Schuman et.al., 2018). This also speaks to the very fact that for rural livelihoods, with limited institutional support, culture, spirituality and religion have value and are entrenched in people's ways of knowing and being. Based on this, it is therefore contended that how rural people experience and understand changing climatic conditions vary depending on contextual factors such as economic constraints, depletion of natural capital that people depend on to enhance their livelihoods, their beliefs, the valuation and meaning of change.

### *5.2.2 The gendered nature of climate-related risk experiences*

In the findings chapter above, we demonstrate the centrality of gender in mediating people's experiences, understandings and adaptation strategies. In Tshani Mankosi gender mattered in different ways. Goh, (2012), argues that men and women may be exposed to similar impacts of climate change, but how they value and view the impact is intricately linked to their roles and responsibilities. This is the case with men and women respondents in Tshani Mankosi where both men and women note similar climatic events and patterns. However, the impact varies as women experienced more negative impacts due to social norms and seascape rankings that limit their roles to the domestic space of the household where the reproduction of life is dependent on them (Barceló et.al, 2024). This was related to gender where they note the impacts that are connected to their roles in the fisheries system, restricted to shellfish intertidal

harvesting with less local monetary value compromising their financial, human and physical capital (De la Torre-Castro et.al., 2017). Intertidal fishing in many communities is seen as a women's job as it is perceived to be less dangerous and has less value (Kleiber et.al., 2015). Restricting women to low value harvesting diminishes their financial capital, which is a key livelihood asset, and capacitates women in coping with climate risks, and reduces vulnerability. The restriction of women to certain spaces does not happen in a vacuum, it is a system that is perpetuated by social structures where skills to fish are passed down from men to boy children.

Men on the other hand interact with the ocean and fish resources with high local monetary value. This is due to social stratification of men who dominate fishing of large fish species and diving for crayfish (Haque et.al, 2023). However, men highlighted the increased human capital risk in fishing due to changing ocean dynamics. From these gendered dynamics, we can deduce that the differing roles and responsibilities that men and women partake in result in different experiences of climate-related risks (Haque et.al, 2023). The inability of women to interact with other spaces in the ocean as they are restricted to “less dangerous” spaces such as harvesting shellfish, ultimately results in them not being able to generate an income and going days and even weeks without harvesting. This affects their human capital and financial capital, which then affects food security and also impacts their daily household responsibilities. In other words, it affected their social reproductive and gender roles. For most, particularly men, an inability to access the ocean at times meant working in undesirable and dangerous conditions, thus compromising their human capital (Badjeck et.al., 2010). As can be seen, the impact is devastating for both men and women, but it is different and gendered.

Women’s experiences were deeply entrenched in unpaid domestic labour as caregivers and contributors to household subsistence. Since women relied on declining availability of natural capital such as mussels and oysters for income and subsistence, changing ocean dynamics resulted in days or even weeks of not being able to access the ocean, ultimately leading to increased competition over means of capital accumulation. That means, women prioritising their own homes and securing their means of financial and human capital to enhance their livelihoods and reproduce life. This has thus compromised social networks in the village, particularly regarding ocean resources. The demand for competition over marine resources increases the value assigned to the resource and the users also tend to protect their means of capital to ensure continued flow of the scarce resource (Craig, 2006). These dynamics highlight compounded vulnerabilities in the dawn of environmental change where there is increased

competition over MRL, compromised social ties which people used to leverage on for subsistence, tied with the productive responsibilities that have intensified women's exposure to climate-related risks. The importance of social capital, such as social networks, connections, and trust, as a coping resource is vital in assisting women and communities in responding to external stressors (Wolf, Adger, Lorenzoni, Abrahamson & Raine, 2010; Antwi-Agyei, 2012; Musavengane & Kloppers, 2020). Social capital is central to adaptive capacity and plays an important role in achieving positive livelihood outcomes (Adeger, 2003). However, weakened social networks, which we have seen in Tshani Mankosi in relation to selling marine resources, can increase vulnerability, which can be detrimental for livelihood sustainability, particularly in the dawn of environmental change, compromising natural, social, human and financial capital. This is supported by Esterhuyse (2012), who argues that social capital has a direct impact on the other forms of capital. The heightened strain posed by climate-related risks, coupled with the increased competition among local communities for tourism-related opportunities, such as selling goods or services to visitors, sometimes undermines the social capital of these communities, which then ultimately affects other forms of capital that enhance livelihood outcomes (Craig, 2006; Shackleton & Luckert, 2015).

This research then argues that how people perceive, experience and respond to their natural environment is influenced by their gender identity, gender roles and expectations. Gender, therefore,, influences how people experience the impact of climate-related risks (Yadav & Lal, 2018; Daoud, 2021; Anugwa et.al, 2023).

### 5.3 Adaptation strategies to climate-related risks on livelihood strategies

Local realities and understanding of the physical environment provide a framework for how people interpret consistently changing and unpredictable environmental events. Including these ideas in climate change adaptation is the starting point for creating context-specific adaptation measures that do not undermine people's conceptions of their physical environment, as this informs their responses (Antwi-Agyei, 2012; Becken et.al, 2013; Sibiya, 2019; Rühlemann & Jordan, 2021). Therefore, it was essential that people's experiences and how they conceptualise climate-related risks are assessed to achieve the broader aim of this study.

People's perceptions of climate change and variability influence human behaviour, including how people respond to climatic stressors, and overlooking these perceptions can lead to poorly

designed adaptation strategies that are not grounded in the contextual vulnerabilities of people (Nelson et.al, 2023). There is a high interplay between economic factors, individuals' beliefs, direct experiences, social influence and other contextual factors in shaping understanding and responses to climate change (also see Wiid & Ziervogel, 2012; Phuong et.al, 2018; Findlater et.al., 2018; Masinde, 2024).

The findings show that individuals employ varying adaptation strategies that reflect the interplay between livelihood assets and contextual vulnerabilities as highlighted in the SLF (Badjeck et. al, 2010). The adaptation strategies employed by respondents range from adjusting planting dates and techniques, adjusting harvesting and fishing schedules, reusing laundry water, building windbreakers, social grants and diversifying livelihood strategies- off-farm activities or all together forgoing participating in some climate-sensitive livelihood strategies (also see Nhemachena et.al, 2014; Alobo Loison, 2015; Taruvinga et.al, 2016; Popoola et.al, 2018; Rubekie et.al, 2022). With the constantly changing climate, these strategies provide short-term buffers against climate-related risks. People moving to off-farm work, which is often low wages, results in reduced resilience as they now have to rely on one income to sustain their livelihoods. Reducing livelihood outcomes and plunged into a downward livelihood mobility due to climate-related risks.

### *5.3.1 Adjusting fishing schedules and techniques*

The findings section suggests that people are continuously trying to adopt varying adaptation measures in attempts to enhance their livelihood outcomes. However, there are multiple limitations and barriers that result in ineffective adaptation, which ultimately affects people's assets, such as financial capital to buy physical assets, to limit trade-offs like compromised human capital in relation to food security, safety and conflicts. People adjusting fishing locations can increase catchability and income, ultimately enhancing livelihood sustainability (Rahman et.al., 2021). However, literature also shows how changing fishing location can increase competition over natural resource commons, ultimately resulting in community-based conflicts amongst villages, placing people at greater risks with neighbouring villages ( Ratner et.al., 2017; Tamou et.al., 2018; FAO, n.d; Glaser et.al., 2019; Mendenhall et.al., 2020).

In responding to changing ocean dynamics, people adjust their fishing schedules, often going to sea during calmer periods, changing fishing locations or spending most of their daily hours observing the ocean. The findings highlighted the restrictions in adaptation to decreasing

natural capital as they do not have the financial means to buy boats and advanced fishing gear, the physical capital that can enhance their livelihoods. This then means that the lack of physical assets leads to compromised human capital, increased food insecurity and risk to conflicts. The perceptions in Tshani Mankosi were similar to the above stated, people highlighting increased conflicts between villages due to changing fishing location. Climate change has placed marginal communities and people at a rather compromised position where people continuously have to

negotiate with themselves and weigh options as a means of securing and sustaining their livelihoods. Studies show how climate-related impacts increase vulnerability particularly for marginal groups as they lack assets (capital) that enable them to adapt (Daw et.al., 2009; Traerup & Mertz, 2011; Rahman et. al, 2021). From the above, we can deduce that assets are central in adaptation and reducing vulnerabilities.

### *5.3.2 Adjusting planting and harvesting schedules*

As a means of securing a livelihood, coastal rural people alternate between ocean and land-based livelihoods. This is a common theme in coastal communities globally (Barceló et.al., 2024). Multiple studies globally and in Africa have shown the different adaptation strategies which rural people use to adapt to climate-related risks on their livelihoods (Adger et.al, 2003; Rubekie et al., 2022). This is consistent with this study's findings, where people adjusted and continuously shifted their cultivating and harvesting schedules to adapt to current climatic conditions and increase production. However, they also noted that as the years go by, it is becoming increasingly difficult to predict rainfall, leading to increased vulnerability due to crop failure, which ultimately results in food insecurity, compromising Human capital (Jennings & Magrath, 2009; Guido et.al., 2020).

Apart from implementing less resource-intensive strategies, such as adjusting planting schedules. People with financial means invest in adaptation strategies that increase the odds of a productive harvest. Dorwards (2009) refers to this as stepping up, increasing investments in assets to increase productivity, food security and nutrition, human capital, when faced with increasing unpredictability of climatic conditions. However, resource-intensive strategies were done mostly by men respondents with financial capital, asset wealth to plant twice a year, buy input and install irrigation systems, physical capital (Makate et.al., 2016; Ubisi et.al, 2017). On the other hand, women hampered with household responsibilities and child care limits their

participation in income generating livelihood strategies mostly use less resource extensive strategies such as, reusing laundry water for their small home gardens and creating furrows to manage flash floods (Nhemachena et.al, 2014, Taruvinga et.al, 2016; Popoola et.al, 2018). This highlights the gendered disparities inherent in adaptation, particularly in the context of South Africa, where men have historically migrated for work, resulting in them being able to invest in assets that increase productivity, such as installing irrigation systems, buying livestock or having access to buy medication for livestock or input for crop farming.

