



UNIVERSITEIT VAN PRETORIA  
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## Gender and Socio-Ecological Resilience to Climate Change

*A transformative Approach in selected Post-Fast Track  
Resettlement farms in Zvimba East District, Mashonaland West  
Zimbabwe*

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A Thesis submitted to the Faculty of Humanities, University of Pretoria, in  
fulfilment of the requirements for the degree of Doctor of Philosophy 2023

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## DEDICATION

I dedicate this thesis to God who has given me the strength to complete this study and women who are seeking to build resilience to climate change in Post-Fast Track Resettlement Farms.

## DECLARATION

I declare that this thesis carrying the title, “Gender and Socio-ecological Resilience to Climate Change: A Transformative Approach in Selected Post-Fast Track Resettlement Farms in Zvimba East District, Mashonaland West, Zimbabwe,” is my own original work and has not been submitted for a degree at this institution or any other for diploma, degree or for other related purposes. I also declare that all the sources cited and quoted have been indicated and acknowledged by means of complete references.

Name: Praise Gamuchirai Karuma

Signature.....

Date.....

## ETHICS STATEMENT

As the author of this thesis, I declare that for the purposes of carrying this research, I obtained research ethics approval acknowledging that I have complied with all the ethical standards required. The approval was done by the University of Pretoria Research Ethics Committee and the Office of the CEO for Zvimba Rural District Council, Mashonaland West, Zimbabwe.

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## IMPORTANT NOTES ON REFERENCING

In terms of referencing style, the Harvard method has been used. Only secondary data was referenced in the text. Similarly, women in Post Fasttrack farm households' life historical accounts were cited in the text. However, frequently used Shona terms were cited in foot note form. Although these were explained under the frequently used Shona terms section in the preliminary pages of the thesis, the idea was entirely based on the need for quick referencing.

## ABSTRACT

The study focused on how gender influences the socio-ecological resilience of women to climate change in selected Post-Fasttrack Resettlement Farms (PFTRFs) in Zvimba East District. The study analyses the level of women's livelihoods' socio-ecological resilience to climate change in PFTRFs and how these can be improved to be sustainable. The study was premised upon the key question 'how socio-ecologically resilient are the women's livelihoods in the wake of climate change? In building the case for this study the nature and trends of climate change in the area were established and how these impacted on women's lives and their livelihoods. The women's responses to climate change impacts and the level of socio-ecological resilience of the means adopted were also another driving force to carry out this study. In doing this the study employed the mixed methods methodology hinged on the use of the survey method (337 households), in-depth interviews (30), FGDs (3) and observations conducted across three farms which facilitated an analysis of how genders influence the socio-ecological resilience of women to climate change in PFTRFs. Adopting the gender and socio-ecological resilience framework, the study analyzed the level of socio-ecological resilience to climate change of the women in PFTRFs and the need for a transformative approach to adapting to climate change in these areas. The study revealed a socio-ecological resilience gap in women's adaptation to climate change. Their practices were discovered to be highly maladaptive owing to the patriarchal nature of the institutions they must report to. Additionally, the study noted that socio-ecological resilience to climate change and gender aspects of communities have an inextricable and conflictual relationship which leads to faulty adaptations in Post-Fasttrack Resettlement Farms if not handled properly. In as much as climate change was perceived to be negatively affecting women in PFTRFs, in their response the impacts have pushed women to be innovative and diversify their livelihood options through the on-farm, non-farm, and off-farm mechanisms. Nevertheless, the responses of these women are not fully socio-ecological resilient to climate change as sustainability remains questionable, hence the need for the existing means to be developed and transformed into being socio-ecologically friendly was emphasized by the study. Based on this the study recommended that there is need for climate proofing of some of the means and ways adopted by women and also funding some of these initiatives to be sustainable. Adding on to this training of women in socio-ecological resilience needs to be done as well as putting policies that help women farmer have access inputs and funding so as to cope with climate change.



