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**The Impacts of Climate Change on the Livelihoods of Small-Scale Traders in
Zambia: A Case Study of Cross-Border Traders in Kazungula District**

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Abstract

Climate change is one of the global problems that the world is facing today. Previous studies have shown that climate change has negatively affected the livelihoods of the vulnerable population. However, understanding climate change is usually influenced by how it affects a person's livelihood. For agriculture-dependent communities, it has been documented that climate change includes rainfall variability and its effects on production. Nevertheless, there is limited evidence regarding climate change and its effects on non-agriculture-dependent livelihoods. This study builds on the current literature by investigating the impacts of climate change on the livelihoods of the cross-border traders in Kazungula district. The study adopted a single case study design and employed semi-structured interviews, a focus group discussion and document analysis. The study was guided by the Sustainable Livelihood Approach and Capability Approach. The study found that traders understood climate change as rainfall variability, extreme temperature, and drought. The effects of climate change were mainly associated with mobility and reduced profits in their business, which impacted their ability to meet basic needs. The respondents had opted for coping strategies, including joining village banking groups, giving goods on credit, and changing their type of business. However, the adaptation process was found to be impacted by other factors, such as border restrictions (related to power relations), limited access to financial capital, lack of skills and lack of institutions to support the traders to effectively adapt to the impacts of climate change. It can be argued that the impacts of climate change on the livelihoods of cross-border traders are acute and have limited options for adaptation. Hence, policy interventions should be open to including non-agricultural dependent livelihoods.

Keywords: Vulnerability, climate change, cross-border trader, and livelihoods

Preface

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I would also like to extend my sincere appreciation to my supervisor, Professor Max Koch, for his guidance and constructive feedback throughout my master's thesis. Many thanks to the Chairperson of Kazungula Cross-Border Association for his help and hospitality during my fieldwork. A big thank you to all my friends and family for your moral, social and spiritual support. Finally, I also thank God almighty for giving me strength in the most difficult times of life.

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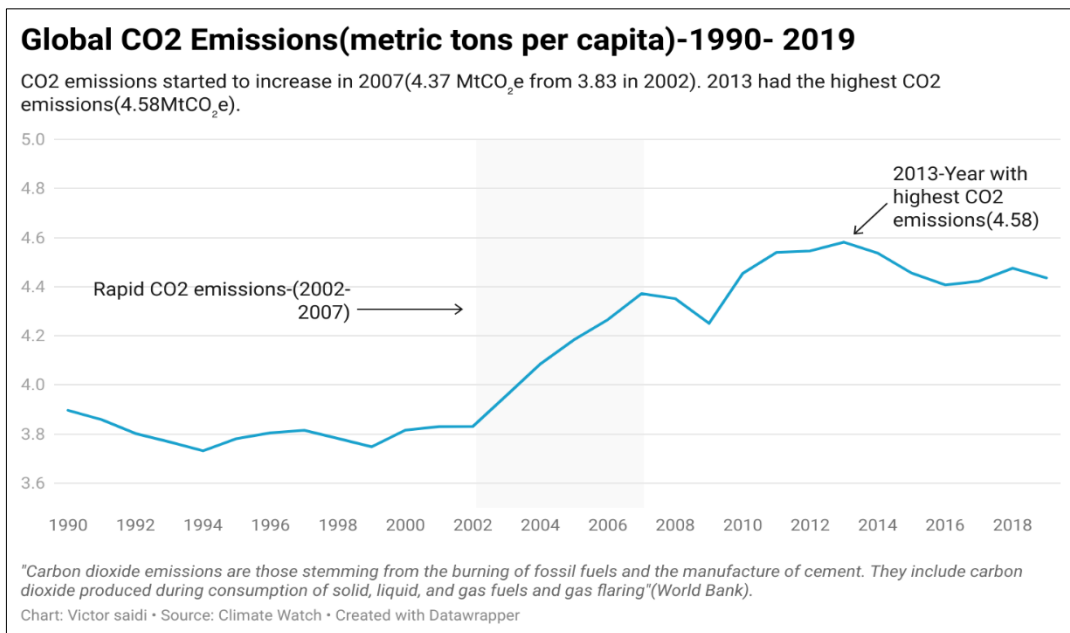
1. Introduction

This section provides a comprehensive introduction to the study. First, I will highlight the background of the study; second, I will present the context. Third, I will present the research aims and significance of the study. The section ends with the presentation of the structure of the thesis.

1.1. Background of the Study

Global Carbon dioxide emissions have continued to rise since 2002, from 3.83 metric tons per capita to 4.44 MtCO₂e in 2019 (Climate Watch, 2020). The emissions stemmed from “burning fuels and manufacture of cement as well as consumption of gas fuels, solid, liquids and gas flaring” (World Bank, 2023). The key contributors to the emissions include industry, agriculture, forestry, transport and direct energy use in buildings (United Nations Environment Programme, 2022).

Figure 1 below shows CO₂ emissions from 1990 to 2019.



The author designed **figure 1** based on the Climate Watch dataset.

However, cumulative distribution per capita differs among countries, with USA and EU being the major emitters of CO₂ with 25% and 17% respectively, in the period 1950 to 2019. While China and Russia contributed 13% and 7%, respectively.

Nonetheless, less developed countries contributed 0.5% of global (historical) CO₂ emissions (UNEP, 2022).

Global emissions have resulted in climate variability, observed evidence includes; heat waves, floods, droughts and tropical cyclones (Mukherji *et al.*, 2023). These events have resulted in other global challenges, such as food shortages, wildfires and destruction of human habitation, leading displacements and global migrations (UNEP, 2022). For instance, Population and Development Review (2010) projected that climate change would lead to an increase in the number of migrants from North Africa to Europe by 2030.

Despite low per capita emissions, which are below the global average, developing countries are the most vulnerable to the effects of climate change (Mukherji *et al.*, 2023). Vulnerability to climate hazards is prevalent in countries with high poverty, conflicts, and climate-sensitive livelihoods (*ibid*). Southern Africa has, in recent years, experienced the worst forms of climate hazards, including cyclones such as Fred in 2023, Kennedy and Idai in 2019 in Mozambique (World Meteorological Organization, 2023; UNICEF, 2019). The cyclones led to hunger and the displacement of thousands of people from their homes. Such events undermine the efforts of the vulnerable population to escape the trap of poverty (UNDP, 2007).

In southern Africa, Zambia has been cited to be most vulnerable to climate hazards such as flash floods, seasonal floods, extreme temperatures, and droughts (World Bank, 2021). The majority of the rural population that depends on climate sensitive agriculture was noted to be the most vulnerable coupled with their low adaptive capacity (*ibid*). The increase in climate induced hazards has affected sectors of the national economy such as agriculture, mining, business activities, energy and health, which impedes Zambia's efforts towards the achievement of Vision 2030's goal of becoming a "prosperous middle-income country by 2030" (Ministry of National Development Planning, 2016). Further, Thurlow *et al.* (2008) claimed that Zambia lost a cumulative total of US\$4.3 billion of the GDP due to climate change for the period 2007 to 2016. Similarly, in the same period, the country experienced

a US\$2.2 billion GDP loss in agriculture(ibid).

Climate variability in Zambia has majorly been associated with agriculture; studies conducted in the country, such as (Nyanga *et al.*, 2011; Haque *et al.*, 2012; Zimba, 2016; Mulenga, Wineman and Sitko, 2017; Ngoma *et al.*, 2021) have all investigated how climate change affects farmers and their adaptive capacity. However, in areas like Kazungula with low precipitation, as indicated in (Thurlow *et al.*,2008), farmers have diversified their livelihoods by engaging in cross-border trading. Hence, little is known about how climate change affects cross-border traders and their adaptation strategies. Against this backdrop, this study investigates how climate change affects cross-border traders and their adaptive capacity. This thesis will contribute to the body of knowledge on the impacts of climate change on livelihoods by adding a perspective of rural cross-border traders of Kazungula district of Zambia.

1.2. Aim and scope of the study

This case study aimed to understand the impacts of climate change on the livelihoods of cross-border traders in Kazungula district of Zambia.

The study is guided by the following research questions:

Research question: How do cross-border traders in Kazungula district narrate their experiences of climate change and its impacts on their livelihoods?

- I. How does climate change affect the livelihoods of cross-border traders in Kazungula district?
- II. What adaptation strategies do cross-border traders employ to cope with the impacts of climate change?
- III. What challenges or opportunities do cross-border traders encounter in adapting to climate change?

To answer my research questions, I used semi-structured interviews with eight cross-border traders, a focus group discussion with key informants, and I reviewed documents such as national policy on climate change, the 8th National Development Plan (8NDP) and other relevant documents. I will elaborate more on

samples and justification in the methods section.

1.2.1. Significance of the study

This study contributes to the body of knowledge in several ways; Firstly, as pointed out earlier, previous studies on the impacts of climate change on livelihoods have concentrated on agriculture, ignoring other community members whose livelihoods do not directly depend on farming. Hence, the study will bring a new perspective on climate change focusing on cross-border trading. Further, this study could be used to inform future research on the topic.

Secondly, the information gathered through this study would help policy makers to design more inclusive climate adaptation policies that would encompass the needs of the farmers and non-agricultural livelihoods like informal cross-border traders. This would lead to the development of interventions that would be responsive to the needs of the community members.

Thirdly, the study contributes a new theoretical view on climate change that combines the capability approach and sustainable livelihoods approach to understand how traders are affected by climate change.

1.3. Description of Context and Climatic Characteristics

Zambia is a low-income country in Southern Africa. It is a landlocked nation with eight neighbours: Malawi, Angola, Zimbabwe, Mozambique, Tanzania, the Democratic Republic of the Congo, Botswana, and Namibia. Its area is 752,612 square kilometres. There were 19,610,769 people living in Zambia as of 2022, the majority of whom were based in Lusaka (Zambia Statistics Agency, 2022). Furthermore, Zambia has 10 provinces, with Lusaka serving as both the administrative and commercial hub (ibid).

Zambia's major economic activities include mining, energy agriculture, Tourism, and manufacturing industry. The country was in 2018 considered the World seventh largest producer of copper. The major mining exports include copper and cobalt which account for over 70% of the country's total exports earnings (Zambia Development Agency, 2023). Further manufacturing and agriculture account for 9

and 3.4 percent of the gross domestic product (GDP) respectively (World Bank Group, 2023).

Zambia enjoyed robust economic growth for the period 2000 to 2005, the economy grew at an average rate of about 5.8 percent per year and rose to a stable 6.8 percent for the period 2006 to 2015. This attainment of macroeconomic stability led to the reclassification of the country as the lower middle income country (Ministry of National Development Planning, 2017). Despite this stability, in recent years Zambia has undergone severe economic crises which led to a shrinkage GDP growth rate of 4.6% in 2021. The change is attributed to the spillover effects of the war in Ukraine, Covid19 and the copper prices which had continued to plummet on the international market (World Bank, 2023). This led to a huge decrease in Atlas Gross National Income per capita, leading to reclassification of the country to low income in 2021 from being a lower middle income country in the past years (Hamadeh *et al.*, 2022). See figure 2 (map of Zambia) for details regarding the ten (10) provinces as well as the Agro Ecological Zones of the country.

Climatic Characteristics

Zambia experiences a sub-tropical climate comprising three distinct seasons, which include, a wet rainy season (November to April), winter (May to August) and dry season which is around September to October (World Bank, 2021).

The country is divided into five ecological zones based on the amount of annual precipitation (Thurlow, Zhu and Diao, 2008). Zone one (1) is the driest area of the country with less than 800 mm of annual rainfall and it covers the southern part of the country while the northern part receives rainfall averaging to 1,400 mm per year (World Bank, 2021). The rainfall patterns in Zambia are influenced by the Inter-Tropical convergence Zone (ITCZ) and the El Niño/Southern Oscillation (*ibid*). The former oscillates between the north and south tropics around October and April bringing a rainy season in the country. Conversely, the latter causes inter-annual variations of weather conditions. It causes much drier than average conditions in December to February in the Southern region of the country while causing bringing

wetter conditions in the north region(World Bank, 2021). The details of ecological zones and precipitation can be seen in **Figure 2**.

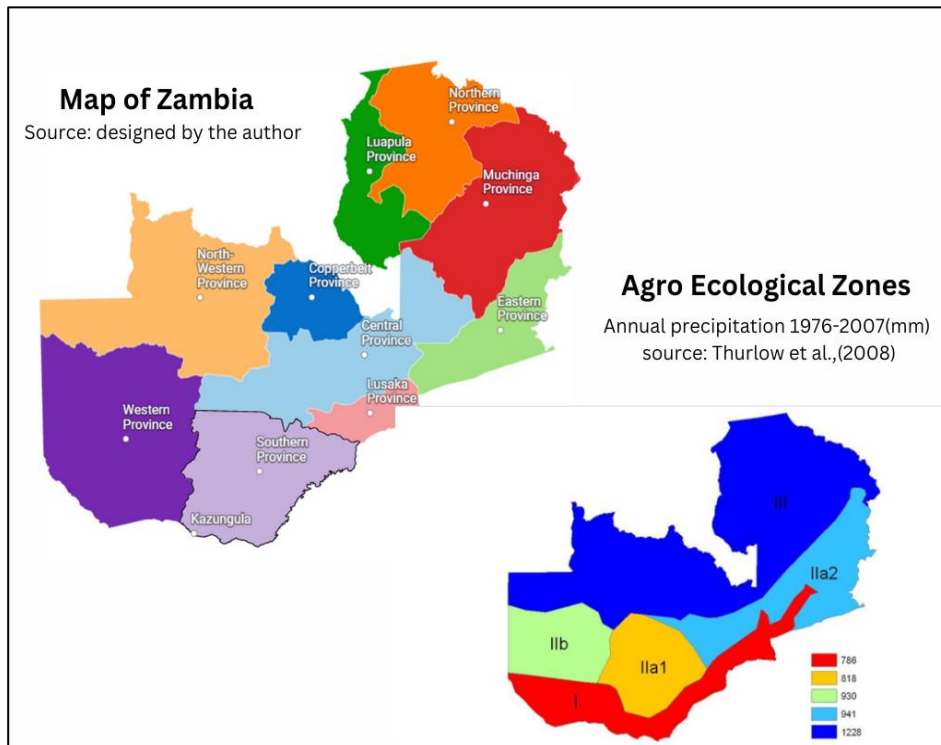


Figure 2 shows the provincial administrative provinces and ecological regions.