### *5.3.3 The role of social capital in adaptation to climate-related risks*

On land-based livelihoods, mostly used for household subsistence, unlike ocean-based livelihoods, there is little to no competition over resources to produce capital. As a result, women often leverage social capital for adaptation. Respondents indicated making African beer to pay men to assist with water collection or reciprocal labour exchange and sharing resources to enhance agricultural productivity and household resilience. This is consistent with other studies (see Emdon, 2013; Duba, 2019; Khalil et.al., 2021; Nyahunda, Trivangasi, 2022). Adger (2010) argues that societies naturally have the ability to adapt to climate-related risks, and that this adaptability is intrinsically linked to the assets they possess and the will for collective action. In the absence of substantial financial capital, social capital plays a key role in promoting climate change adaptation by reducing risks and increasing collective action to achieve positive livelihood outcomes for farmers (Wang et.al, 2021). Women employing less resource intensive adaptation strategies lowers their ability to cope with climate-related risks, as these strategies may provide short term benefits which then may increase food insecurity, this then results in women relying on social capital- such as reciprocal labour and community networks in order to navigate the impacts of climate-related risks on their livelihoods. However, social capital in the absence of other forms of capital is not a long term effective adaptation strategy, particularly in the context of a continuously changing climate.

### *5.3.4 Resources- financial and physical capital as enabling assets for adaptation*

As demonstrated in section 5.3.2, access to financial capital and other forms of capital influences climate adaptation strategies (Ankrah, Anum, Anaglo & Boateng, 2023). One of the findings that emerged was a lack of resources, particularly financial capital, in enabling communities to adapt. Studies have emphasised the importance of resources in facilitating

climate change adaptation and how it is the least available resource for rural people, impacting their physical capital and ultimately human capital (Antwi-Agyei, 2012; Ruth et.al, 2022). This is the case for Tshani Mankosi, where respondents dropped out of certain livelihood activities due to a lack of financial capital, which increased their livelihood vulnerability.

The role of social grants in marginal communities has a paradoxical effect. This form of income is often highlighted as one that is precarious but also has benefits for economic security, particularly with the strain imposed by a changing climate on livelihoods. The findings suggest that while social grants provide a crucial safety net, to help absorb economic shocks from declining natural capital, they are not a long term solution to climate-related risks and as a buffer or a livelihood alternative (Babugura et.al.,2010; Musemwa et.al., 2015; Kubayi, 2022; Obisesan & Chitakira, 2021). This is due to the fact that, with the strain posed by a changing climate on natural capital, people used social grants to supplement their livelihoods. However, with declining natural capital, failed harvests, people now have to rely heavily on social grants to sustain their livelihoods.

Apart from social grants, other livelihood alternatives respondents in Tshani Mankosi highlighted as a form of enhancing adaptive capacity and sustaining their livelihoods was selling livestock and moving to off-farm livelihood activities such as working at the local backpacker, doing domestic work for tourists, construction work and working in neighbouring towns (Lyimo, Kangalawe, 2010; Amoah & Simatele, 2021). This highlights how climate change adds a strain on livelihoods as people are now starting to rely more on other livelihood alternatives apart from natural resources. Dorward (2009) and Scoones (2015) state that as a form of decreasing livelihood vulnerability due to degrading natural capital, lack of financial capital and physical capital constraints, rural people move to off-farm activities to enhance livelihood productivity. Some of the alternative livelihood strategies or incomes provide temporary relief, which is not sustainable in the long run, with factors such as seasonal tourism, COVID-19 and declining natural capital, which threaten livelihoods and increase vulnerability. This highlights how climate-related risks are an added burden on already economically marginalised people, compromising their livelihoods.

### 5.4 Shifting livelihoods, climate and gendered implications

Shifting livelihoods and diversification is not a new phenomenon (Hebinck & Van Averbeke,

2007; Chepkemoi, 2020). Livelihood shifts constitute the dynamic pathways people use to sustain their lives, particularly in response to external stressors such as climate change and socio-economic change. The shifting livelihoods observed in this study are a response to the contextual vulnerabilities of people as climate-related risks undermine the viability of agricultural and fishing activities. Scholars acknowledge that livelihood diversification has the potential to enhance climate resilience for rural people (Mohammed et al., 2021). As a result, Cannon (2014) argues that there needs to be a shift from the reliance on climate-sensitive activities into alternative rural livelihoods to create more sustainable livelihoods in the dawn of environmental change. Shifting livelihoods and engaging in multiple income- generating livelihood activities reduce vulnerability and enhances adaptive capacity to external shocks. Rural livelihoods are on a new trajectory due to declining natural capital intersecting with multiple other contextual stressors and vulnerabilities (Shackleton & Luckert, 2015). In Tshani Mankosi we also see the shifts in livelihoods where many of the respondents noted shifting to off-farm livelihood strategies and some altogether abandoning climate-sensitive livelihood strategies or moving from land-based livelihoods to solely relying on ocean-based livelihoods. The shift in livelihoods is due to restricted assets that are required to maintain land-based livelihoods. Climate change has added multiple strains to rural livelihoods as people, particularly people drenched in poverty, now prioritise moving away from livestock production due to increased financial strain in sustaining cattle production with the emergence of pests attacking cattle, sheep, pigs and chickens (Shackleton & Luckert, 2015). The shift away from land- and ocean- based livelihoods increases vulnerabilities, as people must now rely on income-generating activities as their primary means of sustaining their livelihoods, rather than using income to supplement land- and ocean-based livelihood strategies.

The findings from this study align with Dorwards' (2009) livelihood aspirations framework of stepping up, stepping out or hanging in. Households with limited financial and physical assets struggle to implement financially intensive adaptation measures which sometimes, more often than not, force some to forgo fishing or agricultural production and stepping out, where they diversify their livelihood activities to off-farm activities or hanging in and maintaining their current levels of financial capital (Dorward, 2009). Dorward (2009), further states that decisions people take are influenced by their circumstances and their understanding of the opportunities and limitations they encounter. This has been the common thread in literature but also in Tshani Mankosi, where adaptation and adaptive capacity are deeply rooted in how

people understand their physical environment, but also the assets (or lack of) that become an enabling agent or barriers for adaptation.

### *5.4.1 Livelihood shifts and the gendered implications of climate-related risks: space, labour and vulnerabilities*

Another aspect that has shifted livelihoods is the gendered labour burdens that the respondents have incurred in the dawn of changing climatic conditions. Climate change poses a negative impact on men and women by affecting different forms of capital and labour dynamics (Liru, 2020; Duru et.al, 2022; Rubekie et.al, 2022). Women are seen to be more vulnerable to climatic effects when compared to their male counterparts. This is due to the roles and responsibilities women take up and the total working time which is now constrained by climatic conditions (Bardasi & Woden, 2006; Ruth et.al., 2022). The longer women spend in search of natural resources, the less time and energy they have for performing other household tasks, which results in increased food insecurity, ultimately resulting in decreased human capital (Liru, 2020). Increased workload as a result of climate-related risks has broader implications for women, sometimes resulting in women forgoing participating in other livelihood strategies that could potentially enhance their adaptive capacity and have positive livelihood outcomes.

These gendered roles and responsibilities are not natural or innate; they are created by institutions that oppress women, such as social norms created by capitalism to benefit the means of capital accumulation for the minority (Tsikata, 2009). Onwutuebe (2019), states that patriarchy thrives through institutions and societal structures that help to dominate, oppress and exploit women. When we employ a gender lens, we need to understand and take into account the construction of feminine and masculine spaces, and why these spaces were constructed, and to benefit who. Women occupy certain spaces within the household and all their other duties, responsibilities and roles are largely tied to this idea of feminine and masculine spaces that are created by systems of capitalism and colonialism (McDowell, 1997). The confinement of women in certain spaces is directly rooted in ideas of capital production, a system constructed by upper class bourgeoisie that benefits one while oppressing the other based on class, race or gender. When adding climate change to a system that already oppresses women, women then find themselves in spaces with less livelihood assets, increased responsibilities, ultimately leading to reduced adaptive capacity. Women in Tshani Mankosi were the only ones that relied on social grants, particularly child grants as an alternative livelihood income; they indicated

how precarious this reliance is as they are the main providers of food in their households. Men on the other hand, as previously noted, rely on financial means accumulated from working in neighbouring towns and cities. Labour migration, particularly for marginal communities can be seen as private climate finance for adaptation and reduces vulnerabilities by building financial, human and physical capital (Sakdapolrak et.al., 2024; Huckstep & Beynon, 2024; IOM, 2024). For rural people, labour migration plays a very important role, which has the potential of enhancing adaptive capacity.

### *5.4.2 Implications of climate-related risks and the shifts in local knowledge*

For generations, communities have relied on local knowledge to observe ocean dynamics and predict weather patterns which enabled them to manage resources sustainably (Garutsa & Nekhwevha, 2019; Duba, 2019; Liru, 2020; Rankoana, 2021). The increase in unpredictable climatic conditions has hampered rural livelihoods. Smith, Chowenga & Karsters (2024) state how climate change presents complexities for rural livelihoods in regard to climate-related decision making. This is due to the fact that local knowledge is the basis for local level decision making. One of the key findings of this study indicated shifting livelihood dynamics due to local knowledge becoming unreliable. This finding is consistent with Jiri et.al (2024) assertion, stating that indigenous knowledge is becoming less dependable as a result of increasingly changing climatic patterns. Climate variability has reduced rural people's confidence in indigenous knowledge, which has reduced their adaptive capacity and increased vulnerability to climate-related risks (Kalanda-Joshua et.al., 2011; Jiri et.al, 2015). Climate variability imposes new dynamics to rural livelihoods, with species migration, it has proven to be more difficult for rural people to predict weather patterns as the species they used to rely on to predict weather patterns have now migrated, leading to increased vulnerability to climate variability and change. Climate perceptions studies indicate the need for climate education for rural people to enable them to adapt (Roy, Kumar & Rahaman, 2024). However, this thinking is flawed and problematic as it undermines people's awareness of their environment and doesn't address structural issues that restrain people's adaptation, such as unemployment. As such, it perpetuates the narrative that rural people do not understand and are distant beings from their natural environment and in order for them to adapt, they need to know what climate change is, which is conceptualised and perceived in western and scientific terms. Here it is argued that based on the findings of this study, there are shifts in local knowledge. However, local knowledge has not entirely "eroded" but has evolved due to changing climatic conditions.

# CHAPTER SIX – CONCLUSION

## 6.1 Introduction

This chapter provides an overview of the study's findings and connects them to the research objectives outlined in chapter one. The argument, coastal rural livelihoods, climatic-related risks and their implications and adaptation, is present. Finally, questions arising for future research in the wild coast are articulated.

In making sense of the findings, the study draws on three theoretical frameworks that complement each other in the analysis: (i) the Sustainable Livelihoods Framework, (ii) Dorward's Livelihood Aspirations Theory, and (iii) the concept of social reproduction. These frameworks offer a multifaceted lens for understanding how rural coastal communities navigate climate-related risks and shifting livelihoods. The Sustainable Livelihoods Framework highlights the structural conditions and access to resources that shape people's adaptive strategies. Dorward's Livelihood Aspirations Theory, on the other hand, adds a future-oriented perspective, highlighting how people act not only in response to present vulnerabilities but also in pursuit of future livelihoods, shaped by their aspirations, opportunities, and social positioning. Lastly, the concept of social reproduction brings attention to the often invisible and gendered labour that sustains and reproduces life.