## FREQUENTLY USED SHONA TERMS

Amaiguru: maternal aunt

Amainini: maternal aunt

Chisi: Day of rest

Gavakava: an herb used to treat livestock of various ailments

Fish Bonga: Illegal fishermen/ women

Kunaya: receiving good rains

Kugarika: living a good life

Kuneteseke: living the hard way

Kupfuma: being rich

Kurarama zvakakanaka living a good life

Kuronzera: a system of cattle loaning

Kutambura: living the hard way

Madota: ash

Maheu: sweet brewed beer

Maricho: piece-work labouring

Mbuya: grandmother

Muzvare: unmarried adult woman

Sabhuku: village head

Sadza: African thick porridge Sango: forest

Tisvikewo: may you accept my presence

Varombo: the poor

Zvikwambo: goblins

## LIST OF ACRONYMS

AGRITEX: Agricultural Technical Extension

AIDS: Acquired Immuno-deficiency Syndrome

CA: Communal Area

CCC: Citizens Coalition for Change

CCMDZ-Climate Change Management Department of Zimbabwe

COP: Conference of Parties

CSO: Central Statistics Office

DFID: Department of International Development (United Kingdom)

EMA: Environmental Management Agency

ESAP: Economic Structural Adjustment Programme

FAO: Food and Agricultural Organisation

FTLRRP: Fast-Track Land Reform and Redistribution Programme

GDP: Gross Domestic Product

GMB: Grain Marketing Board

GoZ: Government of Zimbabwe

GSF: Government Subsidised Food

HIV: Human Immune Virus

IFPRI: International Food Policy Research Institute

IMF: International Monetary Fund

IPCC: Intergovernmental Panel on Climate Change

LAP: Livelihoods' Asset Pentagon

MDC: Movement for Democratic Change

MoLAFWCARD: Ministry of Lands, Agriculture, Fisheries, Water, Climate and Rural Development

MoECTI: Ministry of Environment, Climate, Tourism and Hospitality Industry

MT: Metric Tonne

NAP-National Adaptation Plan

RS: Resettlement Scheme

RTGS: Real-Time Gross Settlement

SADC: Southern African Development Community

SAPs: Structural Adjustment Programmes

SDF: Social Dimensions Fund

SLA: Sustainable Livelihoods Approach SLF: Sustainable Livelihoods Framework

TMS: Thomas Meikles Supermarket

UN: United Nations

UNDP: United Nations Development Programme

UNEP: United Nations Environmental Programme

UNFCCC: United Nations Framework Convention on Climate Change

UNICEF: United Nations Children's Emergence Fund UNWCED: United Nations World Conference on Environment and Development

WB: World Bank

WFP: World Food Programme

WHO: World Health Organization

ZANU-PF: Zimbabwe African National Union-Patriotic Front

ZIMSTAT: Zimbabwe Statistics

ZIMVAC: Zimbabwe Vulnerability Assessment Committee

ZNCRRS: Zimbabwe National Climate Change Response Strategy

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## Chapter 1: The Problem And Its Setting

### 1.1 Introduction

The central focus of this study was to evaluate how gender influenced the socio-ecological resilience of women to climate change effects in Post-Fast Track Resettlement Farms (PFTRFs) in Zvimba District of Zimbabwe. In doing this, the varied experiences of women living in the constrained environment; that is in Post-Fast Track Resettlement Farms (PFTRFs) in an era punctuated by climate change and its associated effects were unearthed, showing how they responded to climate change as well as their level of socio-ecological resilience of these responses. The study demonstrates that although women in Post-Fast Track Farms (PFTF) face various challenges emanating from climate change, they are not passive recipients; but act in various ways to counter its problems.

Women can craft innovative ways to respond to climate change in ways that are not only beneficial to them but the wider society at large. However, the sustainability of these responses remains questionable as some of them are destructive to the environment. Nevertheless, the study also acknowledges that some of the women's responses to the impact of climate change promote resilience. Significantly, the research highlights the need for various stakeholders to operate at various levels in order to coordinate and collaborate efforts for a transformative gender sensitive socio-ecological resilience to climate change within PFTFs in Zimbabwe.