Impacts of climate change

Climate change in Zambia has mainly been experienced through extreme temperatures, droughts, seasonal floods and flash floods (World Bank, 2021). The incidences of floods and droughts have increased over the years. For example, the number of people affected by floods increased from 1.23 million in 2004-2005 to 1.44 million in the period 2006-2007, affecting about 41 districts in the country (ibid). The Southern province was reported to be most prone to these climate hazards. Recently, in the first quarter of 2023, the province experienced severe floods which affected over 25,768 households in five districts and displacing 1,394 families (Red Cross, 2023). Further, the flood prone areas have also experienced cases diseases such as cholera (UNICEF, 2023).

Further climate change was reported to have a negative effect on Zambia’s economy. The country recorded an average loss of annual growth rate of 0.4 percent

for the period 1977 and 2007 (Thurlow, Zhu and Diao, 2008) and it is projected that, the loss may raise to 0.9 percent if the current climate induced challenges are not addressed. Further, the loss of water due to prolonged droughts resulted to a fall in hydro power generation of 600Megawatts(MNDP, 2017) and a total loss in agriculture GDP of US\$2.2 billion (Thurlow, Zhu and Diao, 2008). Climate variability has undermined the efforts of Zambia’s government to help vulnerable communities to come out of their poverty situation. The majority of vulnerable population in rural areas depends on climate sensitive agriculture which is susceptible to climate shocks (CSO, 2016). The living conditions monitoring survey showed that 76.6 percent of the rural population were living in poverty as compared to 23.4 percent in the urban area (ibid).

Policy framework on climate change in Zambia

Zambia has in recent years developed several policies aimed at curbing the impacts of climate change on the livelihoods. The country has long term vision of enabling vulnerable groups to come out of the trap of poverty by 2030. All the current policies are guided by the goals of the Vision 2030 policy document. Key policies on climate change include the 2016 National Policy on Climate change (NPCC), 2007 National Policy on Environment (NPE) and the 2007 National Adaptation Programme of Action (GRZ, 2006; Ministry of National Development Planning, 2016; Ministry of National Development Planning, 2017; Siyuba, 2021).

However, the country also has certain policies and programmes that target specific sectors such as the National Agriculture Policy and the National forestry policy. Interventions are often done with the help of non-governmental organizations and other supporting partners such as foreign governments and multilateral institutions.

1.3.1. Description of the study area

The Southern province is the fourth largest province in Zambia after Lusaka, the Copperbelt and Eastern province. The province has 13 districts and a total population of 2,381,728 in 2022 (Zambia Statistics Agency, 2022). Kazungula district borders three countries: Botswana, Namibia, and Zimbabwe. It is a rural

district located 234.1 km from Livingstone, the nearest urban area, and occupies an area of 18,055.6 square kilometres. The 2022 census results indicate that the district had a population of 173,002 and population density of 9.6 (ibid).

Figure 3 below shows the location of Kazungula district in Southern province of Zambia.

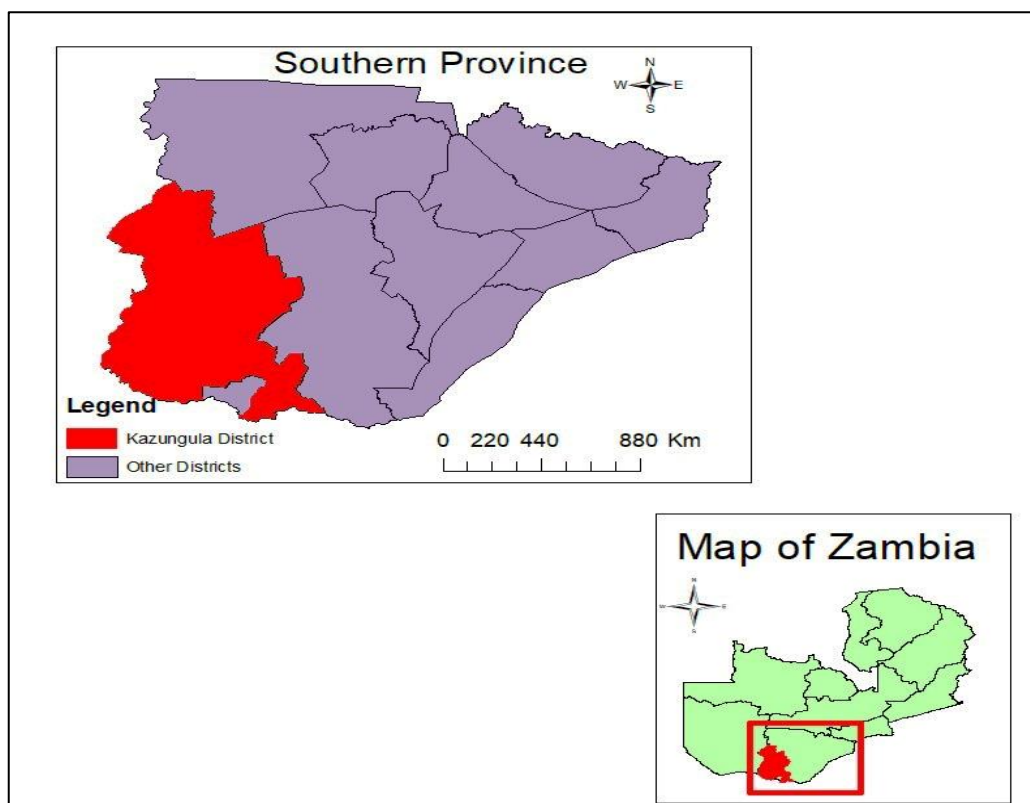


Figure 3 Southern Province of Zambia showing the location of Kazungula district. Source: Designed by the author based on shapefiles

Kazungula area is in ecological zone one (1) which is historically known for being dry with higher incidences of drought than any other regions of the country. The area has high summer temperatures ranging from 22.5 to 26 degree Celsius while in winter months, temperatures range from 13.5°C to 16.5°C (Ambukege, 2019). The area receives low average annual rainfall of below 800 mm, and the soil is not good for agriculture, apart from those near the Zambezi River (ibid). Further, the area is projected to experience an increase in temperature of about “1°C and 3°C by 2060” (Swennenhuis and Mandima, 2012, p. 11). This will lead to more flooding and drought events in the area. The projected impacts of these extreme weather events will include shortage of food, increase in plant diseases, increased animal

mortality, more water borne diseases, reduced fishing activities and reduced mobility due to destruction of roads and other infrastructure (ibid).

The key economic activities in the area include fishing, small scale agriculture, charcoal burning and hunting (Swennenhuis and Mandima, 2012, pp. 6–8). However, those that are close to the border have specialized in trading activities. It includes cross-border trading and managing small enterprises to meet the needs of the local communities and those of the households in the nearby countries. Climate change will have a negative effect on the livelihoods of people of Kazungula district, hence more research is required to find best ways of helping the people to come out the current and anticipated calamities.

1.3.2. Definition of concepts

The following key concepts guide the study:

Livelihoods

Refers to “adequate stock and flows of food and cash to meet basic needs” (Chambers and Conway, 1991, p.5). A livelihood further comprises capabilities, assets and activities required to make a living.

Cross-border trader

The term cross-border trade refers to the business activities of small-scale entrepreneurs involved in buying and selling from neighbouring countries (Zata, 2016). This study adopted the expanded definition by (Kachere, 2011), which included informal traders that travel to nearby countries to order items for resale to local markets (streets, retail stores and others) and those who order inputs for production. For example, weed killer and seeds targeting farmers. I further expand this view by considering those who supply local products to neighbouring countries.

Climate change

The study adopted the definition of climate change according to the Intergovernmental Panel on Climate Change (IPCC), which refers to a shift in the climate's state that can be determined (e.g., by statistical tests) by changes in the mean and/or variability of its attributes and that lasts for a considerable amount of time, usually decades or more (Ipcc, 2022, p. 554). The scope of this definition enabled the researcher to select participants who have been in the area for at least a

decade or more (who participated in the focus group discussion).

Vulnerability

The Intergovernmental Panel on Climate Change (2022, p. 560) defined vulnerability as “the propensity or predisposition to be adversely affected.” To put it into context, vulnerability can be seen as “the degree by which a system is susceptible to or is unable to cope with, adverse effects of climate change including climate variability and extremes” (McCarthy *et al.*, 2001, p. 6)

1.4. Outline of the thesis

This study is segmented into seven (7) chapters. Chapter one covers the Introduction and background, purpose of the study, research questions, significance of the study and culminates with description of the context. Chapter two (2) focuses on empirical review of the impacts of climate on livelihoods and adaptation strategies. In chapter three (3), I present the theoretical framework. Chapter Four (4) presents the methodology and methods used in the study. Research findings are presented in chapter five (5) while chapter six (6) presents the discussion. Finally, in Chapter seven (7) the conclusion of the study is made.

2. Previous studies

Climate change is one of the global challenges that significantly affects the various sectors of the economy, including agriculture, health, and others. IPCC (2022, p.554) defined climate change as “climatic variation that can be detected (for instance, using statistics) by changes in the mean or variability of its attributes over time, generally decades or more.” These changes can occur due to natural occurrences or human environmental activities (ibid). The United Nations Development Programme (2008) pointed out that climate change has damaging impacts, especially on vulnerable groups whose livelihoods depend on natural resources.

Zambia is one of the countries experiencing the negative impacts of climate change, including erratic rainfall, floods, and prolonged dry spells, which adversely affect the livelihoods of communities, including small-scale traders. Livelihoods imply strategies for earning a living in a society. It involves funds, knowledge, property, food, interpersonal interaction, and interconnected relationship with a person’s political, social, and cultural factors (Islam and Ryan, 2016).

Over the years, scholars have extensively investigated the impacts of climate change on livelihoods, and four themes can be generated. The studies in the first category have focused on the macro-level analysis of climate change and the country’s economic development. In their research on the impacts of climate change on economic growth in Zambia, Thurlow et al. (2008) found that climate variability reduces Zambia’s GDP by 0.4% annually. The study further established that agriculture was the most vulnerable sector, with a reduced GDP growth rate of 1 to 2% per year. However, the study focused on the macro-level analysis with little consideration of the views of the local communities. Further, as a single-country study, it is difficult to generalise the findings.

Nonetheless, Dube et al. (2016) bridged this gap by adding a cross-continental perspective on understanding the impacts of climate change. The study established that climate change affects crop yields and reduces biodiversity across the African continent. However, the study was based on the review of previous literature and

needed to present a transparent methodology which other scholars could replicate. Similarly, Matarira et al. (2013), in their study on the social and economic impacts of climate change in Lesotho, found that food crops were most vulnerable to climatic variability.

The studies on the second strand have focused on community perceptions of climate change. Rankoana (2018) investigated human perception of climate change in South Africa; the study established that community members were aware of climate change, which was mainly rainfall variability, cloud formation and changing seasons. The observations of the community were consistent with the meteorological records. Similarly, Mulenga et.al. (2017), in their study on trends of farmers' perceptions of climate change in Zambia, noted some points of convergence and the discrepancy between the farmers' perceptions and meteorological records. However, the study did not show the implications of this discrepancy to their research.

Further, studies in Bangladesh (Haque *et al.*, 2012a), Ethiopia (Belachew and Zuberi, 2015) and Zambia (Ngoma *et al.*, 2021) have asserted that farmers have knowledge about climate change and its effects on agriculture. Nevertheless, these studies have mainly focused on livelihoods that depend on agriculture, neglecting others like cross-border traders. However, Arku et al. (2017) strived to bridge this gap by integrating the perspective of small-scale traders. The study found that traders had knowledge about climate change; it was perceived as prolonged dry spells and unpredictable rainfall patterns. The study further established that traders were affected by climate change. However, it considered other variables, such as education, but only presented frequencies which may not be sufficient for justifying the influence of the variables on the traders' perceptions of climate change. Further, the study provided good insights into urban traders, leaving a gap on rural traders, especially those involved in cross-border trading. Despite the weakness, the study provides a framework on which this paper will be anchored.

The third category of studies have mainly focused on community adaptation to climate change. A study on determinants of farmers adaptation strategies found that

agriculture labour force, gender and level of education of the household head, farming experience and the availability of extension services had a significant influence on the adaptation process of the small holder farmers (Othniel and Resurreccion, 2013). These factors were also important in livelihood diversification (Kalantary, 2010). However, this quantitative study did not allow farmers to express their views or experiences on the topic. Similarly, Ishumael and Godwell (2015) claimed that agriculture dependent livelihoods in Zimbabwe had a low capacity to adapt to the impact of climate change. The study argued that low adaptability has resulted in food insecurity, malnutrition, livestock failures and poverty. Further, Kalantary (2010) claimed that depending on the dimension of climate change affecting their locations, farmers in Zambia have different adaptation strategies, such as crop and income diversification. For example, fishing, honey production and others. However, the adaption process was noted to have been affected by lack of financial or credit facilities, lack of insurance for crops and limited capacity of the structures that support the adaptation process (Swennenhuis and Mandima, 2012). Other factors noted in the literature include: “technological limits”, “information barriers”, “physical and ecological limits” (IPCC, 2007, p.733-734).

The last strand of studies has shed light on trade and climate change. However, there has been a paucity of literature regarding small scale trade and climate change. Nevertheless, a report by World Trade Organization (2022) has shown that climate change has adverse effects on trade; the rising temperatures and floods may lead to the destruction of road infrastructure, making it difficult for traders to import and export their products. However, I argue that the impacts would be more severe, especially on informal traders who usually travel to neighbouring countries for several days to purchase or sell their merchandise. A study conducted in Kazungula district showed that climate change (floods) had a negative impact on social economic livelihoods of people of Kazungula district (Mwape, 2009). Similarly, a study in Ghana established that small-scale traders are prone to the effects of climate change and have limited options for adaption than farmers (Arku, Angmor and Adjei, 2017).