## 6.2 Study findings

The findings of the study underscore the complex interplay between climate-related risks, perceptions, the socio-economic and gendered realities that shape how people adapt. The study has shown that the people of Tshani Mankosi are aware of the changes in the climatic conditions. However, what they attribute the changes to is largely influenced by their beliefs, gendered roles and responsibilities and the different assets they have, which then influences how they adapt to climate-related risks. This is in line with arguments made by (Antwi-Agyei, 2012; Ejembi & Alfa,2012;Obisesan &Chitakira,2021). The respondent's perceptions showed that the Tshani Mankosi community's land and ocean-based livelihoods are highly affected by extreme weather events. These range from failed crop yields, limited access to the ocean and a decreasing mussel population, ultimately affecting people's human capital, compromising food security and wellbeing. Coastal rural people are actively trying to adapt to these changing climatic conditions, which threaten the integrity of the natural resources they depend on. They actively implement adaptation strategies, influenced by how they understand the world around

them, and develop livelihood alternatives as a means of continuously sustaining their lives. While at community level people are grappling with adaptation, there is a role that the state needs to play and take greater responsibility to support rural coastal communities. The above part is a response to the studies first objective.

The second objective of this study was to understand how respondents are adapting and the different enabling assets and barriers to adaptation. To fulfill this objective, section 4.6 highlights adaptation strategies. It shows how men mostly rely on financial capital as a means of adapting to climate-related risks. As opposed to majority of the women respondents who relied less on financial and physical capital due to the socio-economic constraints compounded by their roles and responsibilities in the household. The reliance of women on less resource intensive adaptation strategies, such as shifting planting dates and fishing schedules, increased their vulnerability to climate-related risks, as these strategies provide short-term benefits and increase food insecurity long term. The study established that financial and physical capital play an important role in increasing the adaptive capacity of both men and women. In Tshani Mankosi, one of the livelihood assets that people, particularly women, relied on was social capital, relying on their social networks to enable adaptation and sustain their livelihoods. However, one of the key findings revealed that the use of social capital differs between ocean and land- based livelihoods due to the market demand in ocean-based livelihoods, selling of fish and intertidal spices. These differences are due to the fact that people mostly fish and harvest to sell to tourists. As opposed to land-based livelihoods, where there is not much competition in selling reed baskets, mats, beadwork, and they mostly grow crops for household consumption. The above revealed how people are consistently negotiating as a means of adapting and sustaining their livelihoods. This also highlights systemic issues, where people are drenched in poverty and the poverty margin is increasing, compounded by climate-related risks and the marginal role of the state.

The third objective of this study, which focuses on how climate-related risks have reconstructed livelihoods, is also addressed in section 4.6. Climate change compounded by gendered labour dynamics and socio-economic constraints has imposed livelihood shifts for directly affected communities. These changes include shifts to off-farm low-skilled work, reliance on SASSA grants, increasing gendered labour requirements, and local knowledge becoming less reliable. All of these ultimately reduce or constrain the adaptive capacity of people due to the contextual vulnerabilities that characterise this community. Therefore, more needs to be done at the governmental level to address these constraints. The study identifies gaps in institutional

support, particularly from local government. While policy frameworks exist to address climate adaptation, the practical implementation remains inconsistent and often fails to fully account for systemic inequalities and contextual and gendered vulnerabilities.

In light of these findings and the analysis, this study argues that at community level, climate responses are influenced by how people understand and experience their natural environment and the assets they possess to reduce their vulnerabilities and increase adaptive capacity—ultimately leading to better livelihood outcomes. To effectively adapt, communities need state support, gender sensitive enabling conditions. Adaptation needs to be approached from below and above, it cannot be the responsibility of one group, but a collective responsibility.

## 6.3 Limitations of the study and questions arising for future research

The first limitation is the lack of generalisability as this is a context-specific study. I was not able to interview a majority of the people in Tshani Mankosi as it has many villages, but for a mini dissertation, my sample size was sufficient. Future studies could incorporate most of the villages in Tshani Mankosi and have a larger sample size. The second limitation was the time and resource constraints. Due to this, I was not able to explore in-depth other themes that came up in the field. Therefore, based on the findings of this study, there is a need for future studies in this region, Eastern Cape, particularly the Wild Coast, to explore other factors related to climate change variability and adaptation. There is also a need for a study that looks at the role that local government and CSO play in facilitating climate adaptation in rural communities. Based on the findings above, further research could focus on analysing sea level rise by comparing projected trends with actual observational data. There is also a gap in literature on how people view conservation efforts and how these efforts conflict with people's livelihoods in the dawn of climatic changes and increased demand from tourism for natural resources. A study in line with this gap would be useful.

Lastly, extractive companies looking for oil and gas in the wild coast are becoming pervasive. This will affect people's livelihoods but also has broader implications for climate change and reaching the global goal of below 1.5 degrees. More work needs to be done to understand this threat, both to livelihoods, exacerbating climate change and environmental degradation. One particular case that is of interest in Tshani Mankosi right now is the 2021 Shell oil extraction on the wild coast and what this means for rural livelihoods.

## GLOSSARY

Amalegon- Mixed breed cattle (Inguni + Brahman)

Amasenene- Redbait

Amasimi - Large Ploughing Fields

Asosenabo Ubutyebi Bolwandle - We do not have the wealth/ abundance of the ocean

Ihemu - Hamada ibis

Ingobozi - Reed basket

Intsingisi/Intsingizi - African Hoopoe/ Pupa Africana

Intwasahlobo - Autum

Isishebo- Food used to supplement the main dish

Kubalele - Drought

Siphila Ngolu Lwandle - We live off the ocean

Umnqala- Metal rod used for harvesting

Uqwelagqibe – Tick

Utyalo Mbaza- Mussel Farming

Uvete- Grass frog (Ptychadenidae)

## REFERENCES


Adger, W.N., 2003. Social aspects of adaptive capacity. In *Climate change, adaptive capacity and development* (pp. 29-49).

Adger, W.N., 2010. Social capital, collective action, and adaptation to climate change. *Der klimawandel: Sozialwissenschaftliche perspektiven*, pp.327-345.

Adger, W.N., Arnell, N.W. and Tompkins, E.L., 2005. Adapting to climate change: perspectives across scales. *Global Environmental Change*, *15*(2), pp.75-76.

Adger, W.N., Barnett, J., Brown, K., Marshall, N. and O'brien, K., 2013. Cultural dimensions of climate change impacts and adaptation. *Nature climate change*, *3*(2), pp.112-117.

Ahmed, S. and Eklund, E., 2021. Climate change impacts in coastal Bangladesh: Migration, gender and environmental injustice. Asian Affairs, 52(1), pp.155-174.

Ajayi, V.O., 2017. Primary sources of data and secondary sources of data. Benue State University.

Akintola, S.L. and Fakoya, K.A., 2017. Small-scale fisheries in the context of traditional post-harvest practice and the quest for food and nutritional security in Nigeria. *Agriculture & Food Security*, *6*, pp.1-17.

Alobo Loison, S., 2015. Rural livelihood diversification in sub-Saharan Africa: a literature review. *The Journal of Development Studies*, *51*(9), pp.1125-1138.

Amoah, L.N.A. and Simatele, M.D., 2021. Food security and coping strategies of rural household livelihoods to climate change in the eastern cape of South Africa. *Frontiers in Sustainable Food Systems*, *5*, p.692185.

Amorim-Maia, A.T., Anguelovski, I., Chu, E. and Connolly, J., 2022. Intersectional climate justice: A conceptual pathway for bridging adaptation planning, transformative action, and social equity. *Urban Climate*, *41*, p.101053.

Antwi-Agyei, P., 2012. *Vulnerability and adaptation of Ghana's food production systems and rural livelihoods to climate variability*. University of Leeds.

Anugwa, I.Q., Obossou, E.A.R., Onyeneke, R.U. and Chah, J.M., 2023. Gender perspectives in vulnerability of Nigeria's agriculture to climate change impacts: a systematic review. *GeoJournal*, *88*(1), pp.1139-1155.

Assan, E., Suvedi, M., Olabisi, L.S. and Bansah, K.J., 2020. Climate change perceptions and challenges to adaptation among smallholder farmers in semi-arid Ghana: A gender analysis. *Journal of Arid Environments*, *182*, p.104247.

Assan, E., Suvedi, M., Olabisi, L.S. and Bansah, K.J., 2020. Climate change perceptions and challenges to adaptation among smallholder farmers in semi-arid Ghana: A gender analysis. *Journal of Arid Environments*, *182*, p.104247.

Assan, E., Suvedi, M., Schmitt Olabisi, L. and Allen, A., 2018. Coping with and adapting to climate change: A gender perspective from smallholder farming in Ghana. *Environments*, *5*(8), p.86.

Assan, E., Suvedi, M., Schmitt Olabisi, L. and Allen, A., 2018. Coping with and adapting to climate change: A gender perspective from smallholder farming in Ghana. *Environments*, *5*(8), p.86.

Ayeri, O.S., Christian, V.R., Josef, E. and Michael, H., 2012. Local perceptions and responses to climate change and variability: The case of Laikipia District, Kenya. Sustainability, 4(12), pp.3302-3325.

Babbie, E.R., 2020. *The practice of social research*. Cengage Au.

Babugura, A., Mtshali, N. and Mtshali, M., 2010. Gender and climate change: South Africa case study. *Heinrich Böll Stiftung Southern*.

Badjeck, M.C., Allison, E.H., Halls, A.S. and Dulvy, N.K., 2010. Impacts of climate variability and change on fishery-based livelihoods. *Marine policy*, *34*(3), pp.375-383.

Badstue, L., Lopez, D.E., Umansteva, A., Williams, G., Elias, M., Farnworth, C.R., Rietveld, A., Njuguna-Mungai, E., Luis, J., Najjar, D. and Kandiwa, V., 2018. What drives capacity to innovate? Insights from women and men small-scale farmers in Africa, Asia, and Latin America. Journal of Gender, Agriculture and Food Security (Agri-Gender), 3(302-2019-3644), pp.54-81.

Barbier, E.B., 2015. Climate change impacts on rural poverty in low-elevation coastal zones. *Estuarine, Coastal and Shelf Science*, *165*, pp.A1-A13. Barbier, E.B., 2015. Climate change impacts on rural poverty in low-elevation coastal zones. *Estuarine, Coastal and Shelf Science*, *165*, pp.A1-A13.

Barceló, M., Tengö, M., Simonetti, J.A. and Gelcich, S., 2024. Exploring links between local

knowledge, values and livelihoods in land-sea interface: insights on emerging tradeoffs and change in Southern Chile: *ecosystems and People*, *20*(1), p.2329562.