#### 1.1.1 Contextual Background

Climate change is now a reality in Zimbabwe and the entire southern African region as evidenced through several climatic events witnessed in the recent past. These events have negatively affected the physical environment as well as the socio-economic and political way of life of people (Bhatasara, 2015). Since Zimbabwe is an agro-based country, climate change effects are greatly felt in the agriculture sector, which has been hit hard by adverse weather patterns (Matsa, 2020). Sango (2013) note that agricultural productivity is highly dependent on climate, and climate change is a real threat to humanity. In Zimbabwe, climate change related events like flooding, droughts and cyclones have negatively affected human life (Phiri et al., 2021).

Since the year 2000, recurrent droughts have negatively impacted on agricultural productivity, resulting in harvest failures and food security challenges at both the household and national levels. Scholars (Mavhura et al., 2015; Bhatasara, 2015). Chikozho (2020) and Tayengwa (2017) have

shown how sub-minimal rains in the lowveld areas of Mwenzezi, Chivi and Mberengwa in 2000-2005 resulted in loss of crops and livestock; forcing most rural households to survive on emergency food relief. In some regions of the country, droughts are normal occurrences, and households in these regions are perennial participants in humanitarian food aid programmes (Jayne et al., 2016). When rains finally arrive, flooding leads to crop and livestock loss for many small and large farmers in Muzarabani, Wengezi and Dande areas (Mutopo, 2011).

Since the year 2000, Zimbabwe experienced several adverse weather events associated with the phenomenon of climate change, which negatively affected rural productive systems (Mutopo, 2012). Exploring on the link between agricultural failures in 2001/2002, some development agencies associated it to ‘constrained policy environment’ (UN, 2002).<sup>1</sup> This has been because of attempts to downplay the severity of the 2001/2002 drought (Richardson, 2007). However, the drought has been described as, ‘the most severe in the last 20 years’ (WFP, 2002), and the worst in five decades’ (IMF, 2003).<sup>2</sup> In 2003, the country was hit by Cyclone Elin that destroyed many livelihoods and led to loss of thousands of lives (Chizondidya, 2012; Mtekwa, 2019).

This study acknowledges that certain climatic events experienced in the country are common climatic events that can be seen as normal occurrences. For example, high seasonal rainfall variability is related to El Nino-Southern Oscillation (ENSO) (Philander, 1990; Yamagata et al., 2004), and El Niño events are common and occur every 10 years (FAO, 2014; Oparinde and Hodge, 2011). However, recent trends in climatic variability depart from this norm. As a result, most families that have been dependent on climate-dependent livelihoods have plunged into food security crisis and deeper poverty (Benitez et al, 2018). The manifestation of weather events in the recent past such as Tugwi-Mukosi flooding and Cyclone Idai (Chiweshe, 2023), point to climate change.

Literature has examined these adverse weather events, their effects to households and consequential impact on rural environments (Matondi, 2015; Mutopo, 2018). Chingarande (2008) notes that in rural set ups such as Muzarabani, Plumtree and Tsholotsho, many families were left

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<sup>1</sup> United Nations (2002). ‘Revised Consolidated Appeal for Zimbabwe-Humanitarian Appeal,’ United Nations, available at: <http://www.un.org/Depts/ocha/cap/zimbabwe.html> (2002)

<sup>2</sup> Richard Lee (2003), ‘Crisis in Chidobe,’ in Zimbabwe Eyewitness, World Food Program, available at: [http://www.wfp.org/newsroom/in\\_depth/africa/sa\\_chidobe0209.htm](http://www.wfp.org/newsroom/in_depth/africa/sa_chidobe0209.htm) (9 February 2002)  
Ismaila Usman, ‘Statement by Ismaila Usman, Executive Director for Zimbabwe,’ in the International Monetary Fund 2003 Article IV Report, Zimbabwe (IMF, Washington, D.C., 2003)