Finally, this study builds upon the existing literature on the impacts of climate change on livelihoods. Most of the studies on this topic have majorly focused on climate change and agriculture (Macedo and Healy, 2010; H. Matarira *et al.*, 2013; Dube *et al.*, 2016; Ngoma *et al.*, 2021), comparing meteorological records and community perceptions (Haque *et al.*, 2012; Arku, Angmor and Adjei, 2017; Mulenga, Wineman and Sitko, 2017), and adaptation (Kalantary, 2010; Moser and Ekstrom, 2010; Othniel Yila and Resurreccion, 2013; Adger, Lorenzoni and O'Brien, 2007). These studies have primarily examined agricultural dependent livelihoods and have shown how climate change affects farming communities and their adaptation strategies. However, relatively less literature has explored the impacts of climate change on non-agricultural dependent livelihoods such as cross-border traders. Hence, little is known about their experience of climate change and how it impacts their livelihoods. Hence, I fill the gap in the literature by bringing rural cross-borders perspective on climate change.

3. Theoretical Framework

People's livelihoods are being impacted by climate change, especially those in vulnerable populations like cross-border traders. These traders deal with various difficulties such as unstable markets, unfavourable government policies, and shifting weather patterns that can greatly impact their ability to make a living. It is crucial to apply analytical approaches that consider the intricacy and interrelation of these difficulties to comprehend their effects and how traders can adapt. In this study, I examined the effects of climate change on the livelihoods of cross-border traders using two complementary frameworks: the Capability Approach (CA) and the Sustainable Livelihoods Approach (SLA). The capability approach strongly emphasises people's autonomy and chance to produce worthwhile results. This approach provided a framework for understanding how climate change affects the capability of traders to access important resources for the attainment of a decent livelihood. The SLA focuses on access to available assets, including financial, social, physical, and human capital. The approach deals with primary drivers of vulnerability, such as access to resources, shocks, and weak institutions, to enhance resilience to impacts of climate change.

The SLA is important in this study for the following reasons. First, it helped me to identify the means of living of the cross-border traders in the catchment districts. Second, SLA is “normatively based” (Lienert and Burger, 2015) on “equity, capability and sustainability” (Chambers and Conway, 1991). Further it accounts for the differences in the study participants, such as gender, age, class, social group, ethnicity, and others. This allowed me to get information from multiple sources and consider the differences between the groups.

The second theory (CA) considers people to be “active agents” in the process of change that affects their livelihoods (Lienert and Burger, 2015). This enabled me to understand the capability of cross-border traders to adapt to the impact of climate change. Merging the two theories allowed me to obtain detailed insights into the impacts of climate change on livelihoods. The CA enabled me to assess issues such

as power relations within the groups or community, which the SLA neglects. However, the SLA provides a framework for livelihood analysis, including the “instrumental factors left open by the SLA” (Lienert and Burger, 2015). This will provide new insights that neither theory would show if used independently.

I will thoroughly examine the effects of climate change on cross-border traders using these two frameworks together and pinpoint the adaptation strategies. The frameworks will help me to investigate how cross-border traders' capabilities and subsistence methods are impacted by climate change, and I will identify the resources and aptitudes essential for enhancing resilience in the face of a changing environment.

3.1. Sustainable Livelihood Approach (SLA)

A livelihood consists of the capacities, assets and activities needed to support a way of life. A livelihood is sustainable if it can withstand shocks and stress, recover from them, maintain, or improve its capacities, and support the next generation's means of subsistence (Chambers and Conway, 1991).

Livelihoods comprise three components. First, assets which are tangible and intangible resources available to the community for their well-being. The tangible assets are categorised as stores (savings, credit schemes, food stocks) and resources (water, land, trees). These assets are under the command of the household. Intangible assets include claims and access. Claims are demands or requests for support in the form of food, loans, and others, often in times of shock. This could be obtained from relatives, the government, private organisations, and others. Access involves the use of resources and services such as information, health, transport, and others (Chambers and Conway, 1991, pp. 5–8). These concepts will help the researcher understand the components of traders' livelihoods and aspects vulnerable to climate change.

3.1.1. Livelihood Framework

A livelihood framework is a tool for understanding the livelihoods of vulnerable people. This approach has been used in development interventions in developing

countries. It is a people-centred framework which gives clear guidance on issues researchers could look for in the livelihoods analysis. The framework has five elements which include vulnerability context, livelihood assets, transformation structures and processes, strategies, and livelihood outcomes (Department for International Development, 1999).

First, vulnerability context; these are factors in the individual's environment that affect their ability to achieve what they need (DFID, 1999). For example, climate change can limit the ability of the vulnerable groups to meet their basic needs due to the disruption of community economic activities because of shocks such as floods, droughts, earthquakes, and others.

The second aspect of this framework is livelihood assets. The focus is to understand the various assets and endowments people use to attain positive livelihood outcomes. The framework identified five assets or forms of community capital, which include social, physical, natural, financial, and human capital (DFID, 1999). For people to seek various forms of livelihood and meet their livelihood goals, they need to have the skills, knowledge, labour-force capacity, and physical and mental health that are collectively represented by human capital (*ibid*).

Social capital refers to the networks, social claims, social relationships, affiliations, and connections people use to their advantage when seeking various livelihood choices that call for collective efforts (Scoones, 1998). This gives the individuals an opportunity to have a say on issues that affect their livelihoods. Natural capital refers to natural resource stocks (DFID, 1999) and environmental services (Scoones, 1998), which are a source of resources for services needed for livelihoods. The effects of climate change on natural capital include reduced agricultural productivity, water insecurity, flooding, extreme weather events, collapsed ecosystem and health risk (UNDP, 2007, pp. 27–30).

Economic or financial capital refers to the resources that people employ to accomplish their livelihood goals (DFID, 1999). They include services such as cash and economic assets, including basic infrastructure necessary to achieve various

livelihood options (Scoones, 1998). However, DFID (1999) separated basic infrastructure from financial capital and referred to it as physical capital. It includes access to information, roads, markets, decent shelter, and affordable transportation.

The third element of the livelihoods approach is transforming structures and processes. These are the legislations, policies and institutions which determine access or control of capital (ibid). In rural communities, there are institutions such as NGOs and public agencies that strive to help vulnerable groups to cope with climate shocks. The analysis of such institutions allows one to explore the barriers and opportunities for sustainable livelihoods (Scoones, 1998). Fourth, the framework also emphasises analysis of the livelihood strategies employed by individuals to meet their livelihood goals (DFID, 1999). For example, investing in trading activities, farming, and others. **Figure 4** below shows the livelihood framework.

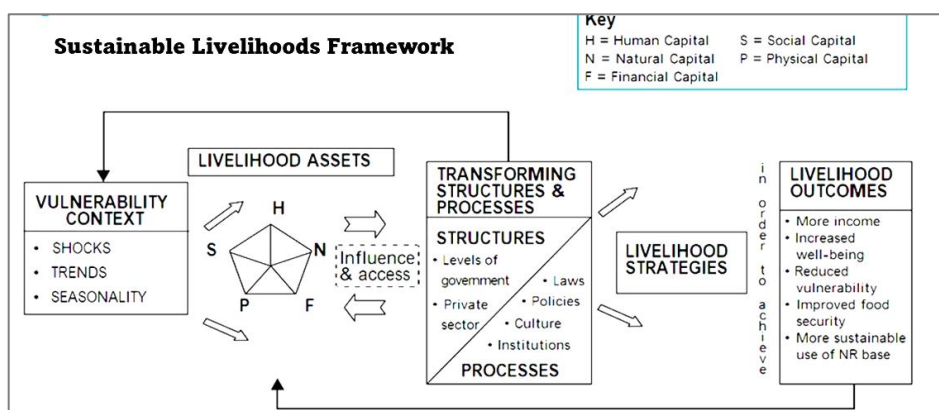


Figure 4 Livelihood Framework- adapted in DFID 1999

Despite the clear analytical structure, the Sustainable Livelihood Framework does not account for power and politics with regards to livelihoods and governance (Scoones, 2009). This gap could lead to the omission of important aspects of community assessments. To avoid this problem, this study integrates CA which considers power relations. Lienert and Burger (2015) further noticed that SLA ignores the “dynamics of changes related to capitals, institutions, policies and processes”.

3.2. Capability Approach

The capability approach is a theoretical framework for “assessing and evaluating individual well-being, policies, social arrangements and development proposals” (Robeyns, 2005, p. 2). The theory has two major claims: first, achievement of well-being is of moral importance, and second, well-being should be understood in terms of capabilities and functionings (Robeyns and Byskov, 2021). Functionings are considered “beings and doings” (Kronlid, 2014, p. 32). For example, the ability to have nutritious meals, travel, vote, and others.

The capability approach also assesses people’s freedoms to attain their potential doings and beings (Robeyns and Byskov, 2021). Having freedom implies the availability of the means to achieve one’s wishes or doings (ibid). When analysing well-being, it is crucial to assess people’s resources and what they can do or be with available resources (ibid). The theory emphasises the ability of people to achieve their desires and not just the freedom to access available opportunities. Robeyns and Byskov (2021) argue that an individual’s capability to attain certain doings depends on conversion factors. This refers to the “degree to which a person can transform a resource into functioning” (ibid). This concept enables researchers to understand the level of functioning one can get from given resources. For example, this could be the extent to which traders increase their sales given the availability of trading spaces.

Robeyns (2005, p. 99) identified three types of conversion factors that influence the achievement of certain doings. First, “personal factors” such as gender, intelligence and skills determine one’s ability to convert a “commodity into functioning” (ibid). For example, traders living with disabilities may not have the ability to cross to neighbouring countries for trading purposes. Second, “social conventional factors” which include power relations, gender roles and others. Third, “environmental conversion factors” such as climate, roads, and geographical location influences how one converts a good into functioning (ibid). For example, floods disrupt the ability of traders to access trading facilities.

Figure 5 shows the various factors that affect the achievement of functionings. These includes social context, means, individual conversion factors, social influence, capability set and choice.

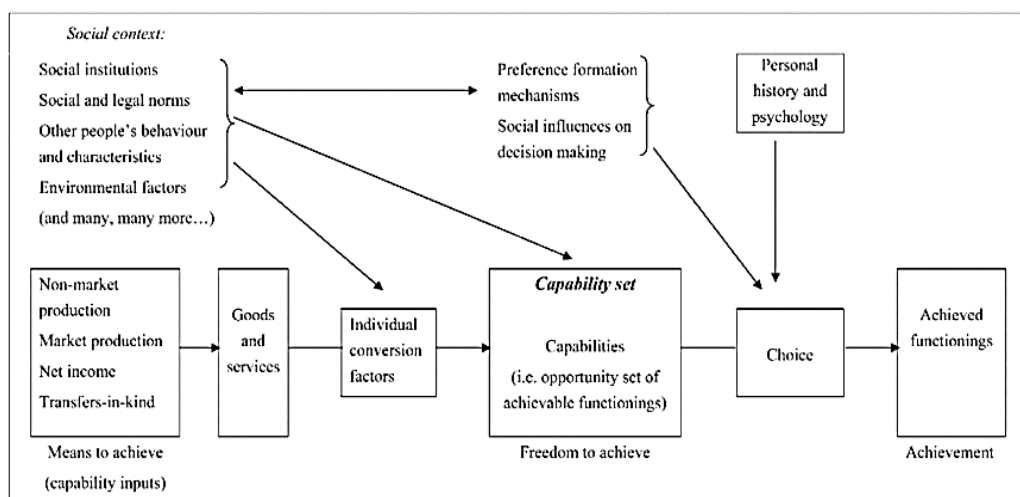


Figure 5 adapted from Robeyns (2005.p,98)

However, the CA (Robeyns theory) was criticised for having unclear categorization of the infrastructure facilities. It is unclear whether they are convention factors, goods/commodities, or social context. The theory does not give a clear analytical guidance in this regard (Lienert and Burger, 2015). Further, the theory treats environmental resources as conversion factors, however, resources such as water, land and others are important inputs for community livelihoods especially in rural communities. In the end, Lienert and Burger (2015) further pointed out that, the CA ignores “aggregated effects of activities and their feedback loops on social and natural enabling factors for capacities”. For instance, use of natural resources such as forests would have negative effects on the environment including floods and droughts.

Finally, climate change has a significant impact on well-being and adaptation of vulnerable groups. It affects the social, economic, and other aspects of life which have an effect on the ability of individuals to meet basic needs. Using Robeyns five criteria, Kronlid (2014) claimed that the effects of climate change could be analysed

by looking at mobility, health, knowledge system, working and playing. This theory will provide a clear framework for analysing the effects of climate change on livelihoods. However, only aspects that are relevant to the study will be used.

3.2. How SLA and CA have informed previous studies

Most academics throughout the world have turned their attention to climate change in the recent past. The complexity of this phenomenon has prompted scholars to employ a range of ideas and methods to comprehend how it affects communities and livelihoods. I looked at how both theories have been operationalised in prior studies to obtain insight into the many theoretical claims of both approaches. Some scholars have used the SLA, while others have gone with the CA.

3.2.1. Sustainable Livelihoods Approach

In order to gain a comprehensive understanding of the local adaption strategies of farmers in Ghana, Arku (2013) applied the SLA and strength-based approach. He argued that SLA provides a platform for exploring poor people's adaptation strategies and their social "economic reality". Using the capability approach, he argued that individual capacities determined the farmers' adaptation strategies. The theory informed the study in terms of gender and adaptation capability, factors influencing the perceptions and general coping strategies of the farmers.