Bardasi, E. and Wodon, Q., 2006. Measuring Time Poverty and Analyzing Its Determinants: Concepts and Application to Guinea [MPRA Paper]. *University Library of Munich, Germany*.

Bardasi, E., 2006. Measuring time poverty and analyzing its determinants: Concepts and application to Guinea. *Gender, time use, and poverty in Sub-Saharan Africa*.

Becken, S., Lama, A.K. and Espiner, S., 2013. The cultural context of climate change impacts: Perceptions among community members in the Annapurna Conservation Area, Nepal. *Environmental Development*, *8*, pp.22-37.

Begum, R.A., Lempert, R.J., Ali, E., Benjaminsen, T.A., Bernauer, T. and Cramer, W., & Wester, P.(2022). IPCC, 2022: Chapter 1. Point of Departure and Key Concepts. *Climate Change 2022: Impacts, Adaptation and Vulnerability*.

Benhin, J.K., 2006. Agriculture and deforestation in the tropics: a critical theoretical and empirical review. *AMBIO: A Journal of the Human Environment*, *35*(1), pp.9-16.

Bhadwal, S., Sharma, G., Gorti, G. and Sen, S.M., 2019. Livelihoods, gender and climate change in the Eastern Himalayas. *Environmental Development*, *31*, pp.68-77.

Bhattacharya, T., 2017. Social reproduction theory: Remapping class, recentering oppression.

Bhattacherjee, A., 2012. *Social science research: Principles, methods, and practices*. University of South Florida.

Blignaut, J., Ueckermann, L. and Aronson, J., 2009. Agriculture production's sensitivity to changes in climate in South Africa. *South African Journal of Science*, *105*(1), pp.61-68.

Bob, U. and Babugura, A., 2014. Contextualising and conceptualising gender and climate change in Africa. *Agenda*, *28*(3), pp.3-15.

Call, M. and Sellers, S., 2019. How does gendered vulnerability shape the adoption and impact of sustainable livelihood interventions in an era of global climate change?. *Environmental Research Letters*, *14*(8), p.083005.

Calzadilla, A., Zhu, T., Rehdanz, K., Tol, R.S. and Ringler, C., 2014. Climate change and agriculture: Impacts and adaptation options in South Africa. *Water Resources and Economics*, *5*, pp.24-48.

Cammarano, D., Valdivia, R.O., Beletse, Y.G., Durand, W., Crespo, O., Tesfuhuney, W.A., Jones, M.R., Walker, S., Mpuisang, T.N., Nhemachena, C. and Ruane, A.C., 2020. Integrated assessment of climate change impacts on crop productivity and income of commercial maize farms in northeast South Africa. *Food Security*, *12*, pp.659-678.

Cannon, T., 2014. Rural livelihood diversification and adaptation to climate change. *Community-Based Adaptation to Climate Change; Ensor, J., Berger, R., Huq, S., Eds*, pp.55-76.

Cannon, T., 2014. *World disasters report 2014—Focus on culture and risk. International Federation of Red Cross and Red Crescent Societies* [online]

Cartwright, A.N.T.O.N., 2011. Coastal vulnerability in the context of climate change: A South African perspective. *Cape Town: Centre for Criminology*.

Chambers, R. and Conway, G., 1992. Sustainable rural livelihoods: practical concepts for the 21st century.

Chandra, A., McNamara, K.E., Dargusch, P., Caspe, A.M. and Dalabajan, D., 2017. Gendered vulnerabilities of smallholder farmers to climate change in conflict-prone areas: A case study from Mindanao, Philippines. Journal of rural studies, 50, pp.45-59.

Chepkemoi, R.S., 2020. *An Economic Evaluation of the Role of Land and Livestock Dynamics in Livelihood Diversification in Baringo County, Kenya* (Doctoral dissertation, University of Nairobi).

Chersich, M.F., Wright, C.Y., Venter, F., Rees, H., Scorgie, F. and Erasmus, B., 2018. Impacts of climate change on health and wellbeing in South Africa. *International journal of environmental research and public health*, *15*(9), p.1884.

Chidakwa, P., Mabhena, C., Mucherera, B., Chikuni, J. and Mudavanhu, C., 2020. Women's Vulnerability to Climate Change: Gender-skewed Implications on Agro-based Livelihoods in Rural Zvishavane, Zimbabwe. Indian Journal of Gender Studies, 27(2), pp.259-281.

Connolly-Boutin, L. and Smit, B., 2016. Climate change, food security, and livelihoods in sub-Saharan Africa. *Regional Environmental Change*, *16*, pp.385-399.

Connolly-Boutin, L. and Smit, B., 2016. Climate change, food security, and livelihoods in sub-Saharan Africa. *Regional Environmental Change*, *16*, pp.385-399.

Craig, R.K., 2006. Valuing coastal and ocean ecosystem services: The paradox of scarcity for marine resources commodities and the potential role of lifestyle value competition. *J. Land Use & Envtl. L.*, *22*, p.355.

Daoud, M., 2021. Is vulnerability to climate change gendered? And how? Insights from Egypt. *Regional Environmental Change*, *21*(2), p.52.

Daskon, C. and McGregor, A., 2012. Cultural capital and sustainable livelihoods in Sri Lanka's rural villages: towards culturally aware development. *Journal of Development Studies*, *48*(4), pp.549-563.

Davis, P. and Ali, S., 2014. Exploring local perceptions of climate change impact and adaptation in rural Bangladesh (Vol. 1322). Intl Food Policy Res Inst.

Daw, T., Adger, W.N., Brown, K. and Badjeck, M.C., 2009. Climate change and capture fisheries: potential impacts, adaptation and mitigation.

De la Torre-Castro, M., Fröcklin, S., Börjesson, S., Okupnik, J. and Jiddawi, N.S., 2017. Gender analysis for better coastal management–Increasing our understanding of social-ecological seascapes. *Marine Policy*, *83*, pp.62-74.

de la Torre-Castro, M., Lindström, L., Jiddawi, N.S., Pike, F. and Max, A., 2022. Women and adaptive capacity to climate change in East African seascapes–Zanzibar as an example. *Frontiers in Marine Science*, *9*, p.931883.

De Melo Virissimo, F and Robinson, E., 2023. What role do the oceans play in regulating and supporting life on Earth.https://www.lse.ac.uk/granthaminstitute/explainers/what-role-do-the-oceans-play-in-regulating-the-climate-and-supporting-life-on-earth/#:~:text=Their%20role%20in%20regulating%20climate,CO2%20from%20the%20atmosphere. Accessed 10 November 2023.

Denton, F., 2002. Climate change vulnerability, impacts, and adaptation: Why does gender matter?. *Gender & Development*, *10*(2), pp.10-20.

Diniso, Y.S., Zhou, L. and Jaja, I.F., 2022. Dairy farmers' knowledge and perception of climate change in the Eastern Cape province, South Africa. International Journal of Climate Change Strategies and Management, 14(2), pp.168-179.

Dorward, A., 2009. Integrating contested aspirations, processes and policy: development as hanging in, stepping up and stepping out. *Development Policy Review*, *27*(2), pp.131-146.

Duba, T., 2019. *Climate and environmental change along the East Coast of South Africa: perspectives from a local marine resource-dependent community and scientific researchers*(Master's thesis, Faculty of Science).

Duru, J., Aro, J. and Oladipo, R.E., 2022. The effects of climate change on the livelihood of rural women: a case study of Ilorin South, Nigeria. *Bulletin of the National Research Centre*, *46*(1), p.165.

Ejembi, E.P. and Alfa, G.B., 2012. Perceptions of climate change in Africa: regional agricultural perspectives. *Research on Humanities and Social Sciences*, *2*(5), pp.1-10.

Elum, Z.A., Modise, D.M. and Marr, A., 2017. Farmer's perception of climate change and responsive strategies in three selected provinces of South Africa. *Climate Risk Management*, *16*, pp.246-257.

Emdon, L., 2013. Gender, livelihoods and conservation in Hluleka, Mpondoland c. 1920 to the present: Land, forests and marine resources.

Esterhuyse, P., 2012. Social capital in a rainwater-harvesting project in Rural South Africa. *Irrigation and Drainage*, *61*, pp.95-105.

FAO, 2012. Smallholders and Family Farmers. https://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf. Accessed 18/05/2023.

Federici, S., 2004. *Caliban and the Witch*. Autonomedia.

Fernandez, B., 2018. Dispossession and the depletion of social reproduction. Antipode, 50(1), pp.142-163.

Fierros-González, I. and Lopez-Feldman, A., 2021. Farmers' perception of climate change: A review of the literature for Latin America. Frontiers in Environmental Science, 9, p.672399.

Findlater, K.M., Satterfield, T., Kandlikar, M. and Donner, S.D., 2018. Six languages for a risky climate: how farmers react to weather and climate change. Climatic Change, 148, pp.451-465.

Fitriana, R. and Stacey, N., 2012. The role of women in the fishery sector of Pantar Island, Indonesia. *Asian Fisheries Science Special Issue*, *25*, pp.159-175.

Food and Agriculture Organization of the United Nations (FAO), n.d. *Chapter 4: Sustainable*

*livelihoods in practice*. [online] Available at: https://www.fao.org/4/a0032e/a0032e04.htm [Accessed 28 January 2025]

Frangoudes, K. and Gerrard, S., 2019. Gender perspective in fisheries: examples from the South and the North. *Transdisciplinary for Small-Scale Fisheries Governance: Analysis and Practice*, pp.119-140.

Fraser, N., 2016. Contradictions of capital and care.

Garai, J., 2016. Gender specific vulnerability in climate change and possible sustainable livelihoods of coastal people. A case from Bangladesh. *Revista de Gestão Costeira Integrada-Journal of Integrated Coastal Zone Management*, *16*(1), pp.79-88.

Garutsa, T.C. and Nekhwevha, F., 2019. Decreasing reliance of indigenous knowledge systems in rural households-the case of Khambashe, Eastern Cape, South Africa. *Africa Insight*, *49*(1), pp.17-36.

Glaser, S.M., Hendrix, C.S., Franck, B., Wedig, K. and Kaufman, L., 2019. Armed conflict and fisheries in the Lake Victoria basin. *Ecology and Society*, *24*(1).

Goh, A.H., 2012. A literature review of the gender-differentiated impacts of climate change on women's and men's assets and well-being in developing countries.

Guido, Z., Zimmer, A., Lopus, S., Hannah, C., Gower, D., Waldman, K., Krell, N., Sheffield, J., Caylor, K. and Evans, T., 2020. Farmer forecasts: Impacts of seasonal rainfall expectations on agricultural decision-making in Sub-Saharan Africa. *Climate Risk Management*, *30*, p.100247.

Halder, P., Sharma, R. and Alam, A., 2012. Local perceptions of and responses to climate change: experiences from the natural resource-dependent communities in India. *Regional Environmental Change*, *12*, pp.665-673.