in poverty; leading them to fend for their daily sustenance through begging for donations. Scoones (2010) explains how rural communities' responses to the disasters faced at the turn of the millennium in Zimbabwe were geared towards survival than the issues of conservation. However, such strategies may not be the best ways to address the challenges of climate change and its corresponding negative impacts as these have not been highly sustainable and socio-ecologically friendly. Chikozho (2019) notes how rural households' adaptation strategies have become a snare for the environment as they have left a trail of destruction; including galleys, soil erosion and other environmental hazards. These problems of climate change, the associated impact of climate change, and households' responses are intricately linked to women's livelihoods which are a central aspect in understanding adaptation as well as poverty reduction (Mutopo, 2017). Given that the effects of climate change are more likely to affect agriculture, and that women are more vulnerable to climate change than men (Arora-Jonsson, 2011; Resurrección, 2013), this study explores these issues in relation to women in Fast Track Land Reform Programme (FTLRP) farms in Zimbabwe.

Climatic variability has certainly impacted negatively on Zimbabwe's post-2000 resettlement programme. This was demonstrated by rain failure in the 2000s as well as the subsequent agricultural failure and food security challenges (Jayne, 2006). The recent climate change-related occurrence also affected small farm households in the context of economic crisis and growing unemployment (Eriksen et al., 2010, Bhatasara, 2015; Yohe et al., 2017). Initially the FTLRP selection criteria favoured the selection of nuclear households, with many people moving into resettlement as families (Masiiwa, 2015; Chingarande, 2008). Subsequently these spaces became feminised as agriculture failed and households spread risks by allocating male labour elsewhere, particularly in artisanal mining. In other cases, after men died; leaving women as owners of the A1 farms and plots through the usufruct rights, they have due to the marriage bond, feminisation became more pronounced (Chanza, 2015). Recent literature reminds us of the increasing proportion of women-headed households in many regions of the world and these have borne the impact of climate change (Berkes et al, 2016).

In the context of economic hardship, we cannot rule out a return to de facto women headship of households; as men seek economic opportunities across the border in South Africa. In his study of youth and land reform in Umguza District, Thebe (2018) showed how young male land

beneficiaries later left for South Africa, leaving their wives behind. As the target for poverty reduction, women now occupy large areas of resettlement in Zimbabwe (Matondi, 2012). The resettlement farms, like former native reserves, have become both a production as well as a feminine space. Some of these women inhabit the most vulnerable and marginal landscapes (Chiweshe and Matondi, 2008). With the FTLRP, agriculturally marginal land such as livestock ranches and wildlife sanctuaries were listed and allocated for resettlement, particularly in semi-arid regions (Thebe, 2011, 2018).

Consequently, there has been a continuity in farming systems from those practiced in communal areas where most farmers originated, with most households leaning towards extensive rain-fed mode and using traditional technologies (Thebe, 2018). This is of great significance to this study since these systems are highly vulnerable to climatic variability. In the absence of irrigation infrastructure, women undertake farming tasks alone, with children or in cooperation with other households as in cases where some share-farming arrangements are in place (Thebe, 2018). However, Mutopo (2018) notes that farming activities have been affected by climatic variability, thus, contributing to crop failure. Crop failure has increased women's work burden as they must embark on alternative livelihoods. According to Chiweshe (2015), agricultural failure signifies the lack of resilient by women farmers who are now occupying the farms. Women have also struggled to cope with climate change in the context of economic crisis, mostly due to lack of funding, poor agricultural technology, lack of community support and the patriarchal ceiling placed in the available copying mechanisms (Bhatasara, 2015; Folke, 2006; Mtekwa, 2009).

## **1.2. Statement of the Problem**

Since the year 2000 when government launched the FTLRP, some interesting literature has emerged on the land reform and resettlement programme, including the post-FTLRP dynamics in Zimbabwe (see, for example, Masiwa, 2005; Chiweshe and Matondi, 2008; Moyo 2011a, b; Moyo and Yeros 2005; Murisa, 2010; Scoones et al., 2011, 2012, Thebe, 2018). Much of this literature on Zimbabwe tends to focus on the broader political economy of the country but fails to look at the issues of gender and resilience of the resettled farmers, considering climatic changes. Since the advent of climate change, focus on resilience is gathering momentum in Zimbabwean studies on land. Attention is drawing towards the assessment of the socio-ecological resilience of women's livelihoods in Post-Fast Track Farms. Many studies (Folke, 2006; Gallopin, 2016; Norris et al.,