Similarly, a study in Iran investigated livelihood vulnerability to drought in rural areas (Keshavarz, Maleksaeidi and Karami, 2017). They used the modified approach, which integrated the SLA with the ecosystems management framework and other theories. SLA was operationalised by creating the composite index, which included all the livelihood assets. The study found that people mostly adapted through farming, management, income diversification and through support from families and friends. Even though this was a purely quantitative study, it shows how the SLA could be used to investigate community vulnerability to climate change. Similarly, Narayan et al. (1999) assessed the capital assets of the poor people using the SLA. The study includes all the five livelihood capital resources as highlighted in DFID (1999). Further, Hammill et al. (2005) showed that resilience to climate

change could be determined by “early warning and technical expertise (human and physical capital), infrastructure stability (physical assets) and access to savings and alternative plans (financial and social capital)”.

3.2.2. Capability approach

The SLA focuses on what kind of resources (assets) are at the disposal of the community and whether they are being accessed or not. However, proponents of the capability approach are more interested in the ability of people to use those resources to improve their livelihoods (Robeyns, 2005). Hence, capability is about “real freedom” that people have for a decent life (Robeyns and Byskov, 2020). It implies the availability of resources and freedom to choose a course of action to achieve their desired livelihoods. Nussbaum (2011, pp. 33–34) identified ten “central capabilities” for human life: life, health, bodily integrity, senses, emotions, practical reason, affiliation, other species, play and control over one’s environment. A study in Nepal assessed the use of biological resources to improve the well-being of people (Lienert and Burger, 2015). It used a model which combined both SLA and CA. The results showed that bodily integrity, other species, and affiliation were related to their valuation of biological resources. These concepts helped in identifying key points for assessing the impacts of climate change on the livelihoods of cross-border traders.

4. Methodology

This section focuses on the methodological approach of the study. It begins with the presentation of the philosophical assumptions that guide the choice of the methods used in the study and research design. It further highlights the study area, methods, sampling, and procedures for data collection and analysis. The section ends with a presentation on the ethical consideration and limitations of the study.

4.1. Research Paradigm

The research paradigm is made of various components of the research process which includes “ontology, epistemology, methodology and methods” (Scotland, 2012, p. 9). Ontology refers to the “nature of reality” (Hudson and Ozanne, 1988, p. 509). The focus is on what “constitute reality” (Scotland, 2012, p. 9) or “nature of its existence” (Alharahsheh and Pius, 2020, p. 40). Epistemology is concerned with the process of generating, acquiring, and disseminating knowledge (Scotland, 2012). In other words, it is concerned with how the researcher intends to obtain the knowledge to reach reality (Alharahsheh and Pius, 2020). Scotland (2012) noted that each paradigm has different ontological and epistemological orientation that determines the type of approach a researcher may take. Key among these are the positivists and interpretivist world views.

The positivists have a realist bent and tends to hold that there is a “single, objective reality” distinct from people’s perceptions (Hudson and Ozanne, 1988, p. 509). Hence, positivists methodology focuses on the relationships between variables to explore factors that influence an outcome. The aim is to infer laws that can be applied to the general population (Hudson and Ozanne, 1988; Alharahsheh and Pius, 2020). However, Scientific generalisations could result in a failure to consider or fully comprehend the motivations behind people's behaviours or actions (Alharahsheh and Pius, 2020). In the current study, I am interested in exploring detailed responses from the people experiencing the impacts of climate change. Hence, focusing on numerical variables, I may miss the unique experiences of the traders. The interpretivists consider the subjective nature of social reality and the

uniqueness of the individual experiences. Further, this reality is perceived to be socially constructed, leading to multiple instead of a single reality as proposed by the positivists. Hence, Hudson and Ozanne (1988) claimed that, human behaviours are context specific and realities are constructed based on the contexts.

The advantages of this view include but are not limited to the following. First, it allows for the collection of in-depth experiences through the use of qualitative methods which involves the interaction with the research participants. Second, it brings a new perspective to the body of research by integrating the knowledge of the respondents. Third it provides insights into the behaviour and actions of the participants based on their own local perspectives (Scotland, 2012; Alharahsheh and Pius, 2020, pp. 41–42). However, the interpretivist is often criticized for lack of validity, transferability, and generalization due to multiple realities of social context. Further, researcher’s interaction with respondents may compromise autonomy and privacy of the participants (Howe and Moses, 1999; Scotland, 2012). Additionally, analysis and interpretation of the respondents’ views are under the control of the researcher. Hence, the limited control of the participants over their data leads to the researchers’ imposition of their subjective interpretation of the information (Scotland, 2012, p13). Danby and Farrell (2004, p. 41) assert that the researcher’s interpretation of data is a “theorised account that represent our understandings of the social worlds” of the respondents.

4.1.1. The paradigm and methodology of the study

This study is influenced by the interpretivist and social constructionist world views (Schwandt, 1994). I adopted this stance because I am interested in the meanings or interpretations of community members of climate change and its effects on their livelihoods. The social reality or “situation specific meanings that constitute the general objective of investigation is thought to be constructed by social actors” (ibid, p. 221). Hence, climate change being a social phenomena, it is cardinal to get an understanding of its impacts from those who experience it (Schwandt, 1994; Creswell and Creswell, 2018). Hence, this philosophical stance allows for researchers to interact with the research participants in their localities to obtain their

views or knowledge about specific social phenomena (Creswell and Poth, 2018). This direct interaction with participants allows for the adoption and application the qualitative approach and methods of collecting and analysing the experiences. The advantage of this approach is that it allows the researcher to obtain data from multiple sources such as interviews, documents, and observations (ibid).

4.2. Research Design

This study adopted a single case study design to understand how rural small scale traders perceive the impacts of climate change on their livelihoods focusing on real life experience of cross boarder traders in Kazungula (Yin, Bateman and Moore, 1983; Yin, 2003). By focusing on a single case, the study provides a comprehensive understanding of the experiences of the traders on climate change. The advantage of this strategy over others is that it allows for the collection of in-depth information from various sources such as interviews, reports and observations (Creswell and Poth, 2018).

Hence, Yin (2003) asserts that conclusions from studies that use multiple sources of information are more accurate and convincing. Further, a study on case study methods revealed that studies that used multiple sources had a better overall quality score than those which did not (Yin, Bateman and Moore, 1983).

4.3. Selection of the research area

Zambia has several border areas due to its location as a landlocked country. Examples include: Kasumbalesa (border with DRC), Chipata (Malawi), Nakonde (Tanzania), Livingstone (Zimbabwe) (UNHCR, 2016). The study site (Kazungula district) was selected for three reasons: first, due to its high level of vulnerability to climate change and lower ability of the vulnerable communities to cope with challenges (Ambukege, 2019). Second, as earlier mentioned, Kazungula is a unique boarder area in that it separates four countries which include Zambia, Zimbabwe, Namibia, and Botswana. As such, due to the nature of the area, cross border trading is a main livelihood option in the area. Hence, it was purposefully sampled due to the availability of the target population (cross border traders).

Figure 6 below shows the location of the Kazungula border area, which was the site of the study.



Figure 6 Kazungula border- Designed by the author using shape files.

At the beginning of the study, I mapped areas mostly affected by climate change in the district and narrowed it down to the areas close to the border where traders were mostly found. Third, I settled for Kazungula boarder area because of the willingness of the administration and community structures for the study to be conducted in the district.

4.4. Selection of research participants and Sample Size

The study used purposive and snowball sampling techniques to select 16 traders for the study. First, I used purpose sampling to select 8 respondents for the focus group discussion. The advantage of this sampling strategy is that it enabled the researcher to select participants who could provide the required information for the research (Farrugia, 2019). The respondents for the FGD were executive members of CBTA and only included those who have stayed in the community for a decade or more and have been doing cross-border trading work for two years and more.

Further 8 respondents were selected for the individual interviews. With the help of a key informant, I used purpose sampling to choose the first respondent then used snowball technique to get to other respondents. The study worked with traders who were involved in some form of cross border trading (buy or sale of products from

one country to another). I focused on those that purchased things (such as beans, maize, and vegetables) from the farmers to sale to neighbouring countries and those that sale manufactured products such as beadings, electronics, clothes, and others across any of the three countries (Zimbabwe, Namibia, and Botswana). However, due to unexpected challenges (see limitations) it was not easy to have an equal number of participants in terms of gender or kind of products sold, hence, I decided to be flexible in the selection of participants based on their availability.

4.5. Methods and Data Sources

The study used both primary and secondary data to gain detailed insights on impacts of climate change on the traders' livelihoods. Primary data were collected using interviews (Mason, 2002), focus group discussions and observations (Billups, 2021). Interviews allow for the collection of holistic and integrated view of the research issue from the perspective of the research participants (ibid) and provide more in-depth information than other methods (Mason, 2002). The secondary data were obtained using document review (Yildiz, 2020).

Interviews

Semi-structured interviews were used in order to have one-to-one interaction with the participants (Mason, 2002). This allowed me to interview the participants in their work localities and trading areas. The interviews were relatively informal and centred around four thematic topics, which included a) vulnerability context; b) effects of climate change on livelihood assets; c) adaptation and capabilities; d) barriers and opportunities. The second theme was categorised into sub-themes, such as effects on trading activities, mobility, meeting basic needs and others. The flexibility of the interview process allowed me to gain detailed information by asking follow-up questions which allowed me to identify new themes from the participants' perspectives.

Table 1 shows the biographical details of the respondents. It contains the code of the participants which were used in this study, their personal and characteristics of their business activities.

Table 1 Characteristics of the respondents (individual interviews)

ID	Gender	Years spend in Kazungula	Age-Range	Level of Education	Duration in small cross-border trading	Products they supply	Occupation	Source of products
IT1	F	30	25-30	Primary	9 years	Groundnuts, charcoal, mats, flour, and clothes.	Full time Trader	Zambia & Botswana
IT2	M	10	45-50	Primary	6 years	Building materials and household goods	Full time Trader	Botswana
IT3	F	25	40-45	Primary	5 years	Beddings, cosmetics and salon	Trader	Botswana & Namibia, South Africa
IT4	F	19	25-30	No formal education	14 years	Shoes, beddings	Full time trader	Zambia & Botswana
IT5	F	35	30-40	Primary	10 years	Hair, blankets, duvets and clothes	Fulltime trader	Botswana
IT6	F	40	45-50	Primary	9 years	Secondhand clothes, Groundnuts and Charcoal	Fulltime trader	Zambia
IT7	F	6	20-25	No formal education	6 years	Shoes and clothes	Fulltime trader	Zambia & Botswana
IT8	F	8	50-55	Secondary	5 years	Drinks, salt, detergents, mayonnaise, and peanut butter.	Full trader	Zimbabwe, Zambia & Botswana

The names of participants were anonymised, however, recording of the interview proceedings were not allowed by some of the participants (details in the challenges section). Even though I tried to use “powerful committee members” (Cross-Border Association leaders) as suggested in (Mason, 2002, p. 81), some respondents did not consent to be recorded, hence, I took detailed notes of the interviews. This challenge was also highlighted by Yildiz (2020) who claimed that individuals do not like to be recorded, hence even obtaining consent for recording, may prevent participants from giving their real opinion on the subject under investigation. Hence, note-taking enabled the respondents to feel at ease, safe and confided in me (ibid). The interviews lasted for a duration of 46 to 60 minutes.

Further, while interviewing the participants, I paid attention (observation) on some examples of products that participants claimed to have been affected because of climate change. Further, the field work was done during the rainy season, I observed the incidences of rainfall and temperatures which I related with the experiences of

the respondents. “Observation evidence provides additional details to the topic under investigation” (Yin, 2003, p. 94).

Document review

I reviewed various documents that were in line with climate change in Zambia. There is limited literature in Zambia with regard to climate change and cross-border trading. Hence, this study relied much on documents such as the IPCC report, Eighth National Development Plan (8NDP), and National Policy on Climate Change (NPCC). The documents were reviewed with the intention of collecting “independently verifiable data”(World Bank Evaluation Group, 2007, p. 1) relevant to my topic and context. The method is cheaper and uses authentic and verifiable information from reliable sources (ibid). Further, I used the steps in document review as suggested by (Yildiz and Meydan, 2020), which include accessing, checking authenticity, comprehending and analysing the documents. The use of the documents can enhance the validity and reliability of qualitative research (Yildiz and Simsek 2018, cited in Yildiz and Meydan, 2020).

Table 2 shows the names and type of documents reviewed in this study.

Name of Document	Type of document
National Policy on Climate Change (NPCC)	Policy
8 th National Development Plan (8NDP)	Policy
Monitoring Small Scale Cross Border Trade in Africa Issues Approaches and Lessons.	Report (World Bank)
Minimum Standards for the Treatment of Small-Scale Traders	Policy

Table 2 List of documents reviewed.

Since the study was done under a difficult circumstance, I chose to use documents to add more facts to the data obtained from research participants. Verifiable information from these credible sources will authenticate the data from our research.

Focus group discussion

I used a focus group discussion with 8 participants who were leaders of CBTA in Kazungula district. The aim was to get a general overview of the impacts of climate

change on cross-border traders in the area. The participants were purposefully selected based on commonality and experience in cross-border trading (Billups, 2021) and duration of stay in the area (a decade or more). The shared experiences of participants enable researchers to gain more insights about the topic, which would otherwise not be collected using alternative methods (ibid). Despite this strength, scholars have warned that proceedings of FGDs may be hijacked by dominant or disruptive personalities (Morgan, 1993; Barbour, 2007; Billups, 2021). Being cognizant of power relations among the group members, which could be due to different leadership roles, levels of education and others, I created an ambient atmosphere for everyone to participate in the discussion. Flick (2009) asserts that FGD's moderator should facilitate and guide the discussion in order for the information to be within the theme of the research topic. The FGD's respondents ranged from 25 to 60 years, and they comprised full-time traders and those combining trade and formal employment. They were all members of the CBTA executive. **Table 3** shows the details of the respondents. I deliberately excluded their positions in the group to protect their identities.