Haque, A.S., Kumar, L. and Bhullar, N., 2023. Gendered perceptions of climate change and agricultural adaptation practices: a systematic review. *Climate and Development*, *15*(10), pp.885-902.

Hauck, M., 2014. Sharing benefits from the coast: rights, resources and livelihoods. Juta and Company (Pty) Ltd.

Hebinck, P. and Van Averbeke, W., 2007. 2 Rural Transformation In The Eastern Cape. In *Livelihoods and Landscapes* (pp. 33-66). Brill.

Hitchcock, K.A., 2013. *Tourism and development: a case study of Mdumbi Backpackers and Transcape non-profit organisation* (Doctoral dissertation, Rhodes University).

Huckstep, S. and Beynon, J., 2024. *Making migration work for adaptation: Classifying remittances as private climate finance*. Center for Global Development. https://www.cgdev.org/publication/making-migration-work-adaptation-classifying-remittances-climate-finance (Accessed: 24 December 2024)

Hunter, R. and Cronin, K., 2020. Climate Change and its Impacts on the Feasibility and Sustainability of Small-scale Systems of Agricultural Production in Communal Areas and on Farms Transferred through Land Reform.

Intergovernmental Panel on Climate Change (IPCC), 2007. Climate Change 2007:Synthesis Report. Contribution of Working Group I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf. Accessed 12 November 2023.

Intergovernmental Panel on Climate Change (IPCC). 2022. Sixth Assessment Report. Working Group II. Chapter 5: Food, Fibre and Other Ecosystem Products. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter05.pdf. Accessed 04 April 2023

Intergovernmental Panel on Climate Change (IPCC). 2022. Sixth Assessment Report. Working Group II. Technical Summary. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_TechnicalSummary.pdf. Accessed 04 April 2023.

International Organization for Migration (IOM), 2024. *Labour migration and climate change: Information sheet*. https://www.iom.int/sites/g/files/tmzbdl2616/files/documents/2024-05/information-sheet-labour-migration-and-climate-change.pdf (Accessed: 24 December 2024).

Islam AR, Tasnuva A, Sultana S, Rumana S. Climate change impact: Food production and local perception. American Journal of Environmental Protection. 2014;3(2):45-50.

Jennings, S. and Magrath, J., 2009, July. What happened to the seasons In *Conference on Seasonality, Future Agricultures Consortium International. IDS Sussex, UK*.

Jiri, O., Mafongoya, P.L. and Chivenge, P., 2015. Indigenous knowledge systems, seasonal 'quality'and climate change adaptation in Zimbabwe. *Climate Research*, *66*(2), pp.103-111.

Jiri, O., Mafongoya, P.L., Mubaya, C. and Mafongoya, O., 2016. Seasonal climate prediction and adaptation using indigenous knowledge systems in agriculture systems in Southern Africa: a review. *Journal of Agricultural Science*, *8*(5), pp.156-172.

Jost, C., Kyazze, F., Naab, J., Neelormi, S., Kinyangi, J., Zougmore, R., Aggarwal, P., Bhatta, G., Chaudhury, M., Tapio-Bistrom, M.L. and Nelson, S., 2016. Understanding gender dimensions of agriculture and climate change in smallholder farming communities. *Climate and Development*, *8*(2), pp.133-144.

Jost, C., Kyazze, F., Naab, J., Neelormi, S., Kinyangi, J., Zougmore, R., Aggarwal, P., Bhatta, G., Chaudhury, M., Tapio-Bistrom, M.L. and Nelson, S., 2016. Understanding gender dimensions of agriculture and climate change in smallholder farming communities. *Climate and Development*, *8*(2), pp.133-144.

Jurgilevich, A., Räsänen, A., Groundstroem, F. and Juhola, S., 2017. A systematic review of dynamics in climate risk and vulnerability assessments. *Environmental Research Letters*, *12*(1), p.013002.

Kaganzi, K.R., Cuni-Sanchez, A., Mcharazo, F., Martin, E.H., Marchant, R.A. and Thorn, J.P., 2021. Local perceptions of climate change and adaptation responses from two mountain regions in tanzania. Land, 10(10), p.999.

Kalanda-Joshua, M., Ngongondo, C., Chipeta, L. and Mpembeka, F., 2011. Integrating indigenous knowledge with conventional science: Enhancing localised climate and weather forecasts in Nessa, Mulanje, Malawi. *Physics and Chemistry of the Earth, Parts A/B/C*, *36*(14-15), pp.996-1003.

Kaminsky, A., 2012. *Social capital and fisheries co-management in South Africa: The East Coast Rock Lobster Fishery in Tshani Mankozi, Wild Coast, Eastern Cape* (Doctoral dissertation, Rhodes University).

Kauneckis, D. and Martin, R., 2020. Patterns of adaptation response by coastal communities to climate risks. *Coastal Management*, *48*(4), pp.257-274.

Kauneckis, D. and Martin, R., 2020. Patterns of adaptation response by coastal communities to climate risks. *Coastal Management*, *48*(4), pp.257-274.

Khalil, M.B., Jacobs, B.C. and McKenna, K., 2021. Linking social capital and gender relationships in adaptation to a post-cyclone recovery context. *International Journal of Disaster Risk Reduction*, *66*, p.102601.

Kimaro, E.G., Mor, S.M. and Toribio, J.A.L., 2018. Climate change perception and impacts on cattle production in pastoral communities of northern Tanzania. Pastoralism, 8, pp.1-16.

Kimbu, A., Booyens, I. and Winchenback, A., 2019. Coping with Change: Livelihood Diversification through Tourism in Rural Coastal Communities. *Critical Tourism Studies Proceedings*, *2019*(1).

Kleiber, D., Harris, L.M. and Vincent, A.C., 2015. Gender and small-scale fisheries: a case for counting women and beyond. *Fish and Fisheries*, *16*(4), pp.547-562.

Kubayi, V.R., 2022. *The Effects of Climate Variability and Change on Rural Livelihoods in the Tiyani Village, Limpopo Province* (Doctoral dissertation, University of Johannesburg).

Li, C., Tang, Y., Luo, H., Di, B. and Zhang, L., 2013. Local farmers' perceptions of climate change and local adaptive strategies: a case study from the Middle Yarlung Zangbo River Valley, Tibet, China. *Environmental management*, *52*, pp.894-906.

Limuwa, M.M. and Synnevåg, G., 2018. Gendered perspective on the fish value chain, livelihood patterns and coping strategies under climate change-insights from Malawi's small-scale fisheries. *African Journal of Food, Agriculture, Nutrition and Development*, *18*(2), pp.13521-13540.

Liru, P.N., 2020. *The influence of climate change on the livelihoods of women involved in rural agriculture in Kakamega county, Kenya* (Doctoral dissertation, Stellenbosch: Stellenbosch University).

Lyimo, J.G. and Kangalawe, R.Y., 2010. Vulnerability and adaptive strategies to the impact of climate change and variability. The case of rural households in semi-arid Tanzania. *Environmental Economics*, (1, Iss. 2), pp.89-97.

Mahlangabeza-Piliso, N.J., 2016. *Perceptions of local communities on legislation governing the use of natural resources in Coffee Bay and Hole-in-the-Wall, Mqanduli, Eastern Cape, South Africa* (Doctoral dissertation, MSc dissertation (Environmental Management), University of South Africa, Pretoria).

Makate, C., Wang, R., Makate, M. and Mango, N., 2016. Crop diversification and livelihoods

of smallholder farmers in Zimbabwe: adaptive management for environmental change. *SpringerPlus*, *5*, pp.1-18.

Malpeli, K.C., Weiskopf, S.R., Thompson, L. and Hardy, A.R., 2020. What are the effects of climate variability and change on ungulate life-histories, population dynamics, and migration in North America? A systematic map protocol. *Environmental Evidence*, *9*, pp.1-9.

Martins, I.M. and Gasalla, M.A., 2018. Perceptions of climate and ocean change impacting the resources and livelihood of small-scale fishers in the South Brazil Bight. Climatic change, 147, pp.441-456.

Masinde, M., Assessing Public Perceptions on Climate Change: Insights from the Free State Province of South Africa. *Available at SSRN 4968396*.

Masipa, T., 2017. The impact of climate change on food security in South Africa: Current realities and challenges ahead. *Jàmbá: Journal of Disaster Risk Studies*, *9*(1), pp.1-7.

Mbatha, N.P., 2011. *Sharing benefits from coastal resources with rural communities in South Africa: the influence of institutional arrangements* (Master's thesis, University of Cape Town).

Mbatha, N.P., 2018. The influence of plural governance systems on rural coastal livelihoods: The case of Kosi Bay.

Mbatha, P., *2022.Cop15: putting gender at the heart of biodiversity governance*. International Institute for environmental and Development. https://www.iied.org/cop15-putting-gender-heart-biodiversity-governance. Accessed 03/10/2023

Mbiti, J.S., 1990. *African religions & philosophy*. Heinemann.

McDowell, L.M., 1997. Writing Women and Space: Colonial and Postcolonial Geographies

Mendenhall, E., Hendrix, C., Nyman, E., Roberts, P.M., Hoopes, J.R., Watson, J.R., Lam, V.W. and Sumaila, U.R., 2020. Climate change increases the risk of fisheries conflict. *Marine Policy*, *117*, p.103954.

Mnimbo, T.S., Mbwambo, J., Kahimba, F.C. and Tumbo, S.D., 2016. A gendered analysis of perception and vulnerability to climate change among smallholder farmers: the case of Same District, Tanzania. *Climate and Development*, *8*(1), pp.95-104.

Mohammed, E.Y. and Uraguchi, Z.B., 2013. Impacts of climate change on fisheries: Implications for food security in Sub-Saharan Africa. Global Food Security, Nova Science

Publishers, Inc, pp.114-135.

Mohammed, K., Batung, E., Kansanga, M., Nyantakyi-Frimpong, H. and Luginaah, I., 2021. Livelihood diversification strategies and resilience to climate change in semi-arid northern Ghana. *Climatic Change*, *164*, pp.1-23.

Mokoena, N. and Dolan, M., 2020. Climate Change's Disproportionate Impact on Women: Agricultural Workers in South Africa. *Georgetown Journal of International Affairs*.Accessed 18/05/2023.

Mokoena, N. and Dolan, M., 2020. Climate Change's Disproportionate Impact on Women: Agricultural Workers in South Africa. *Georgetown Journal of International Affairs*.

Mouton, J. and Babbie, E., 2001. The practice of social research. Cape Town: Wadsworth Publishing Company, pp.871-890.

Mubai, M.E., Bandeira, S.O., Combane, D.J., Daw, T., Gonzalez, T., O'Neill, E.M.D. and Garcia, M.M., 2023. The sacred and climate change: Local perceptions from KaNyaka island in Mozambique. *Climate Risk Management*, *42*, p.100564.