2008) have focused on adaptation and resilience mechanisms that are being employed by rural communities in the wake of climate change. Nevertheless, the missing factor in these studies is an assessment of how socially and ecologically friendly these strategies are and how resilient they are in overcoming the climatic change bedeviling women-headed livelihoods in Zimbabwe. The study therefore seeks to understand how gender influences the level of socio-ecological resilience to climate change in post-fast-track resettlement farms in Zimbabwe.

### 1.2.2 Aim of the study

The aim of the study was to understand how gender influence the level of socio-ecological resilience to climate change in Post Fast Track Resettlement Farms (PFTRF) with a greater focus on how human society, specifically women farmers, are adapting to multiple negative factors when placed in a new and challenging environment. The research sought to understand the means and ways used by women in PFTRF to adapt and overcome climate change and how socio-ecologically friendly they are. In exploring this, the research unpacked the nature of climate change in Post-Fast Track Resettlement Farms and exposed how it affected women's livelihoods. Through this understanding, the study therefore developed a transformative approach for Post-Fast Track Resettlement Farms which will help them to adapt and be more resilient to climate change whilst being socio-ecologically friendly to their environment and community.

### 1.2.3 Research questions

This study sought to fulfil the above aim by answering the following overarching questions:

- ✚ How socio-ecologically resilient are the means and ways used to adapt to climate change by women in Post Fast Track Resettlement Farms in Zvimba?
- ✚ How can shortcoming in these means and ways be transformed to become more socio-ecologically sensitive to the environment?

These overarching question are further divided into four specific questions, focusing on specific aspects of the study:

- What is the nature, trends and patterns of climate change experienced in resettlement farms in Zvimba East District?
- How have these climate change related phenomena affected women farmers in Zvimba East District?
- What are the different livelihood options available/adopted by women in coping with climate change in Zvimba East District?

- How socio-ecologically resilient are the livelihoods options adopted by the women in Post-Fast Track Land Reform Resettlement Farms (PFSLRRF) to cope with climate change in Zvimba East District?

### 1.3 Mashonaland West and Zvimba District

The above questions were addressed in a particular geographical context in which the women under study are living. As a result of this, unbundling of the case studies is very important as it helps in understanding the area better. In as much as the three farms selected under this research are found in Zvimba district, they are also located within a particular region and province which is Mashonaland West. The section outlines on Mashonaland West and Zvimba to paint a clearer picture of the area under study.

#### 1.3.1 Mashonaland West Province in Zimbabwe

Several studies have focused on Mashonaland West Province. Nkomwa et al (2014) notes that Mashonaland West is a province that is found in Zimbabwe; particularly in the North-Western parts of the country. The province has seven districts which include, Makonde, Kariba, Hurungwe, Chegutu, Sanyati, Zvimba and Mhondoro-Ngezi. It has an area of 57,441 km<sup>2</sup> and a population of approximately 1.5 million people Zimbabwe Statistics (ZIMSTAT, 2022). Chinhoyi is the capital of the province. In terms of governance, the province is headed by Miriam Chombo; who is the Minister of State and Provincial Affairs and various District Administrators who oversee the different districts that are found in the province Government of Zimbabwe (GoZ) (2022). The province is home to limestone which is mostly found around the Chinhoyi area whilst it has also rich tourist attraction sites such as the Chinhoyi Caves, Matusadonha National Park and Manna Pools National Park (GoZ, 2018).