ID	Gender	Years spend in Kazungula	Age-Range	Level of Education	Duration in small cross-border trading	Products they supply	Occupation	Source of products
RP1	F	30	40-45	Secondary	7	Salon, beddings & cosmetics	Trader – full time	Botswana & South Africa
RP2	F	45	45-50	Primary	10	Foodstuff	Trader – Full time	Botswana
RP3	M	25	45-50	Primary	8	Groceries	Trader	Botswana & Namibia
RP4	M	50	55-60	Tertiary	15	Duvets and foodstuff	Teacher/Trader	Zambia & Botswana
RP5	M	15	25-30	Secondary	4	Groundnuts, sweet potatoes, Salt, and electronics	Trader – full time	Zambia, Botswana
RP6	M	27	25-30	Secondary	10	Salt con and potatoes	Trader – full time	Botswana and Namibia
RP7	F	18	30-25	Tertiary	6	Glossaries and clothing	Teacher/Trader	Botswana
RP8	M	35	40-45	Secondary	10	Corn, sugar beans	Trader	Zambia to Botswana

Table 3 Details of FDG respondents

4.6. Data Analysis

The interviews were conducted in local languages (Nyanja and Lozi) which I then transcribed in English with the help of the local experts. I used verbatim transcription for all my recorded interviews to capture every utterance from the respondents to present accurate information of the conversation (Lester, Cho and Lochmiller, 2020). The process of transcribing the data took 4-5 hours and helped me to get familiar with the information. However, the field notes from interviews not recorded were presented as memos in the same format (Yildiz, 2020). Memos enabled me to identify statements that were important for analysis (Lester, Cho and Lochmiller, 2020).

I divide the analysis in two parts. First, I analysed the data from the interviews using NVivo Qualitative Data Analysis Software (QDAS). The use of computer aided analysis helped in improving the efficiency and effectiveness of learning from the data (Bazeley and Jackson, 2013). The data were coded based on the five themes of the study as earlier pointed out; however, new nodes were generated due to information that emanated from the interviews (Bazeley and Jackson, 2013). Further, I counter checked all the nodes to ensure that they were recorded correctly.

In addition, I made the analytical process transparent by reporting the frequencies of the codes that were used to generate themes of the study (Lester, Cho and Lochmiller, 2020). The second part of the analysis focused on the reviewing the documents, I conducted a descriptive analysis of the policies and reports which were determined for the study as it is the appropriate way of unveiling the content of the documents (Yildiz and Simsek 2018).

4.7. Positionality and Reflexibility

I have stayed in Zambia for 28 years; I am aware of community members' culture, context, and values and how this familiarity would influence my interpretation of themes (Creswell, 2018). I previously worked for an International nongovernmental organisation on a project which was aimed at enabling farmers to adapt to the impacts of climate change in Kazungula district. As such, I understand government

and local agencies in the catchment area that may be relevant to my study. However, I need to become more familiar with adaptation interventions or whether cross-border traders are affected by climate change. This motivated my research topic, for I wanted to bring new knowledge that could lead to the development of policies that may favour such groups.

4.8. Pilot Study

Prior to my study, I started with two pilot interviews for three reasons. First, to identify challenges that participants could have regarding the interpretation of the interview questions and adjust the phrasing to suit the context. Second, I wanted to assess how easy or difficult it would be to access the traders. Third I wanted to identify certain barriers to the study which could be cultural, time related and others as suggested by (Janghorban, Latifnejad and Taghipour, 2014). After piloting the study, I adjusted the technical terms and used context examples when asking questions.

4.9. Ethical Considerations

To perform the study respectfully, equitably, and responsibly towards all persons involved, I considered ethical issues a crucial component of my research. I inquired about my topic prior to my fieldwork to understand whether or not it may be considered sensitive by the participants. However, the topic was not considered as such in the area, but I remained open to possible developments. At the beginning of the study, I obtained permission from the local municipality and local traders association. Further, during the individual interviews, I explained the purpose of the study and sought consent from the participants (Israel, 2015). Informed consent is essential for respecting the autonomy and dignity of participants and ensuring that they are not coerced into participating (Mays, Pope and Popay, 2005).

Surprisingly, I requested participants to sign a written consent, but some preferred verbal consent. Patton and Cochran (2002) assert that in some cases, participants may feel frightened to give written consent, but it is essential to obtain verbal consent in such cases. Further, I assured participants of confidentiality and

protection from harm (Israel, 2015). In addition, I protected the identity of the participants by assigning pseudonyms and assuring them that personal information would be treated with confidentiality (Birt *et al.*, 2016).

4.10. Limitations

Difficult to access participants: It was a challenge to find most of the respondents as the majority had crossed over to the neighbouring countries for their trading activities. This affected the duration of my work as I had to wait for them to return to the Zambian side. Alternative approaches, such as contacting them on mobile phones could not work because they were out of the coverage area of the Zambian mobile networks. However, with the help of the key informants and other traders, I was able to locate participants for the study.

Recording and signed consent: Some participants preferred verbal consent to written ones and declined to be recorded. Even though I tried to give more information about the nature and purpose of the study, they did not welcome recording and written consent as they claimed that it was risky to be recorded or sign on the document (it would expose their identity). In such cases, I took notes of the conversation.

The threat of cyclone: During the field period, there was a national warning of a cyclone, and the study location was one of the hotspots. In the middle of the study, the cyclone had already affected neighbouring countries like Mozambique and Malawi. This brought feelings of uncertainty during the research period. However, I was on high alert and kept checking on daily weather updates and information from the authorities. Further, the community members were supportive to allow me to collect the information before the situation could get worse.

The expectation of payment for participating: The research participants expected payment for participating in the study. However, after explaining the purpose of the study, some participants agreed to be interviewed. While those that did not accept, I did not force them to participate. Further, after consulting with community members, I learned that some civil society organisations and government

departments usually give an allowance to participants for their workshops and research work.

Impacts of Covid19: It was also noted during the interviews that respondents' challenges were worsened by covid19 pandemic, which had restricted their movements to neighbouring countries. This would influence how respondents perceived the effects of climate change, that is, failing to isolate the impact of climate change from those of covid. Hence this was averted by first recruiting participants with at least four years of trading experience, and second, I advised respondents to focus on climate change. Third I probed much about their experience before the pandemic.

Methodological challenge: I collected data from multiple sources for triangulation purposes. However, this was time-consuming and at times, it was a challenge to bring the results together. It raised questions like what data source matters, verifiable information from documents, individual interviews, or FGDs, which has many people. To overcome this, I analysed the data differently and merged the results based on the similarities of themes generated (Carter *et al.*, 2014).

5. Empirical Results

This chapter presents the findings of the study. The results will be presented in line with the two theories discussed in the theoretical framework (SLA and CA). The data will be presented in three themes. Theme one (1) focuses on the vulnerability context (natural shocks) and how traders perceive climate change. Theme two (2) deals with the effects of climate change on the livelihood assets (physical, social, financial, natural, and human capital) of cross-border traders. Themes one and two aim to provide answers to the first research question (How does climate change affect the livelihoods of cross-border traders?). Theme three (3) focuses on livelihood strategies, capabilities, and adaptation to climate change. The third theme answers questions two and three. However, I will begin by giving a detailed description of the respondents to understand or identify possible factors influencing traders' perceptions and adaptability.

5.1. Characteristics of cross-border traders

This study found that cross-border traders in Kazungula were in two categories. The first category was involved in selling unprocessed and processed agricultural produce from Zambia to Botswana and comprised women with low capital. A study in Ghana also established that women were primarily engaged in selling unprocessed and processed food (Arku, Angmor and Adjei, 2017). Purchasing foodstuff from the farmers is cheaper and does not require higher capital. The women continue this kind of trade due to lacking the capability to meet basic needs (Kachere, 2011; Zata, 2016). Further, Zambia Statistics Agency (2022) found that for the period 2019-2021, the majority of cross-traders in Chirundu were females 79.3 percent while other borders like Nakonde, Kasumbalesa and Mwami had more male traders crossing the border.

The second category of traders involved people with small enterprises who mostly sold manufactured goods from Botswana, Namibia, South Africa, and Zimbabwe. Most of the participants had completed primary to lower secondary education. While a few had completed tertiary education, and others were in formal employment (cross-border was part-time work). This resonates with the findings

from the studies conducted in Zimbabwe (Chani, 2008) and Namibia (Zata, 2016), which established that some cross-border traders are in formal employment and trade is a way of earning an extra income. The choice of country to order the products from was mostly influenced by the quality of the products, costs, and exchange rate of the currency. In addition, proximity to the nearest border town was noted to be a reason for the choice of country. This explains why Botswana (Francis town) was noted to be a common destination for most of the traders in Kazungula.

5.2. Knowledge of vulnerability Context

Vulnerability context refers to the external environment beyond the community's control (DFID, 1999). Changes in the context, such as shocks, seasonality, and trends, can negatively affect livelihoods. Kazungula district is prone to climate shocks such as floods, extreme temperatures, and dry spells. There was a consensus in the findings that participants have observed low precipitation, extreme temperatures, and long dry spells¹. Similarly, results from individual interviews also showed related observations. For example, when asked about their observations on climate change:

One trader observed that:

“... Changes are there in the duration of the rainy season because this time around, rains begin in mid-December to January compared to the past days because, in the past, rains started in October, but this time around, it's different.”²

Another observed that:

“... drought takes a long period of time because even in the seasons in which we expected to have rain, there is no rain. In my childhood, the time when we used to celebrate independence on the 24th of October, we used to celebrate independence in green grasses. But nowadays, you find that people celebrate independence when it is dry.”³

¹ FGD results

² IT1: Interviewee # 1- sold groundnuts, charcoal, mats, and flour.

³ IT3: Interviewee # 3- cosmetics, salon and beddings

The participants further observed prolonged extreme temperatures. Hot temperatures were noted to have been running across all seasons. While the duration of the rainy and cold seasons was reported to be reducing, the hot seasons seem to dominate. One trader noted that the temperatures were increasingly becoming hot in the dry season⁴. The current study's findings confirm the results of the study by Swennenhuis and Mandima (2012, p.11), who projected increased variability and incidences of floods in the Kazungula area. Using vulnerability context as the first point of analysis (SLA) has enabled us to explore shocks and dimensions of climate change that affect the livelihoods of the cross-traders. Even though the theory offers a variety of factors that could be investigated, I only focused on those aspects related to climate change. Fundamental changes noted by respondents were mainly extreme temperatures, variability in precipitation and prolonged drought. DFID (1999) argued that vulnerability context could negatively affect livelihood assets, vital for attaining salient livelihood options.

5.3. Impact of Climate Change on Livelihood Assets

To understand how climate change impacts the livelihoods of cross-border traders, I explored key livelihood assets, which included physical, natural, financial, and social capital. DFID (1999) argues that the SLA explores the assets, and how they are turned into livelihoods outcomes.

5.3.1. Access to Physical and Natural Capital

Cross-border traders have access to various local infrastructures such as roads, bridges, and education. The area has an ultramodern bridge which has, on the one hand, increased the mobility of the traders and, on the other hand, affected the trading activities. Previously traders used a pontoon to cross over to neighbouring countries, but with the new bridge, they find it easy to do their work. However, on the negative side, the bridge came with a one-stop border facility which regulates trading activities. Hence, traders find paying the charges associated with their trading work difficult. Further, climate change has presented various challenges

⁴ IT5: Sales hair, blankets, and duvets

regarding natural and physical capital. The areas close to the riverbank were more exposed to floods. A feasibility study on water and sanitation projects established that communities near the river bank, like Makalanguzu, were susceptible to climate hazards such as floods and human safety (Weeks and Seath, 2016, p. 37). The report further shows that:

Agricultural activity as an income generator is also very limited, largely due to the unfavourable soil conditions in the area around the town (ibid, p.36).

This is why most of the livelihoods, especially around the border, which are drought-prone, often depend on cross-border trading. The findings are further amplified in the Eighth National Development, which shows that:

“Climate change and variability have led to adverse effects such as droughts, floods and extreme temperatures on key sectors including energy, agriculture, and water. This has resulted in decreased hydroelectricity generation capacity, food insecurity and limited access to clean drinking water for people and animals”(Ministry of Finance and National Planning, 2022, p. 59).

Similarly, respondents observed that surrounding villages, such as Sikaunzwe and Mambova, were exposed to floods, making roads impassable⁵. This affected traders as they only made a few sells during periods of floods. Surprisingly, power outages were never mentioned as an issue. Does it imply that the area is free of load shading or that most traders do not sell goods that require refrigeration? Since most traders sell clothing, power should not be an issue. In addition to the effects on road infrastructure, transportation costs of the products from the wholesale traders to their respective retail shops were noted to have been high. When asked about the impacts of climate change on the business’s profitability, one respondent who sold electronic products complained about the high cost of transportation of his goods

⁵ RP3: FGD – Salon and beddings

from Botswana⁶.

Another respondent from a FGD who sells foodstuff from Botswana said:

“I sometimes try to cut on transport costs by requesting a lift in private cars. But with the issues of rainfall, for example, if it is raining too much, you are forced to sometimes not travel, you stay back and not make any income. Also, if it is very hot, some things like foodstuff usually go bad”⁷.

These findings are consistent with the results of the study by Zata (2016), who also established that cross-border traders had challenges with the cost of transportation and opted for affordable ones, which were often long-distance trucks which took several days to get to their destinations. With increased temperatures and rainfall coupled with poor road infrastructure, the traders involved in perishable goods were at high risk of experiencing losses. Even though traders’ livelihoods do not directly depend on aspects of natural and physical capital, the effects of climate change on the physical infrastructure and natural environment seem to affect their livelihoods.

5.3.2. Access to Human Capital

Human capital refers to the “skills, knowledge, ability to labour and good health for the pursuit of different livelihood strategies” (Scoones, 1998, p. 8). The majority of traders in Kazungula do not have high levels of education; most of them have only attained lower primary school education. When asked about training opportunities, one trader indicated that she had participated in capacity building⁸ focusing on women’s empowerment. Nevertheless, the focus group discussion noted that there were no capacity-building opportunities for traders. This could explain why most traders were not applying for available grants while others had never received positive feedback from their applications (see details under the rubric of financial capital).