Musavengane, R. and Kloppers, R., 2020. Social capital: An investment towards community resilience in the collaborative natural resources management of community-based tourism schemes. *Tourism Management Perspectives*, *34*, p.100654.

Musemwa, L., Muchenje, V., Mushunje, A., Aghdasi, F. and Zhou, L., 2015. Household food insecurity in the poorest province of South Africa: level, causes and coping strategies. *Food Security*, *7*, pp.647-655.

Mushongah, J., 2009. *Rethinking vulnerability: Livelihood change in southern Zimbabwe, 1986-2006* (Doctoral dissertation, University of Sussex).

Musinguzi, L., Natugonza, V., Efitre, J. and Ogutu-Ohwayo, R., 2018. The role of gender in improving adaptation to climate change among small-scale fishers. *Climate and Development*, *10*(6), pp.566-576.

Nelson, L.K., Cullen, A.C., Koehn, L.E., Harper, S., Runebaum, J., Bogeberg, M., Strawn, A. and Levin, P.S., 2023. Understanding perceptions of climate vulnerability to inform more effective adaptation in coastal communities. *PLOS Climate*, *2*(2), p.e0000103.

Nhemachena, C., Hassan, R. and Chakwizira, J., 2014. Analysis of determinants of farm-level adaptation measures to climate change in Southern Africa. *Journal of Development and Agricultural Economics*, *6*(5), pp.232-241.

Nightingale, A., 2009. Warming up the climate change debate: A challenge to policy based on adaptation. *Journal of Forest and Livelihood*, *8*(1), pp.84-89.

Nyahunda, L. and Tirivangasi, H.M., 2022. Adaptation strategies employed by rural women in the face of climate change impacts in Vhembe district, Limpopo province, South Africa. *Management of Environmental Quality: An International Journal*, *33*(4), pp.1061-1075.

Nyang'au, J.O., Mohamed, J.H., Mango, N., Makate, C. and Wangeci, A.N., 2021. Smallholder farmers' perception of climate change and adoption of climate smart agriculture practices in Masaba South Sub-county, Kisii, Kenya. *Heliyon*, *7*(4).

O'Neill, B.C., van Aalst, M., Zaiton Ibrahim, Z., Berrang-Ford, L., Bhadwal, S., Buhaug, H., Diaz, D., Frieler, K., Garschagen, M., Magnan, A.K. and Midgley, G., 2022. Key risks across sectors and regions.

O'Neill, B.C., van Aalst, M., Zaiton Ibrahim, Z., Berrang-Ford, L., Bhadwal, S., Buhaug, H., Diaz, D., Frieler, K., Garschagen, M., Magnan, A.K. and Midgley, G., 2022. Key risks across sectors and regions.

Obisesan, M. and Chitakira, M., 2021. Investigating climate change awareness and adaptation strategies among female farmers in the Lephalale municipal area in South Africa. *African Journal of Science, Technology, Innovation and Development*, *13*(6), pp.727-734.

Omoyajowo, K., Danjin, M., Omoyajowo, K., Odipe, O., Mwadi, B., May, A., Ogunyebi, A. and Rabie, M., 2024. Exploring the interplay of environmental conservation within spirituality and multicultural perspective: insights from a cross-sectional study. *Environment, Development and Sustainability*, *26*(7), pp.16957-16985.

Onwutuebe, C.J., 2019. Patriarchy and women vulnerability to adverse climate change in Nigeria. Sage Open, 9(1), p.2158244019825914.

Onwutuebe, C.J., 2019. Patriarchy and women vulnerability to adverse climate change in Nigeria. *Sage Open*, *9*(1), p.2158244019825914.

OR Tambo District Municipality, 2018. Climate Change Vulnerability Assessment and Response Plan. https://letsrespondtoolkit.org/municipalities/eastern-cape/or-tambo/. Accessed

12 November 2023.

Ortega-Cisneros, K., Cochrane, K.L., Rivers, N. and Sauer, W.H., 2021. Assessing South Africa's potential to address climate change impacts and adaptation in the fisheries sector. *Frontiers in Marine Science*, *8*, p.652955.

Ossome, L., & Naidu, S, 2021., The agrarian question of gendered labour. In *Labour questions in the Global South* (pp. 63–86). Springer.

Oyarzo, C., Kaulen, S., Marchant, C., Rodríguez, P., Caviedes, J., Miranda, M.D., Schlicht, G. and Ibarra, J.T., 2024. Vulnerability of small-scale farming livelihoods under climate variability in a globally important archipelago of the Global South. *Environmental and Sustainability Indicators*, *24*, p.100540.

Pearse, R., 2017. Gender and climate change. *Wiley Interdisciplinary Reviews: Climate Change*, *8*(2), p.e451.

Petheram, L., Fleming, A., Stacey, N. and Perry, A., 2013. *Indigenous women's preferences for climate change adaptation and aquaculture development to build capacity in the Northern Territory*. National Climate Change Adaption Research Facility.

Phuong, L.T.H., Biesbroek, G.R., Sen, L.T.H. and Wals, A.E., 2018. Understanding smallholder farmers' capacity to respond to climate change in a coastal community in Central Vietnam. Climate and Development, 10(8), pp.701-716.

Popke, J., Curtis, S. and Gamble, D.W., 2016. A social justice framing of climate change discourse and policy: Adaptation, resilience and vulnerability in a Jamaican agricultural landscape. Geoforum, 73, pp.70-80.

Popoola, O.O., Monde, N. and Yusuf, S.F.G., 2018. Perceptions of climate change impacts and adaptation measures used by crop smallholder farmers in Amathole district municipality, Eastern Cape province, South Africa. GeoJournal, 83, pp.1205-1221.

Popoola, O.O., Monde, N. and Yusuf, S.F.G., 2019. Perception and adaptation responses to climate change: An assessment of smallholder livestock farmers in Amathole district Municipality, Eastern Cape Province. South African Journal of Agricultural Extension, 47(2), pp.46-57.

Rahman, M.S., Toiba, H. and Huang, W.C., 2021. The impact of climate change adaptation strategies on income and food security: Empirical evidence from small-scale fishers in

Indonesia. *Sustainability*, *13*(14), p.7905.

Rankoana, S.A., 2016. Rainfall scarcity and its impacts on subsistence farming: The role of gender and religious rituals in adaptation to change. *Agenda*, *30*(3), pp.124-131.

Rankoana, S.A., 2018. Human perception of climate change. *Weather*, *73*(11), pp.367-370.

Rankoana, S.A., 2021. Exploring indigenous knowledge on medicinal plants used to treat COVID-19 related symptoms. *Technium Soc. Sci. J.*, *25*, p.798.

Rao, N., Mishra, A., Prakash, A., Singh, C., Qaisrani, A., Poonacha, P., Vincent, K. and Bedelian, C., 2019. A qualitative comparative analysis of women's agency and adaptive capacity in climate change hotspots in Asia and Africa. *Nature Climate Change*, *9*(12), pp.964-971.

Rapholo, M.T. and Diko Makia, L., 2020. Are smallholder farmers' perceptions of climate variability supported by climatological evidence? Case study of a semi-arid region in South Africa. *International Journal of Climate Change Strategies and Management*, *12*(5), pp.571-585.

Rapholo, M.T. and Diko Makia, L., 2020. Are smallholder farmers' perceptions of climate variability supported by climatological evidence? Case study of a semi-arid region in South Africa. *International Journal of Climate Change Strategies and Management*, *12*(5), pp.571-585.

Ratner, B.D., Meinzen-Dick, R., Hellin, J., Mapedza, E., Unruh, J., Veening, W., Haglund, E., May, C. and Bruch, C., 2017. Addressing conflict through collective action in natural resource management. *International Journal of the Commons*, *11*(2).

Reid, P. and Vogel,C., 2006. Living and responding to multiple stressors in South Africa-Glimpses from KwaZulu-Natal,Global Environmental Change, 16 (2).

Reisinger, A., Howden, M., Vera, C., Garschagen, M., Hurlbert, M., Kreibiehl, S., Mach, K.J., Mintenbeck, K., O'Neill, B., Pathak, M. and Pedace, R., 2020. The concept of risk in the IPCC Sixth Assessment Report: A summary of cross-working group discussions. *Intergovernmental Panel on Climate Change*, *15*, p.130.

Republic of South Africa Department of Forestry, Fisheries and the Environment. 2020. National Climate Change Adaptation Strategy (NCCAS). https://unfccc.int/sites/default/files/resource/South-Africa_NAP.pdf. Accessed 15 November

2023.

Rey-Moreno, C., Roro, Z., Siya, M.J., Simo-Reigadas, J., Bidwell, N.J. and Tucker, W.D., 2012. Towards a sustainable business model for rural telephony.

Rhiney, K., Eitzinger, A., Farrell, A.D. and Taylor, M.A., 2016. 3 Assessing the vulnerability of Caribbean farmers to climate change impacts. Climate change and food security: Africa and the Caribbean, p.59.

Roco, L., Engler, A., Bravo-Ureta, B.E. and Jara-Rojas, R., 2015. Farmers' perception of climate change in mediterranean Chile. Regional environmental change, 15, pp.867-879.

Rojas-Downing, M.M., Nejadhashemi, A.P., Harrigan, T. and Woznicki, S.A., 2017. Climate change and livestock: Impacts, adaptation, and mitigation. Climate risk management, 16, pp.145-163.

Roy, A., Kumar, S. and Rahaman, M., 2024. Exploring climate change impacts on rural livelihoods and adaptation strategies: Reflections from marginalized communities in India. *Environmental Development*, *49*, p.100937.

Rubekie, A.P., Pauline, N.M. and Kaaya, L.T., 2022. Coastal communities' responses to climate change and variability impacts: a threat to coastal and marine resources?. *Climate and Development*, *14*(9), pp.842-856.

Rubekie, A.P., Pauline, N.M. and Kaaya, L.T., 2022. Coastal communities' responses to climate change and variability impacts: a threat to coastal and marine resources?. *Climate and Development*, *14*(9), pp.842-856.

Rühlemann, A. and Jordan, J.C., 2021. Risk perception and culture: implications for vulnerability and adaptation to climate change. *Disasters*, *45*(2), pp.424-452.

Ruth, N.S., Jenna, T. and Sewela, M.F., 2022. THE IMPACT OF CLIMATE CHANGE ON COMMUNAL FARMERS LIVELIHOODS. *Russian Journal of Agricultural and Socio-Economic Sciences*, *131*(11), pp.164-175.

Sakdapolrak, P., Sterly, H., Borderon, M., Bunchuay-Peth, S., Naruchaikusol, S., Ober, K., Porst, L. and Rockenbauch, T., 2024. Translocal social resilience dimensions of migration as adaptation to environmental change. *Proceedings of the National Academy of Sciences*, *121*(3), p.e2206185120.