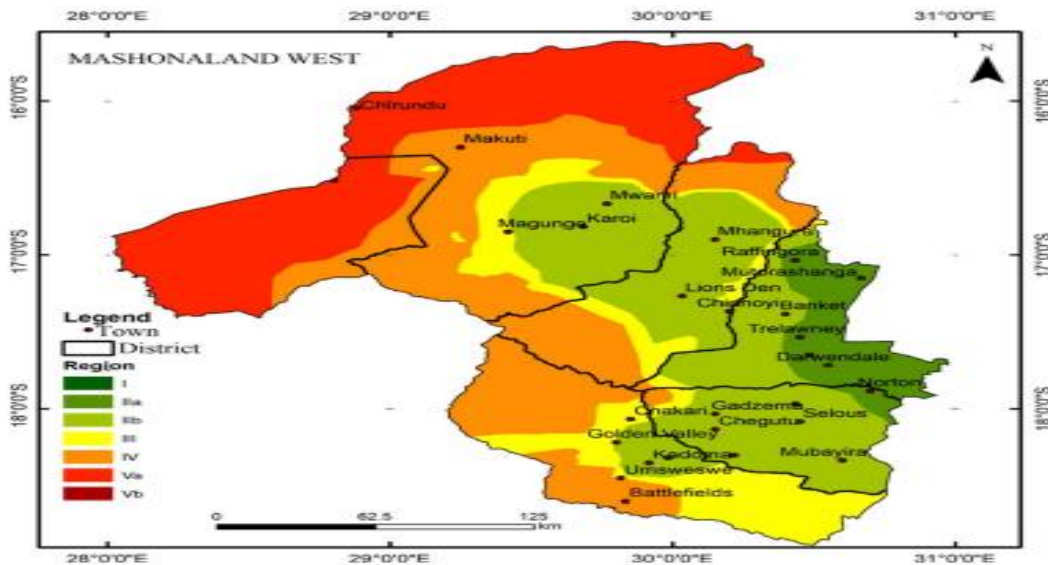


Figure 1: Map of Mashonaland West Natural Regions: Adapted from ZINGSA AEZ (2020)

In terms of climate as highlighted in the map above, the climate of the province is quite diverse and very dense in nature; as different areas in the province have varying climatic conditions which make it a unique province in Zimbabwe. As can be noted, the province has areas found in AEZ 2a, 2b, 3, 4 and 5a which is unique in nature as shown above. The rains normally received in the province as a whole range from 500mm-900mm a year (Chiweshe, 2019). The province is known for its agricultural endeavours which include crop cultivation and livestock production. Crop varieties grown in the province include maize, tobacco, cotton, soya beans amongst others whilst cattle ranching and goat rearing are the livestock production projects that are mainly practised in the province (Mubaya et al., 2017). The province houses one of the biggest GMB silos in Zimbabwe which are the Lion’s Den Silos. Having painted this picture of the Mashonaland West Province, the study focuses on the Post-Fast Track Resettlement Farms found in Zvimba District whose profile will be given below.

### 1.3.2 Zvimba District

The study was carried out in Zvimba, a district located in Mashonaland West Province of Zimbabwe which is in central northern Zimbabwe. Zvimba District is bordered by Guruve District to the north, Mazowe District to the east, the city of Harare to the southeast, Chegutu District to the south, Kadoma District to the southwest and Makonde District to the west and northwest. Its main town, Murombedzi, is located about 110 kilometres (68 mi) by road west of Harare the capital and largest city of Zimbabwe (Kamwi et al, 2018). The current population of

Zvimba District is 348 002 according to the last census of 2022 (ZIMSTAT, 2022). Of this population 50.6 per cent are females while males constitute the remaining 49.4 per cent. By population size, Zvimba Rural District is the second largest in Mashonaland West after Hurungwe and has 17.5 per cent of the total provincial population. The district is boarded by six other districts and its main town is Murombezi. The coordinates of the district are: 17° 42' 0.00" S, 30° 12' 0.00" E (Kamwi, 2019). The district is divided into two main parts; which are Zvimba East and Zvimba West. Zvimba East; which this study will focus on, is much closer to Harare and is more connected to the Chivero catchment area.