⁶ RP1: FGD respondent – saloon and beddings

⁷ RP2: FGD Sales foodstuff

⁸ IT5: sales blankets, beddings

Even though the government is making efforts to support cross-border traders, Kazungula has received less support. For example, the COMESA Small Scale Cross Border Trade Initiative which aims to ease trade inflows by promoting policy reforms in the COMESA region; the project only targeted four border posts, namely Chirundu, Nakonde, Mwami and Kasumbalesa. However, Kazungula was not included in the project (COMESA, 2020). Human capital has a bearing on the ability of the community to earn a living or adapt to the impacts of climate change. Hence, according to Robeyns (2005, p. 99), I would argue that traders are affected by both “personal” (lack of skills or training) and “social conversion factors” (lack of government policies to support cross-border traders) which impedes their ability to pursue various livelihood activities.

5.3.3. Access to Financial Capital

Financial capital refers to financial resources an individual uses to attain their livelihood objectives (DFID, 1999). Examples include pensions, grants from the state, loans, and basic infrastructure. These are vital for the pursuit of livelihoods (Scoones, 1998, p.8). If other capitals are affected by climate change, financial capital may serve as a critical resource for both adaptation and recovery. The district has various financial institutions, including banks and microfinance services. However, most traders need more capability to access formal banking systems. Hence, they are not able to get loans due to collateral requirements. Climate change has significantly affected traders, especially those with low capital (primarily women). Most of these traders do not have formal documents of the establishment of their business. Even though the government, through the Ministry of Community Development and Social Services, runs the Social Cash Transfer and women empowerment programmes (Ministry of Community Development and Social Services, 2022), the traders interviewed had yet to access these funds. Further, despite the decentralisation policy, which has allowed for the disbursement of funds at the district level through the Constituency Development Fund (CDF), traders have not accessed these funding opportunities.

When asked about access to financial resources, a trader who participated in a focus

group discussion explained that:

“I don’t think there are any people who have come across to help the traders, especially the small-scale traders. Why do I say so? (...) people can come, we will hear from the District Commissioner that there are forms here make the small groups of 10, they will even end up grabbing some of our money to make papers for photocopies and afterwards go quiet (...).”⁹

Another participant said that:

“(...) I will still have to remove either 5 kwacha or 6 kwacha so that I buy the form. So, I just thought that it is just wasting my time because there’s nothing which came true in Kazungula”¹⁰.

Another trader claimed that:

“(...) we have had the Constituency Development Fund now we have the Citizen Economic Empowerment (CEE) program all those issues we have applied many times, but there’s nothing which has come out of it.”¹¹

I observed that respondents with higher income and used cross-border trading as an additional source of income were more capable of applying for the grants as most of them were employed while others had formal education. However, traders with a low level of education had never applied for the grants, and they did not have the capability to do so.

Further cross-border traders seem to have lost confidence in institutions that offer grants because they have not received any help even after applying. In addition, some traders lack information about loan requirements and procedures. One trader who sells beddings narrated that:

“(...) the council (municipality) told me to sign on the form for

⁹ RP 8- FGD – sales con sugar and beans

¹⁰RP 1 – FGD – sales cosmetics and beddings

¹¹ IT5 – Interview – sales hair blankets and clothing

a loan, but I refused to get the money which will come as a loan. So again, I feared getting the loan, whose terms and conditions I did not know. It is better when you get something which you have knowledge about, and you know that the loan you receive is for how long and when to start paying back. We have heard many that people who got loans have ended up losing their businesses, their houses, just a lot of things.”¹²

Further data from the Eighth National Development Plan indicated that:

“Effective citizen participation in economic activities is limited by low savings rates, casualisation, weak credit cultures, high borrowing costs that restrict access to finance, and insufficient skills in the creation of bankable proposals” (Ministry of Finance and National Planning, 2022, p. 33).

The findings of this study show that, despite the presence of some financial institutions, cross-border traders had limited access to financial resources or insurance. Since their livelihoods depend on this asset, the effects of climate change may be difficult to overcome due to limited resources. According to the capability approach, more than the availability of resources is needed; the ability of the individuals to convert those assets into functionings is of great importance (Robeyns, 2005). The findings can be understood from the capability perspective that traders’ “personal conversion” factors, such as lack of skills in proposal development and “social conversion” factors, such as banking policies, affect the capability of traders with low income to adapt to the effects of climate change (Robeyns and Byskov, 2020).

5.3.4. Access to Social Capital

Social capital refers to membership in formal or informal associations where people

¹² IT1

gain resources when pursuing various livelihood goals (DFID,199). It includes, among others, “social networks, affiliation and social claims” (Scoones,1998, p. 8). Vulnerable groups have scanty resources to afford formal insurance or loans from lending institutions in case of climate hazards such as floods and prolonged droughts (Narayan *et al.*, 1999). Hence, local networks become the key source of strength in times of stress. When people are in a group can influence or place a demand on the political agenda. In their assessment of 47 countries, Narayan et al. (1999) found that the common source of social capital for vulnerable groups was mainly the extended family. On the contrary, experiences of cross-border traders in Kazungula showed that membership in associations such as cross-border associations and village banking groups was a common source of social capital (see the details on adaptation). Women were primarily involved in local associations.

One trader shared her experience with Cross Border Traders Association (CBTA) membership:

When asked about her involvement in the association, she said:

“I am a member of COMESA Cross Border Trader Association, so in this association, we contribute some money as a membership fee, and the main issue about that group was like us, who are small-scale traders when we go to Botswana, we should be paying let me say for instance when we come with our goods, we are not supposed to pay more, but they will have to reduce a bit. For example, if my duty is 3000 kwacha, I will just pay 1,500 kwacha because I am a member of CBTA. But since I joined this group, I have not seen any progress. I don’t know if there’s a problem or maybe it is us who don’t know what to do”.¹³

Access to social capital is a challenge among the traders in Kazungula district. The majority of respondents have not joined any groups, but those in associations do

¹³ IT3 – sales cosmetics beddings

not see benefits, and many have stopped paying membership subscriptions. Hence in times of climate change, traders have limited capacity to adapt.

5.4. Effects of climate on livelihood strategies

The main livelihood activity in Kazungula is cross-border trading. The study found that there were two main categories of traders. The first group involved those selling manufactured products such as household goods (furniture, fans, curtains beddings, electronics, and others) which they order from Botswana (Francis town), Zimbabwe and Namibia to resale to customers in Zambia.

One trader narrated that:

“(…) clothes and beddings I order from Chinese shops in South Africa and Botswana they are quality compared to ours. (...) the same dress is of more quality in South Africa than a dress which you can find in our Zambian Pep store. In short, I can say in other countries like Botswana and Namibia they have good quality or good grades clothes compared to ours. So, it is advantages me because when people come, (...) they say your clothes are better than in pep. So, it is an advantage to my side because I saw the quality, and they are unique. Not everyone can afford to go to Botswana and South Africa and buy their own.”¹⁴

The participants referred to the quality and cost of the products as the main factors for choosing the countries they trade from. Zata (2016) also found that the quality and cost of the products from other countries were the primary motivation for traders to order from neighbouring countries.

The second category comprises traders who supply Zambia’s agro products such as beans, maize, and vegetables, which they order from the farmers and supply to neighbouring countries. The traders that sell manufactured items have small enterprises located in one area in the trading space of the district. Most of the traders are women with less formal education.

However, some government workers (such as teachers) are often involved in cross-

¹⁴ IT3

border trading as a means of gaining extra income. This was consistent with the findings in studies by (Chani, 2008; Nyahunzvi, 2014; Zata,2016) that established that some people engaged in cross-border trade are in formal employment and trade is used as an extra source of income and not a survival strategy.

Regardless of the kind of business, climate change has negatively impacted cross-border trading. For instance, when asked about the impacts of climate change on business activities, one participant explained:

“(...) Infrastructure also is affected, especially bridges. You are at the time when you want to cross to another country, you find that the bridge is washed away, so you have to stay back”¹⁵.

Even though there is a bridge that enables traders to cross to other countries, most communities still have makeshift bridges that cannot withstand the pressure of the wind and floods. A trader specialising in selling farm products explained that it was difficult to reach some villages due to extensive flooding in some areas of the district. The bridges are washed away, and roads become impassable.¹⁶ As such, traders find it hard to order or sell their products in the rainy season.

One trader selling manufactured products said:

“(...) in places like Skaunzwe (...), you find that even if it did not rain, the people are affected because of another part of Zambia where rains fall very much. A small stream before Gwenzi area becomes flooded, and people are cut off from the mainland. I usually fail to travel to the village to exchange my goods with charcoal (coal)”¹⁷.

Further, participants’ businesses were affected by the unpredictable seasons, which made it difficult for traders to plan what kind of products to order. One trader specialising in manufactured products said:

¹⁵ IT3

¹⁶ IT7 – sales of secondhand clothes, groundnuts and charcoal

¹⁷ IT1

“These tracksuits I bought them last year in June. Yet it was too hot, and I could not make any sales. And now I was hoping it would be cold during this rainy season, so I ordered fleece (beddings), but because of the very hot temperatures, people are not buying them”¹⁸.

Another participant said:

“I bought some umbrellas for the rainy season, but we do not have rain, and no one is buying them. I am running into a loss”¹⁹.

Climate change is experienced differently according to the kind of products they supply. Traders that supply groundnuts and vegetables from Zambia to Botswana complained about the heat. Most traders selling farm products have low capital and usually carry their sales on their heads. With extreme temperatures in Kazungula, traders struggle to make their sales. Key effects of heat are mainly on the health of the traders and the perishable products.

One trader said:

“I carry my vegetables and groundnuts on my head to Botswana, but there is too much heat such that I usually have a headache and feel dehydrated.”²⁰

However, when asked whether it affected profits, she said she recorded no losses despite the heat. Another trader who owns an enterprise narrated that:

“When it is dry season it is very hot, even when working, you have to plan well. For instance, in my case, once it is the hot season, I need to make sure that by 07:30 hours, I am leaving because, by 08:00 hours, I won’t move; it will be very hot. And am one person who is sensitive to the sun. Once I expose

¹⁸ IT3

¹⁹ IT4 – sales shoes and beddings

²⁰ IT6- sales groundnuts and charcoal

myself to the sun, I will feel weak and cannot perform my duties properly”²¹.

Even though most respondents perceived the heat to have an effect on the traders’ health, a different perspective was observed by a trader involved in the sale of plastic sandals and bedding. When asked about the impact of extreme heat on her business activities.

She narrated that:

*Heat affected her plastic products, such as slippers, whose quality was comprised of extreme temperatures. She further narrated that, during the hot season, due to high temperatures, she usually has a few customers coming to buy her products*²².

Further, one participant involved in trading fresh fish explained how he abandoned his business after water levels in the stream had reduced. He could no longer buy fish from fishermen in Namibia. In response to a question on how he was affected by climate change, a respondent from the focus group discussion narrated that:

“I used to order nice fish from Mauna River in Namibia, but now, it’s no longer there even other Zambian traders who used to travel there are no longer going there”²³.

This means that traders remain with limited sources of livelihood as climate change affects their means of making a living. Interestingly, the study also found that traders that had more than one line of business, especially two enterprises, did not feel that climate change affected their business. For instance, when asked whether climate change affects their business or not, one respondent who sold household goods and metal bars said:

“Not really; what happens is if you bring what people want at that particular time, it moves, for example when it’s the hot

²¹ IT7 – sales shoes and clothes

²² IT7 – sales of shoes and clothes

²³ RP2 – sales foodstuff

season, we go to Botswana, and order fans bring them here, customers are able to buy within a short period of time. It is an advantage somehow as long as you have money to order; the effect is not really much.”²⁴

The findings show that climate change has a negative impact on the livelihoods of the cross-border traders in Kazungula district. The effect on one livelihood asset impacts the ability to attain other livelihood options. For example, the destruction of bridges and roads can affect the “mobility” (Nussbaum, 2011) aspect of the livelihood set.

5.5. Climate change and traders’ capability to meet basic needs.

Climate change affects livelihood assets making it difficult for people to meet their essential needs. Kazungula is a rural area with part of the population in agriculture. Participants who were affected by climate change had difficulties in meeting their basic needs. One respondent who sells farming products narrated that in times of droughts, she could not afford the necessities such as sufficient food and paying children’s fees as there was no water supply for the farmers to grow their crops²⁵. Another trader bemoaned that in times of climate change, she struggles to meet the basic needs of her family, including paying rentals for her small enterprise²⁶.

A trader from the focus group discussion noted that:

“If people don’t have a mealie meal, they can’t come and buy tropicals (sandals) or slippers which are I am selling. They will concentrate on buying mealie meals²⁷. We are affected because business is going down. A person can’t buy a television if they don’t have income. What brings us business is to see that people have got enough food. Then they think of buying television (tv) as a want; then they will come for things as wants”²⁸.

²⁴ IT2 – sales of building materials and household goods

²⁵ IT 6- sales ground nuts and charcoal

²⁶ IT 5

²⁷ Mealie meal is flour made of corn, Zambia’s staple food.

²⁸ RP3- sales glossaries

Similarly, one interviewee said:

“(...) all of us depend on a farmer to supply for survival. So, you find that if the farmers do not harvest well, even the cost of living will be high. Food will be expensive. Even just people who are not farmers, even their life will be hard instead of them concentrating on other things (...) food is expensive. So, they will start concentrating on buying food instead of buying other goods which they need.”²⁹

This means that climate change is perceived to have a direct and indirect effect on the livelihoods of the cross- border traders. As climate change affects agriculture, farmers change their priorities on what to purchase, which is usually physiological needs, hence not being able to buy other things deemed less important. Maslow (1943) posits that people’s motivation is driven by unsatisfied needs, and if all needs are not met, the focus is usually on physiological needs while others are ignored. This could be the reason for the 8th NDP to have put much emphasis on agriculture enhancement.

This document indicates that:

“(...) attain economic transformation that will be marked by advancements in industrialisation and economic diversification for sustained growth driven by agriculture (...)” (Ministry of Finance and National Planning, 2022, p. 32).