Sánchez-Cortés, M.S. and Chavero, E.L., 2011. Indigenous perception of changes in climate

variability and its relationship with agriculture in a Zoque community of Chiapas, Mexico. Climatic change, 107, pp.363-389.

Santhia, D., Shackleton, S. and Pereira, T., 2018. Mainstreaming sustainable adaptation to climate change into municipal planning: An analysis from the Eastern Cape, South Africa. Development Southern Africa, 35(4), pp.589-608.

Schuman, S., Dokken, J.V., Van Niekerk, D. and Loubser, R.A., 2018. Religious beliefs and climate change adaptation: A study of three rural South African communities. *Jàmbá: Journal of Disaster Risk Studies*, *10*(1), pp.1-12.

Scoones, I., 2015. *Sustainable livelihoods and rural development* (p. xv). Rugby: Practical Action Publishing.

Senja, O., 2021. Gender and Climate Change: Challenges and Opportunities. *Senja, O.(2021). Gender and Climate Change: Challenges and Opportunities. HAPSc Policy Briefs Series*, *2*(2), pp.85-93.

Serrat, O. and Serrat, O., 2017. The sustainable livelihoods approach. *Knowledge solutions: Tools, methods, and approaches to drive organizational performance*, pp.21-26.

Shackleton, S. and Luckert, M., 2015. Changing livelihoods and landscapes in the rural Eastern Cape, South Africa: Past influences and future trajectories. *Land*, *4*(4), pp.1060-1089.

Shackleton, S., Cobban, L. and Cundill, G., 2014. A gendered perspective of vulnerability to multiple stressors, including climate change, in the rural Eastern Cape, South Africa. *Agenda*, *28*(3), pp.73-89.

Shahi, P., 2011. Upper Mustang's rain spell has weather experts scratching their heads'. *The Kathmandu Post*, (28 July 2011).

Shisanya, S. and Mafongoya, P., 2016. Adaptation to climate change and the impacts on household food security among rural farmers in uMzinyathi District of Kwazulu-Natal, South Africa. Food security, 8, pp.597-608.

Sibiya, N.P., 2019. *Climate variability, asset adapttation and rural livelihoods in Mtubatuba, Kwazulu-Natal, South Africa*(Doctoral dissertation).

Simpson, N.P., Williams, P.A., Mach, K.J., Berrang-Ford, L., Biesbroek, R., Haasnoot, M., Segnon, A.C., Campbell, D., Musah-Surugu, J.I., Joe, E.T. and Nunbogu, A.M., 2023. Adaptation to compound climate risks: A systematic global stocktake. *Iscience*, *26*(2).

Slegers, M.F., 2008. “If only it would rain”: Farmers’ perceptions of rainfall and drought in semi-arid central Tanzania. *Journal of Arid Environments*, *72*(11), pp.2106-2123.

Small, L.A., 2007. The sustainable rural livelihoods approach: a critical review. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, *28*(1), pp.27-38.

Smith, G., Chowenga, M. and Karsters, J., 2024. Local knowledge matters: understanding the decision-making processes of communities under climate change in Suriname. *Frontiers in Climate*, *5*, p.1294271.

Sowman, M., 2020. Participatory and rapid vulnerability assessments to support adaptation planning in small-scale fishing communities of the Benguela Current Large Marine Ecosystem. *Environmental Development*, *36*, p.100578.

Spangler, K. and Christie, M.E., 2020. Renegotiating gender roles and cultivation practices in the Nepali mid-hills: unpacking the feminization of agriculture. *Agriculture and Human Values*, *37*, pp.415-432.

Sultana, F., 2014. Gendering climate change: Geographical insights. *The Professional Geographer*, *66*(3), pp.372-381.

Tambe, S., 2022. Sustainable livelihoods approach. In *Teaching and learning rural livelihoods: A guide for educators, students, and practitioners* (pp. 45-56). Cham: Springer International Publishing.

Tamou, C., Ripoll-Bosch, R., de Boer, I.J. and Oosting, S.J., 2018. Pastoralists in a changing environment: The competition for grazing land in and around the W Biosphere Reserve, Benin Republic. *Ambio*, *47*, pp.340-354.

Tanny, N.Z. and Rahman, M.W., 2016. Climate change vulnerabilities of woman in Bangladesh. *The Agriculturists*, *14*(2), pp.113-123.

Taruvinga, A., Visser, M. and Zhou, L., 2016. Barriers and opportunities to climate change adaptation in rural Africa: Evidence from the Eastern Cape Province of South Africa. *International Journal of Development and Sustainability*, *5*(11), pp.518-535.

Thinda, K.T., Ogundeji, A.A., Belle, J.A. and Ojo, T.O., 2020. Understanding the adoption of climate change adaptation strategies among smallholder farmers: Evidence from land reform beneficiaries in South Africa. *Land Use Policy*, *99*, p.104858.

Thondhlana, G., Vedeld, P. and Shackleton, S., 2012. Natural resource use, income and dependence among San and Mier communities bordering Kgalagadi Transfrontier Park, southern Kalahari, South Africa. *International Journal of Sustainable Development & World Ecology*, *19*(5), pp.460-470.

Thornton, P.K., Ericksen, P.J., Herrero, M. and Challinor, A.J., 2014. Climate variability and vulnerability to climate change: a review. *Global change biology*, *20*(11), pp.3313-3328.

Tirivangasi, H.M., Makwala, S.N. and Rankoana, S.A., 2023. Public perceptions of climate change: A rural case study of Motupa community in Limpopo province, South Africa.

Trærup, S.L. and Mertz, O., 2011. Rainfall variability and household coping strategies in northern Tanzania: a motivation for district-level strategies. *Regional Environmental Change*, *11*, pp.471-481.

Tsikata, D. and Amanor-Wilks, D.E., 2009. Land, labour and gendered livelihoods. *Feminist Africa*, (12).

Tsikata, D., 2009. Gender, Land and Labour Relations and Livelihoods in Sub-Saharan Africa in the Era of Economic Liberalisation. *Feminist Africa*, (12), pp.11-30.

Tsikata, D., 2016. Gender, land tenure and agrarian production systems in Sub-Saharan Africa. *Agrarian South: Journal of Political Economy*, *5*(1), pp.1-19.

Turpie, J. and Visser, M., 2013. The impact of climate change on South Africa's rural areas, 2013. *Search in*.

Ubisi, N.R., Mafongoya, P.L., Kolanisi, U. and Jiri, O., 2017. Smallholder farmer's perceived effects of climate change on crop production and household livelihoods in rural Limpopo province, South Africa. *Change and Adaptation in Socio-Ecological Systems*, *3*(1), pp.27-38.

Ubisi, N.R., Mafongoya, P.L., Kolanisi, U. and Jiri, O., 2017. Smallholder farmer's perceived effects of climate change on crop production and household livelihoods in rural Limpopo province, South Africa. *Change and Adaptation in Socio-Ecological Systems*, *3*(1), pp.27-38.

United Nations. 2006. CLIMATE ACTION. https://www.un.org/en/climatechange/what-is-climate-change. Accessed 14 November 2023

UNDP (2009) *Resource guide on gender and climate change*. New York: United Nations Development Programme.https://www.undp.org/publications/resource-guide-gender-and-climate-change. Accessed 23 November 2023.

Von Storch, H. and Krauss, W., 2005. Culture contributes to perceptions of climate change. *Nieman Reports*, *59*(4).

Wang W, Zhao X, Li H, Zhang Q. Will social capital affect farmers' choices of climate change adaptation strategies? Evidences from rural households in the Qinghai-Tibetan Plateau, China. Journal of Rural Studies. 2021 Apr 1;83:127-37.

Wiid, N. and Ziervogel, G., 2012. Adapting to climate change in South Africa: commercial farmers' perception of and response to changing climate. South African Geographical Journal= Suid-Afrikaanse Geografiese Tydskrif, 94(2), pp.152-173.

Wolf, J., Adger, W.N., Lorenzoni, I., Abrahamson, V. and Raine, R., 2010. Social capital, individual responses to heat waves and climate change adaptation: An empirical study of two UK cities. *Global Environmental Change*, *20*(1), pp.44-52.

Woodhouse, E., Moreau, M., Booker, F., Anthem, H., Coulthard, S., Eghenter, C., Goldman, M. (2022). Why gender matters for biodiversity conservation. IIED, London. https://www.iied.org/21266iied. Accessed 13/09/2023.

Yadav, S.S. and Lal, R., 2018. Vulnerability of women to climate change in arid and semi-arid regions: The case of India and South Asia. *Journal of Arid Environments*, *149*, pp.4-17.

Yanda, P.Z., Mabhuye, E., Johnson, N. and Mwajombe, A., 2019. Nexus between coastal resources and community livelihoods in a changing climate. *Journal of Coastal Conservation*, *23*, pp.173-183.

Yeni, S., 2024. Land, natural resources and the social reproduction of South Africa's 'relative surplus population'. *Journal of Agrarian Change*, p.e12584.

Yiridomoh, G.Y., Sullo, C. and Bonye, S.Z., 2021. Climate variability and rural livelihood sustainability: evidence from communities along the Black Volta River in Ghana. *GeoJournal*, *86*, pp.1527-1543

Ziervogel, G., New, M., Archer van Garderen, E., Midgley, G., Taylor, A., Hamann, R., Stuart-Hill, S., Myers, J. and Warburton, M., 2014. Climate change impacts and adaptation in South Africa. Wiley Interdisciplinary Reviews: Climate Change, 5(5), pp.605-620.

Zwane, E. M. (2019). Impact of climate change on primary agriculture, water sources and food security in Western Cape, South Africa. Jamba: Journal of Disaster Risk Studies, 11(1), 1–7.

# LIST OF APPENDICES

## Appendix A: Human Research Ethics Clearance

**Department of [illegible]graphy**

University of Cape Town Private Bag Rondebosch 7701
South Africa

**Professor Isabelle Ansorge**
**FSREC Chair 2025-2027**

13th February 2025

Dear Miss Benya

**MSc - Climate-related risks and coastal livelihoods: lived realities, gender, and adaptation Student Number - BNYANE001**

**Application - SCI/00716/2024**

I am pleased to inform you that as the Chair of the Faculty of Science Research Ethics Committee we have approved the above-named application for research ethics clearance, subject to the conditions and comments by committee reviewers listed below.

**Conditions**

- That the minor modification in the title does not affect the procedures and/or anonymity of interviewees outlined in your application
- You uphold ethical principles throughout all stages of the research, responding appropriately to unanticipated issues: please contact me if you need advice on ethical issues that arise.

**Committee Comments**

* Please discuss what issues you expect to arise from cultural nuances or local power dynamics, and how you will address this in your research
* Providing feedback 2 days after fieldwork may be too soon, as you will not have had an opportunity to refine your findings.
* Regarding publication of results - Please read the UCT Authorship Practices Policy chrome-https://uct.ac.za/sites/default/files/content_migration/uct_ac_za/39/files/Policy_Authorship_Practices.pd f and updates this section accordingly.

Expiration date: 31 December 2025

I wish you success in your research.
Kind Regards,

Isabelle Ansorge
FSREC Chair

# Appendix B: Semi-Structured Interview Sheet

Field Questions

Semi- Structured Interviews

1. Biographical Questions

*Name:
*Igama*

*For how many years have you been based in Tshani/ Mdumbi?
*Yiminyaka engaphi uhlala apha kulenginqi ( eTshani/Mdumbi)?*

*What livelihood practices do you participate in, in the household ?
*Nenza ntoni eyoniphilisa apha endini*

*How Long have you been participating in (Land or Marine based or both or other livelihood activities)?
*Waqala nini uku lima/ tyala okanye ukuloba?*

*What do you plant?
*Zintoni ozityalayo/ utyala ntoni?*

*How big is your cultivation land?
*Ungakanani umhlaba omlimayo okanye amasimi owalimayo*

*How long to you spend in the field/ garden?
*Lingakanani ixesha olisebenza emasimini*

*What do you harvest?
*Yintoni into oyilobayo elwandle*

*How many times do you go to the ocean to harvest? At what times of the day?
*Uyakangaphi elwandle uyoloba ? Ngawaphi amaxesha oya ngawo elwandle?*

***For people that do not engage in land or marine livelihood strategies probe to get more questions as to why they are not or why they might have stopped. What are other activities they do to sustain their livelihood.***

2. Individual Semi- Structured Discussion Questions

***2.1 Local Perceptions and experiences***

*Have you noticed any changes in the local climate over the past few years?

*Ngaba ukhe waluqaphela utshintsho kwimozulu yasekuhlaleni kule minyaka imbalwa idlulileyo?*

How would you describe these changes?
*Ungaluchaza njani olu tshintsho?*

In what ways do you think climate related risks have affected your daily life and livelihood?
*Zeziphi iindlela ocinga ukuba ukutshintsha kwemozulu kubuchaphazele ubomi bakho bemihla ngemihla nendela oziphilisa ngayo?*

Have there been any noticeable changes in livelihood practices due to a changing climatic conditons?
*Zikhona inzinto eziphawulekayo okanye oziqaphelayo kwiindlela zokuphila ngenxa yokutshintsha kwe simo semozulu?*

Are there women who participate in ocean-based livelihood activities in the village?
*Ingaba akhona amanina/ abantu abangoMama abathatha inxaxheba kwimisebenzi yokuziphilisa esekelwe elwandle kule lali?*

Have there been shifts in fishing patterns, availability of marine resources, or other aspects of ocean-related livelihoods (e.g. fishing gear)?
*Ngaba kuye kwakho utshintsho kwiindlela zokuloba, ukufumaneka kobutyebi baselwandle, okanye eminye imiba yokuphila enxulumene nolwandle (umzekelo, izixhobo zokuloba)?*

Are there observable changes in the types of fish or aquatic species targeted, or in fishing techniques?
*Ngaba kukho utshintsho olubonakalayo kwiintlobo zeentlanzi okanye kwiintlobo zasemanzini ekujoliswe kuzo, okanye kubuchule bokuloba?*

Do you think changes in climate and environmental conditions have impacted women smallholders' traditional land-based livelihoods? If so, how?
*Ngobona kwakho, kolu tshintsho kwimozulu butshinsthe najni ubomi bakho okanye indela oziphilisa ngayo?*

*2.2 Adaptation Strategies*

What adaptation measures have you taken in order to cope with the changes you have experinced?
*Ngawaphi amanyathelo owathathileyo ukuhlangabezana lotshintsho lwesimo sezulu?*

Are there any traditional knowledge or practices in your community that are relevant to adapting to climate change?
*Akhona amanyathelo owathathayo ongathi lulwazi lemveli?*

How have these traditional practices evolved in response to recent climate changes?
*Lamanyathelo owathatahyo, ingaba zikhona indela atshintshe ngawo kuleminyaka?*

Are there instances where traditional practices have proven effective in the face of changing environmental conditions? Give examples.
*Akhona amaxesha apho ubonileyo ulwazi lemvele yiyelanogalelo ekuhlangabezeni notshintsho lwesimosezulu?*

### *2.3 Gendered Labour*

In what ways have the effects of climate change influenced your roles and responsibilities within your household?

- When you are out in the ocean/ field/ garden who does the work at home? (probe)

*Zeziphi indela obona ngalo uba olutshintsho lwesimo sezulu luchaphazele izinto ezixhomekeke kuwe apha endlini?*

How have these changes impacted your daily routines and time allocation in agricultural and household responsibilities?
*Olutshintsho lungaba ikhona indela ezichaphazele ngazo izinto ozenzayo ngosuku?*

How has Climate change influenced the type of work and availability of work that you part take in?
*Olutshintsho lwesimo sezulu ingaba lukuchapazele njani kwizinto ozenzayo okanye kwimisebenzi oyenzayo?*

Have there been any noticeable shifts in the types of crops or activities you are engaged in due to climate-related changes?
*Lukhona utshintsho olubonayo kwizino enizityalayo ngenxa yotshintsho lwesimo sezulu?*

Are there any challenges you face in obtaining resources necessary for their livelihoods?
Zikhona izinto onothi ziyakuvalela ekufumaneni izinto ezinophuhlisa indela oziphilisa ngayo?

### *2.5 Closing Questions*

What are the barriers or concerns of women smallholders regarding their future in the context of ongoing climate changes and environmental degradation?

Are there specific interventions or support that women smallholders believe would enhance their resilience and well-being?

# Appendix C: Focus Group Sheet

**Focus Group Discussion Questions**

**Things to highlight:**

Highlight local perceptions and experiences.

Highlight adaptation strategies employed (women and men)

Highlight experiences in livelihood practices and how people are adapting. Highlight access to assets/capital

Highlight how Climate related risks have influenced gendered labour in the context of the village.

**General Introductory Questions:**

Can you share a bit about your background and experiences as people who live off the ocean and land amongst other livelihood activities?

*Cela nindicacisele lubanzi ngendela eniziphilisa ngazo, nindinike umfanekiso?*

How long have you all been engaged in land and marine based activities?

*Abanye benu apha baqala nini ukulima nokusebenzisa ubutyebi bolwandle?*

**Local Perceptions and Experiences on Climate Change:**

Can you share any specific experiences or events that you attribute to climate change in the community?

*Cela nindibalisele ngolutshintso lwesimo sezulu apha eTshani, nilibona njani, nithi yezwa yintoni?*

How do you think climate related risks have impacted the overall community livelihoods of smallholders?

*Olutshintsho lwesimo sezulu ingaba lunuchaphazele njani ningumphakathi walapha eTshani?*

**Adaptation Practices and Strategies:**

What specific changes have you made in your agricultural or smallholder practices in response to climate change?
*Ngawaphi amanyathelo enwathathayo ukuhlangabezana nolutshintsho lwesimo sezulu kwizinto enizenzayo ezidibene nomhlaba?*

Are there any traditional or indigenous knowledge-based practices that you have adopted to cope with climate-related challenges?
*Ulwazi lemvele ingaba lukhona indela elindinceda ngalo ekukhawuleleni nolutshintsho lwesimo sezulu?*

**Reshaping Rural Livelihoods:**

In what ways have you noticed climate related risk affecting you on a day-to-day basis?
*Olutshintsho lwesimo sezulu ingaba nilibona lunichaphazela njani kwizinto ezinizenzayo zoniphilisa ngemihla ngemihla?*

How have your roles and responsibilities changed due to climate change, if at all?
*Ingaba izinto ezixhomekeke kuwe zitshinsthe njani nge nxa yotshintsho lwesimo sezulu, uba zikhona indela ozibona zikuchaphazele ngayo okanye zitshintshe nagayo?*

Can you tell me of any collaborative efforts within the community to adapt to the impacts of climate change on livelihoods?
*Zikhona indela enincedana ngazo ningumphakazi ukukhawulelana nolutshintsho lwesimo sezulu?*

**Conclusion:**

In closing, are there anyways government or civil society organisations have assisted you as a community is adapting to climate related risks?
*Xasivala, Ingaba zikhona indela urhulumente nhe nkapani ezininceda ngalo ekuhawuleleni noTshinstho lwesimo sezulu?*

# Appendix D: Consent Form

Informed Voluntary Consent to Participate in Research Study.

Project Title: Climate-Related Risks and Coastal Livelihoods: lived realities, gender and adaptation

My Name is Anele Songo Benya. I am a student in the Environmental and Geographical Science department doing my master's degree through ACDI at the University of Cape Town. I am conducting a research for my MPhil project, which this study forms a part of.

**Invitation to participate, and benefits:** You are invited to participate in a research study conducted by Anele Benya UCT (ACDI), with Tshani Mankosi community. The aim of this study is to understand how coastal people are adapting to the adverse effects of climate related risks on their land and marine livelihoods. The study aims to shed light on the gender dimensions of climate change adaptation and the potential for promoting inclusive and sustainable approaches to enhance the resilience of coastal rural people. I believe that your participation would be a valuable source of information, and hope that by participating we will both gain useful knowledge.

**Procedures:** During this study, you will be asked to answer some questions and to share your experiences in how you navigate the impacts on climate change on your livelihood.

**Recording & Photographs:** I may record audio and take photographs as part of the study. These will be used to reflect and have accurate accounts of your story in the research analysis. If you object to this, please indicate below.

**Risks:** The harmful risks to you, related to your participation in this study, is that some topical discussions may bring up past memories that you or your family have experienced that may be uncomfortable.

**Feedback**: You will receive feedback about the results of this research through a summary of the findings of the research.

**Disclaimer/Withdrawal:** Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided without your signed consent. Note that the researcher may also withdraw you from the study at any time. Please also note that no decision-making will occur as a result of these discussions.

**Confidentiality**: All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained, and pseudonyms will be used if necessary.

**What signing this form means:** By signing this consent form, you agree to participate in this research study. The aim, procedures to be used, as well as the potential risks and benefits of your participation have been explained verbally to you in detail, using this form. Refusal to participate in or withdrawal from this study at any time will have no effect on you in any way. You are free to contact me, to ask questions or request further information, at any time during this research.

| | | | |
|---|---|---|---|
| I agree to participate in this research (tick one box) | Yes ☒ | No ☐ | |
| (Initials) | | | |
| I agree to be audio-recorded | Yes ☒ | No ☐ | |
| (Initials) | | | |