However, traders who had a wide range of products do not associate their losses with a lack of customer base from farmers due to climate change, one trader who combines, clothing, shoes, and beddings, noted that she was not affected by farmers’ loss of productivity as she depended on the truck drivers who were on transit to other countries³⁰. However, she noted extreme heat and unpredictable weather patterns to be the main issues that affect her business. Generally, climate change affects the ability of traders to meet basic needs. The National Policy on Climate Change affirms that:

“(...) climate change adversely affects vulnerable groups whose livelihoods

²⁹ IT3 – trader# Beddings, cosmetics, and salon

³⁰ IT4 - trader# shoes and beddings

largely depend on natural resources, such as forestry and water. This results in food insecurity and a shortage of water. In addition, the vulnerable groups tend to be under-represented in decision-making on climate change, which in turn severely limits their ability to contribute, implement and apply their expertise” (Ministry of Lands and National Development Planning, 2016).

5.6. Adaptation capabilities challenges and opportunities

All respondents who were affected by climate change had developed some coping strategies. These included joining village banking groups, product diversification, selling goods on credit and exchanging goods for goods. When asked how they adapted to the impacts of climate change, below were the key issues that I noted.

A trader specialising in bedding and cosmetics said:

“In times of climate shocks, I usually go to Makunka village to exchange my things with Charcoal which I come and resale here.”³¹

Another trader said:

“(…) When things are hard in this shop with no sales (…), those are the time when I need to have opportunities to start supplying things from Zambia to Botswana. I start supplying things in Botswana, such as kapenta (dry fish), beans or whatsoever (…). Sometimes I go with their orders (…).”³²

The traders use those strategies to enable them to survive in times of crisis. However, the impacts seem to outweigh the adaptation strategies employed. Some traders use “social capital” (DFID,199) to survive the crisis. This is mainly done through the village banking groups.

For example, one respondent said:

“I joined a village banking group and a local self-help group in our community. I save some money through this initiative and use it to keep my business running,

³¹ IT3 - trader # beddings, cosmetics, and salon

³² IT6 - trader # secondhand clothes, groundnuts, and charcoal

especially in difficult seasons. Further, I change the type of business depending on the seasons and weather patterns that prevail each year.”³³

Another trader who sells cosmetics, clothes and shoes indicated *that when her business is experiencing some losses, she often goes to order some caterpillars(worms) that are usually cheap but marketable at the border*³⁴.

A trader who supplies Zambian products (ground nuts, charcoal³⁵, and secondhand clothing) to Botswana needed more capital to continue her business. Hence, her adaptation strategy was to smuggle some goods and avoid border charges³⁶. Even though this was relatively silent in most of the interviews, evidence shows that it is the typical strategy used by the traders.

For example, the COMESA fact sheet noted that:

“(....) bypassing border posts, concealment of goods, under-declaration, wrong classification, under-invoicing and other similar concealment methods (....) seeking to evade taxes or fees imposed by governments, traders also try to avoid administrative formalities in areas such as health, agriculture, security, and immigration, which are perceived as costly, complex and time-consuming” (COMESA, 2020, p. 2).

The traders feel that they do not have the power to influence the decisions through dialogue; hence they use alternative means. IPCC (2007) argued that local groups often feel that they do not have power or access to decision-making. Thus, dominant groups have more power over vulnerable groups (traders). Hence, this is a challenge in the adaptation process.

Other reasons were noted by the World Bank report, which shows:

“Some small-scale traders might actively try to avoid contact with border officials, perhaps because of past experiences of corruption or

³³ IT8 - trader # drinks, detergents, mayonnaise, and peanut butter

³⁴ IT7 – trader# Shoes and clothes

³⁵ Coal – made from trees used as a fuel source in Zambia.

³⁶ IT6 - trader # secondhand clothes, groundnuts, and charcoal

harassment, because they find the documentary requirements of the formal border clearance process overly demanding and cumbersome, or because of a lack of awareness of border requirements that leads to misperceptions about the amount of duties that are applicable to the goods they carry” (World Bank, 2020, p. 17).

Results from interviews indicated that border prices were the main challenge to adaptation. One trader stated: *“When you reach the border, you will have to pay and while in transit, some things will break, and you end up running into a loss”*³⁷

Similarly, a trader from the focus group discussion bemoaned that:

“(…) what is killing us people is the issue of the border. If Zambia Revenue Authority and the council can reduce their border pricing or the charges of goods for local traders, it will be easy. But you find you have three containers; you will be charged just like someone who is coming from Lusaka.”³⁸ Another interviewee said: “(…) For me, to take things in Botswana is not easy. I need to declare them sometimes when I reach the border; there are things which are not passing there. For instance, lotions. So, I need to make plans on how I am going to take them there.”³⁹

The Eighth National Development Plan asserts that the “inefficiencies at the border posts result in delays in clearing goods”(Ministry of Finance and National Planning, 2022, p. 33). These challenges affect traders’ ability to adapt to the impacts of climate change. Nevertheless, the traders perceived climate change to have created opportunities for cross-border traders. The effects of climate change, especially natural assets, would allow traders to supply scarce products, hence maximising profits. For instance, one trader highlighted that:

*“(…) there is a certain time when we had much rainfall, we ordered umbrellas and people bought until they finished, so it was an advantage to us because we needed business.”*⁴⁰

³⁷ IT2 – trader # building materials and household goods

³⁸ RP1- FGD respondent

³⁹ IT3 - trader # beddings, cosmetics, and salon

⁴⁰ IT5- trader# hair, blankets, duvets, and clothes

Further, another trader noted that *when there was poor rainfall, it gave her an opportunity to order food from Botswana to supply in Kazungula, and she made very good sales*⁴¹.

In addition, traders supplying household goods seem to take advantage of extreme heat to sell fans from Botswana. The findings from both document reviews and interviews indicate that traders have the potential to adapt to climate change but are often challenged by structures such as border restrictions that seem not to favour small-scale traders.

⁴¹ RP2- FGD respondent

6. Discussion

This section gives more detailed insights into my findings in relation to the two theories, sustainable livelihoods approach and capability theory. The study aimed to respond to three questions which included (1) How does climate change affect the livelihoods of cross-border traders in Kazungula district? (2) What adaptation strategies do cross-border traders employ to cope with the impacts of climate change? (3) What challenges or opportunities do cross-border traders encounter in adapting to climate change? I will show how the two theories were able to address the questions and possible weaknesses. The empirical data will be collated with the existing literature to show the commonalities and unique contribution of this study to the body of knowledge.

6.1. Impacts of climate change on cross-border traders

Knowledge system

Local knowledge is vital for understating, predicting, and planning for adaptation. In as much as modern society relies much on meteorological records, local people's observations play a critical role in adapting to climate change. Kronlid (2014) argued that climate change can lead to the loss of local knowledge systems.

Traders in Kazungula perceived climate change as extreme temperatures across the year, reduced duration of the rainy season, droughts, and floods. One trader complained of the unpredictable nature of the weather patterns and seasons in the Kazungula district. Traders used key national events such as Independence Day celebrations and Christmas to track seasonal changes and plan their activities. However, due to climate change, the respondents observed a lack of rainfall in the months they previously used to have rain and weather patterns were unpredictable. This would imply that "weather randomness" (Kronlid, 2014, p. 40) has led to the loss of local knowledge and may affect how traders would adapt to the impacts of climate change. This loss of traditional knowledge may impact their capability to be "rational" in the light of climate change. This is evident in the sentiments of a

trader who could not sell her tracksuits and fleece blankets due to unpredictable temperatures (IT3).

These findings differ slightly from a study conducted in Ghana that focused on small-scale urban traders. The study established that traders perceived climate change as a lack of rainfall and did not include extreme heat and floods (Arku, Angmor and Adjei, 2017). Does this suggest that because small-scale traders in the urban areas conduct their businesses in shelters while cross-border traders are always in transit and are exposed to extreme heat? Or could it also be possible that because the study took place when there was a warning of a cyclone in the country and lots of awareness on the topic might have influenced their responses? It seems the location of the border and traders' current and past experiences influenced their perceptions of climate change. A study from Bangladesh affirms that "recent memories of climate events could affect local people's beliefs in the direction of change"(Momtaz and Shameem, 2016, p. 99). Further continued awareness of climate change on radio stations might have contributed to their understanding. However, both Robeyns (2005) and DFID (1999) seem not to address how exposure to sudden shocks influences respondents' knowledge of climate change.

Despite this discrepancy, I found some similar trends in the perceptions of the farmers. Studies that investigated farmers found mostly excessive heat, drought (Nzeadibe *et al.*, 2012; Mulenga, Wineman and Sitko, 2017) and "rainfall distribution" (Arku, 2013, p. 427). The result of this study further complements previous empirical studies conducted in Kazungula. These studies projected extreme temperatures above 26°C and a projected increase of 1°C and 3°C by 2060, and rainfall, as well as drought incidences, have been noted to be more frequent (Swennenhuis and Mandima, 2012; Ambukege, 2019). However, these changes have resulted in the loss of local knowledge, which continues to affect traders in planning and conducting their work considering climate change.

Working and play (focus on work)

Climate change was found to have affected the livelihood strategies of the cross-border traders in Kazungula district. Interestingly, unlike farmers who are mostly

affected by drought and rainfall variations (Arku, 2013; Mulenga, Wineman and Sitko, 2017), cross-border traders are also affected by extreme temperatures. Traders that were affected by floods associated it with the destruction of road infrastructure, which makes it impossible for them to order products for sale, while others associated it with a reduced number of customers and profitability of their businesses. In other words, climate change affected the “mobility” (Kronlid, 2014) capacity of cross-border traders. The heat was noted to affect the “health”, especially of the traders that sold their products on the streets of the neighbouring countries but did not result in a loss in profits. This could be due to resilience to the heat. However, those who sold warm clothing bemoaned the lack of sales due to prolonged extreme temperatures. The perceptions of the effects of climate change seemed to have been influenced by the duration and kind of trading activities being done by the traders. For example, traders involved in the sale of household goods did not complain about the heat, yet those who sold their products on the streets struggled with extreme heat.

Capability to meet basic needs

I found a strong link between agricultural productivity and the effects of climate change on the livelihoods of traders. It was noted that traders' income was reduced when climate change affected farming activities. Some traders, for example, those selling manufactured products, complained of a lack of sales while those who purchased farm products lacked goods to supply to neighbouring countries, leading to the high cost of doing business.

I further found that climate change affected the capability of some traders to meet basic needs such as food, paying rentals and fees for the children. This confirms the findings by Arku et al. (2017), who established that traders who were affected by climate change had difficulties in meeting their basic needs. Another point of convergence in our findings was on the level of education; people with higher education could meet most of their necessities. However, the results of the current study are slightly different as I found some indirect effects of climate change due to the effects on the farmers' livelihoods.

A study conducted in Kazungula also found that farmers were severely food insecure during the period of floods or climate hazards (Ambukege, 2019). Even though a few traders reported not to have been affected by climate change's impacts on agriculture, the farmers seem to be at the centre of the community livelihood in Kazungula as they are both suppliers of agricultural products and primary consumers of the manufactured goods. Rural traders seem to experience more effects of climate change than those in urban areas due to their locations and dependence on climate-sensitive livelihoods.

Even though DFID (1999) emphasises access to capital and Robeyns (2005) conversion of the resources into functioning, both seem to ignore the interconnected nature of rural livelihoods. It appears the impacts of climate change on farmers' livelihoods have spillover effects on the well-being of the traders. For example, one trader who was involved in foodstuff trading noted the change in the priorities of the customers whenever there was poor rainfall which affected the farmers. The customers did not buy the products such as bedding and clothes as they opted for basic needs like food instead of other products (RP2). Hence, to understand this relationship, I would suggest using theories that consider both basic needs and the nature of the rural system instead of assuming that all rural livelihoods directly depend on natural assets.

6.2. Traders' adaptation strategies

The capability of social systems to adjust to and deal with the effects of climate change depends on various elements, including money, technological advances, education, knowledge, abilities, infrastructure, availability of assets, and leadership skills (McCarthy *et al.*, 2001, p. 8). Chambers and Conway (1991) add that people's ability to pursue certain livelihood options depends on the availability of assets at their disposal and their unique capabilities. Further, adaptation was theorised to take many forms, which included "reducing current consumption; accumulating and storing in other assets; preserving and protecting asset base for recovery; selling assets; diversifying; make claims and migrate" (*ibid*, p. 11).

This study found that cross-border traders in times of climate hazards adopted coping strategies such as diversifying the products they supplied on the market. For example, one trader travelled to nearby villages to exchange her products with charcoal for resale at the Kazungula border (IT3). Other strategies used were joining village savings groups and giving out their products on credit. For example, they begin to order things that are in short supply, such as Maize, dry fish (capenta) and some processed goods, which they exchange with other products, such as charcoal and beans.

However, findings from a study that focused on urban traders in Ghana established that the majority of traders did not opt for coping strategies (Arku, Angmor and Adjei, 2017, p. 64). Further, those who opted for coping strategies depended on friends, family, and manual labour. Similarly, a study in Kazungula found that most of the farmers did not opt for copying strategies. However, those who opted employed “stress coping strategies”, “emergency coping strategies”, and “crisis coping strategies”(Ambukege, 2019, p. 42). The findings are different from the results of this study; instead of selling productive assets or borrowing from friends and relatives, cross-border traders have used local strategies to strive to recover or adjust to the impacts of climate change. Hence, the findings fit well with the SLA and CA that emphasises on the local resources and abilities of the individual.

It was also noted from this study that one’s income level mainly influenced the choice of adaptation. For example, traders with lower capital, especially those selling farming produce, seemed to have limited adaptation options. At the same time, those with bigger enterprises were more capable of adjusting as they had access to financial capital. Further, such traders saw climate change as an opportunity to increase sales during a crisis. For example, one trader explained that when there was poor rainfall, it gave her an opportunity to order food from Botswana to supply in Kazungula, and she made very good sales (IT4).

Diverging from theorised claims on adaptation, this study also found that traders smuggled some products. This enabled them to avoid border charges in order to remain with a decent capital (see details on adaptation challenges). Hence, in

addition to Chambers and Conway (1991) propositions earlier highlighted, people with low adaptation capability to the impacts of climate change may consider illegal survival strategies.

However, there has been a great support in the literature that social capital can lead to the reduction of vulnerability (Woolcock and Narayan, 2000) and increase “economic efficiency” (Department for International Development, 1999) by improving people’s income when individuals or communities encounter crises. This raises an expectation that traders’ access to social capital, such as being a member of the village banking group and membership in cross-border associations, would enhance their capacity to adapt to the impacts of change. On the contrary, I found that membership in these associations was only a temporary strategy and not an adaptation. For example, being a member of COMESA CBTA did not give a voice to traders who hoped for the reduction of border fees. This confirms the claim by (Adger, Lorenzoni and O’Brien, 2007), who suggested that “the relationship between social capital and adaptation is neither unidirectional nor necessarily positive”.

6.3. Capabilities and challenges in adaptation to climate change

Challenges to adaption have been categorized into three subgroups which include limited access to financial capital, border restrictions and absence of support structures (transformation structures and processes).

Access to livelihood assets depends on the individual’s capacities and external factors (Robeyns, 2005). Cross-border traders in Kazungula have taken the local-based adaptation strategies, which may be referred to as “autonomous adaption” (McCarthy *et al.*, 2001, p. 8). However, the traders have limited access to micro-financial institutions where they could get loans in times of crisis due to low capital and level of education. In addition, most cross-der traders lacked alternative “regular inflows of money” (DFID, 1999), like pensions and social safety net services such as social cash transfer programmes. IPCC report affirms that local adaptation strategies are often constrained by a “lack of adequate financial resources” (Intergovernmental Panel on Climate Change, 2007, p. 734). This seems

to be influenced by what Robeyns and Byskov (2021) called personal (skills, knowledge) and social conversion factors (financial policies). Most traders had lower levels of education coupled with discriminatory monetary policies that do not allow vulnerable groups access to loans.

A study conducted in Heartlands areas, including Kazungula district, noted constrained access to financial facilities by rural households because they do not meet the criteria of lending institutions (Swennenhuis and Mandima, 2012). A study in Namibia also established that capital was a challenge for cross-border traders, and their activities were mainly funded by individual savings (Zata, 2016). Hence, village banking becomes the primary source of income in times of climate crisis. However, Narayan *et al.* (1999, p. 45) argued that “when poor people support each other, their scant resources may limit the gains made”. For example, the village savings scheme is based on trust, and the risk of loss is very high. If a participant loses funds or fails to pay the loan, it may lead to a huge loss for the members. This would result in the failure of the traders to adapt to climate change.

Further, the adaptation process transcends individual endowments and capacities. The IPCC report showed that people could have access to resources but converting them into positive livelihood outcomes can be affected by “regulations” and organisations or national policies (IPCC, 2007). The findings of this study show that traders’ adaptation was affected by the lack of support systems. The study found that there were no institutions that directly supported traders in the adaptation process. However, public programmes such as the Citizens Economic Empowerment Fund and Constituency Development funds are not accessible to traders. Even those who had applied have never received any of these grants; as such, traders feel frustrated with such institutions, and some traders do not feel the need to apply for such opportunities. Even though others have joined the cross-border association seeking to enhance “collective capacities”(Ibrahim, 2006), this has not translated to the improvement of their capability to influence change.

This study also found that all traders in both FGD and individual interviews complained about stringent measures at the border, which greatly affected the

adaptation process. Key issues noted included delays, confiscation of property and customs duty. Similarly, the 8th National Development Plan affirms that there are inefficiencies at the border posts, leading to delays in clearing goods (MFNP, p. 33). As a result, traders opt for other means, such as smuggling and under-declaration of property. Both COMESA (2020, p. 2) and (Kachere, 2011) found that cross-border traders used various strategies, including “wrong classification”, “under invoicing”, and smuggling to evade taxes. This puts the cross-borders at risk of abuse, arrest and others (COMESA, 2021).

Further, the study noted the high cost of transportation to have affected traders’ adaptation process. To overcome this and custom duties. Traders use long-distance trucks (carrying products such as copper and others) from one of the neighbouring countries. They often pay drivers not to declare the goods as they are often not searched for small merchandise. As such, the traders can evade tax and continue with their businesses. This explains why some traders refused to be recorded or sign consent forms during the interview sessions.

The above challenges make it difficult for traders to adapt to the impacts of climate change. Unlike farmers, traders do not have many support structures in the community, they lack support from both the government and private institutions as such autonomous adaptation has been at the core in Kazungula. Traders have often relied on social capital and their own income to cope with the impacts of climate change.

Finally, using the different sources of information has helped authenticate and gather information neither method would have been able to collect. For instance, interviews alone would not have provided information regarding challenges in adaptation due to their association with border illegalities. Most traders avoided talking about this, but I understood the situation in detail by reviewing the documents. Further, combing the two theories has enabled me to explore my research questions adequately. However, adding a third theory, like the basic needs approach, will help to unearth the interconnected nature of rural livelihoods and the effects of climate change.

7. Conclusion

The aim of this study was to understand the impact of climate change on the livelihoods of the cross-border traders in Zambia. The study was guided by the following sub questions: RQ1.1. focused on the understanding the impacts of climate change on the livelihoods; RQ1.2. aimed at elaborating the adaptation strategies employed by the traders while RQ1.3. focused on the challenges and opportunities encountered by the traders as they adapt to the impacts of climate change. The study was guided by the sustainable livelihood approach and the capability approach. SLA was used to explore the context and various capital endowments in the community and how climate change has affected traders access to such livelihood assets. The capability approach was used to identify key capacities that were vulnerable to climate change and how that affected the adaptation process of the traders.

The findings of the study showed that traders were greatly impacted by the impacts of climate change. The cross-border traders were mostly affected by drought, extreme temperatures, and unpredictable rainfall patterns. I found traders knowledge was consistent with findings of other studies done in Zambia. However, I noticed that traders were affected by various dimensions of climate change unlike farmers who mostly mentioned rainfall variations. The reason for this was because traders are often mobile, hence affected by heat. Further, the warning about cyclone Fred which circulated during the period of the study might have enhanced the traders' perceptions of climate change.

The central capabilities affected by climate change included mobility which was mostly due floods and destruction of the road infrastructure; Bodily health which was associated with extreme heat especially traders who carried their products in the streets; Work and play which mainly associated on their abilities to do their business in the light of climate change; Knowledge systems was mainly due unpredictable seasons which made it impossible for the traders to plan the type of products to supply on the local market. Climate change has led to the loss of local

knowledge which is key for the adaptation of cross-border traders. Despite these effects on their capacities, traders have opted for copying strategies.

The coping strategies in literature have been noted to include reducing consumption; storing in other assets; preserving asset base; selling assets; diversification; make claims and migration (Chambers and Conway 1991, p. 11). In the current study, I found that traders had employed coping strategies which included diversification; exchange goods with other products; sale their products on credit; venture in different businesses and joining village savings groups. However, these strategies were influenced by the kind of business they were doing and the level of income. Those with higher income were more likely to order their products from other countries during the climate crisis such as floods which was seen as an opportunity for them. But for the low capital traders which were mostly women, it very difficult to adapt, with the majority joining own savings groups.

The study found three key barriers to adaptation which included lack of access to financial capital, border restrictions and lack of support from institutions. Access to financial capital was noted to be a big challenge as traders did not have the capacity to apply for the loans due to low capital and lack of skills. Further, cross-borders' low capital businesses which have already been impacted by climate change are subjected to payment of duty at the border. This makes it difficult for the traders to raise enough income to adapt to climate change. This has led to traders avoiding the border and declaring their products. After reviewing the public documents, both the 8th National Development Plan and National Policy on Climate Change do not seem to address the plight of the traders.

The study found two interesting findings which were not found in most literature. First, the interconnected nature of the rural livelihoods systems meant that when farmers were affected by climate change, traders experienced the worst effects, I learned that farmers were the primary customers of manufactured products and producers of agricultural products. Hence, traders were most vulnerable to the impacts of climate change. Second, this study established that power relations within rural context may lead to the adoption of illegal means of adaptation

strategies. Since traders have no capacity or control over border and tax decisions, they opt for smuggling to avoid tax.

Finally, by combining SLA and CA we have been able to unearth findings which would not have been brought out by either theory alone. SLA has provided a step-by-step approach for analyzing the impacts of climate change while CA has given insights into the effects and challenges in adaptation. This combination has helped in identifying assets and capacities of the traders convert those resources into livelihoods outcomes.

Future studies could consider comparative study of impacts of climate change on livelihoods focusing on farmers and traders. Most studies have brought out the understanding of the farmers while we have bridged the gap by adding rural traders. There is a need to compare the traders' views and farmers to understand some differences in their perceptions. Further, future studies could explore why traders with higher education seem to be less affected by climate change than those with no education. In addition, there is a need to understand the extent to which climate disaster warnings (e.g cyclone) could influence traders' perceptions on climate change.

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Annex: 1 - Individual Interview

Thank you for agreeing to participate in the interview. I am a Student from Lund University conducting a study on the impacts of climate change on cross-border traders in the Kazungula district. Your participation is important in helping me to understand the challenges you face as a cross-border trader in the context of climate change. The interview should take about 30-45 minutes.

Theme	Question
Background	<ol style="list-style-type: none">1. ID.....2. What is your age range?3. How long have you been in Kazungula district?4. How long have been a cross-border trader?5. What kind of products do you order?6. Where do you order and sell your goods?7. How long does it take for you to return to Kazungula?
Vulnerability context	<p>a) Changes in Temperature</p> <ol style="list-style-type: none">1. Do you observe any changes in dry season temperature?2. Do you see any changes in the rainy season temperature?3. Are there any changes to the length of cold or hot periods? <p>b) Changes in rainfall patterns</p> <ol style="list-style-type: none">1. Do you observe any changes in the amount of rainfall or duration of the rainy season?2. How is the intensity of rainfall events?3. How is the length of dry spells during the rainy season?
Effects climate change on livelihood assets	<p>a) Effects on livelihood Assets</p> <ol style="list-style-type: none">1. How has climate change affected the availability and quality of natural resources as a cross-border in Kazungula district?2. How has climate change affected your physical environment e.g roads

3. How does climate change affects access to social and financial resources?

c) Effects on trading activities

1. Does climate change affect your trading activities? If yes, then how?
2. How has climate change affected the profitability of your businesses compared to past years?

d) Meeting basic needs

1. How have changes in the climate affected your ability to meet household needs such as food, shelter, and water.

e) Mobility

1. How have the changes in the weather conditions affected your ability to cross to the nearby countries for trade?
2. How does climate change affect access to local markets and customers?

Adaptation and capabilities

3. How have you benefited from hot/warm temperatures?
 4. Are there organizations or institutions that support traders affected by climate change? If yes, what kind of services do they offer?
 5. How do you conduct your trading activities considering the effect of heat, drought, floods etc?
 6. What barriers do you encounter in adapting to the effects of climate change?
-

Annex 2: Focus Group Discussion

1. Background

Tell me about your background, in terms of the kind of trading activities, how long you have stayed here and countries where you go for your trading activities in Kazungula.

2. Vulnerability context

Have you observed any variations in the occurrence or severity of extreme weather occurrences (such as storms, floods, and droughts) in Kazungula and other areas where you carry out your trading activities?

3. Effects of climate change on livelihood assets (*natural, physical, human, and social*)

Does climate change affect your livelihoods? if so, then how?

Have you noticed any beneficial possibilities or innovations arising from the effects of climate change in Kazungula district?

4. Adaptation and capabilities

How have you adapted your trading activities or strategies in response to the impacts of climate?

Are there any organizations or government programmes that support the adaptation of the cross-border traders?

5. Barriers and challenges

What key barriers and challenges prevent you from adapting to the impacts of climate change?

Annex 3: Introductory Letter



Graduate School
FACULTY OF SOCIAL SCIENCES

January 26, 2023

1

Saidi Victor Phiri

Katherine Anderson Ahlstedt
Programme Coordinator
Graduate School

To whom it may concern,

With this letter we confirm that Saidi Victor Phiri, born May 11, 1992, is a student enrolled in the *Master of Science Programme in Social Scientific Data Analysis* majoring in Social Work, at Lund University, Sweden. The programme runs full-time for two years, from August 30, 2021 to June 4, 2023 and is 120-credits. Saidi Victor Phiri has so far completed 82.5-credits of the programme with good results.

Saidi Victor Phiri is currently register for the master's thesis course *SIMZ51: Master's (Two Years) Thesis in Social Scientific Data Analysis, 30-credits* with a major in Social Work this spring term 2023. As a component of the master's thesis course, Saidi Victor Phiri intends to conduct fieldwork in the Kazungula district in Zambia from February 2 – April 2, 2023 in order to investigate the impacts of climate change on livelihoods. The student's thesis work is being supervised by Professor Max Koch at the School of Social Work at Lund University.

Please do not hesitate to contact us if you have any further questions.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Katherine Ahlstedt'.

Katherine Anderson Ahlstedt
Programme Coordinator
Graduate School
Lund University



LUND UNIVERSITY
Faculty of Social Sciences

Annex 4: Interview Nodes

Name	Description	Files	References
Adaptation		8	25
diversify		8	15
Barriers			
Lack of customers		6	8
Restrictions		6	10
Transportation		8	9
Cross-border countries			
Botswana		7	14
Namibia		1	1
South Africa		1	2
Zambia		3	2
Zimbabwe		1	1
Customers			
Civil servants		5	8
farmers		6	9
Local people		8	15
Retail stores		1	1
Track drivers		4	7
Effects of climate change			
Health		3	4
loss of profits		4	6
Mobility		8	16
No effect		2	2
Perishable products		2	4
Impacts on trade		4	11
Knowledge about climate change			
Drought		5	10
floods		3	4
High temperature		8	18
Reduced Rainfall		7	14
Unpredictable weather patterns		5	8
meeting basic needs			
difficult to meet basic needs		5	9

Farmer trader relations		3	4
opportunities		0	0
Good market		1	1
Power relations		2	5
Social capital and support systems			
Associations		2	3
village banking		2	4
Empowerment programme		5	1
Type of business			
Beddings or clothes		4	7
cosmetics		2	4
farm products		2	9
Glossaries		2	5
Household goods		2	2
shoes		2	8