Zvimba District is under Chief Zvimba, the custodian of the land and works with various village heads that are found in his domain (GoZ, 2019). The Zvimba chieftainship was founded by Neuteve Chihobvu who migrated from Guru Uswa (Tsvangirai, 2019). When he arrived in the area now known as Zvimba, he complained that his feet were swollen, (*Ndazvimba makumbo*). He was thereafter called Zvimba. The land now called Zvimba then belonged to the Rozvi tribe then headed by Tambare. Tambare allocated the land to Neuteve (Zvimba) and he eventually became the first chief Zvimba (Beach, 2008). The governance of the district is done by the CEO and the DA of the area that are found at the Murombedzi offices in Zvimba. The district is found in the AEZ region 2A which receives close 700mm-1050mm a year (Kamwi, 2018). The district has mostly loam soils; with some of its parts now turning sandy due to human activities that are about to cause desertification of some of the areas. In terms of agriculture, Zvimba District is primarily a farming and ranching district. Crops raised include tobacco, maize and cotton (Mugandari et al., 2012). Cattle are raised for dairy products and beef. The subsistence economy of Zvimba District is based on conservation farming and favourable crops grown in the area; including maize, finger millet, ground nuts, vegetables, and sorghum (ZIMVAC, 2017). The study therefore focuses on the farms that are found in Zvimba East District in Zimbabwe.

#### 1.4 Operationalisation of key Concepts

Gender -refers to socially constructed roles for male and female human beings.

Socio-ecological resilience -refers to the capacity to adapt and transform absorbing any change or disturbance in the people's way of life and their environment in a sustainable manner.

Post-Fast Track Resettlement Farms -are resettlement areas created after the year 2000 through the FTLRP in Zimbabwe

Women- an adult female human being in community

### 1.5 Contribution of the study

The study contributed literature to the already established body on climate change and the socio-ecological resilience of women smallholder farmers by bringing in experiences of Zimbabwe women farmers on PFTRF. Through helping to bring out how human society adapts to multiple negative factors when placed in a new and challenging environment, the study will help donor community in championing adaptation science in marginalised communities. The study will help in informing socio-ecological resilience policy through bringing to the fore; women's contextual socio-ecological resilience realities in Zimbabwe. In addition to this, this research will also help in developing sustainable socio-ecological resilience mechanisms to deal with climate change for farming economies in developing countries which are crucial for governments in planning ahead. Considering this, the sustainability attribute in socio-ecological resilience, on which this research is focused, brings to the fore sustainable resilience measures, efforts, and policies, which add to contextually, socially, and environmentally feasible development pathways, and which place both social justice and environmental integrity concerns at the centre. By doing so, the research sought to change the dearth in literature on PFTRFs women's livelihoods, socio-ecological resilience experiences based on the impact that these actions have on sustainable development and add to the deficit in literature on sustainable resilient action in contemporary Zimbabwe. The study also developed a transformative gender sensitive socio-ecological resilience model for PFTRFs livelihood transformation for women farmers, donors, and governments to help in climate proofing societies.

### 1.6 Thesis structure

This thesis is structured as follows:

Chapter One provided an introduction of the problem under investigation, contextualising the study and providing a brief outline of the research problem and the research objectives. The chapter set the tone of the argument through presenting the thesis' standpoint in the key argument for this study; which grapples with the question that does gender issues influence the level of socio-ecological resilience of women's livelihoods in PFTFs in Zimbabwe?

Chapter Two contains the review of literature on resilience to climate change from a broad and general perspective, cascading down to a more specific perspective. In this chapter, the gaps and

spaces in areas of climate change and socio-ecological resilience in communities are unravelled based on the revealed literature. Based on these gaps, the need to research the relationship between gender and socio-ecological resilience of women's livelihoods in PFTRFs and the conceptual framework for analysis is developed.

Chapter Three outlines the methodology that was employed in conducting the study. The research design, population, sampling procedure and sample size the data collection and data analyses procedures used in the study as well as the ethical considerations that were observed are explored. The chapter also outlines some of the methodological challenges faced and how these were addressed.

Chapter Four provides a context for the study and examines the background features within which this study was grounded. The chapter presents the natural environment of Zimbabwe, analysis of settlements in Zimbabwe and the climate change overview of the whole country. Through this base, it is able to expose the socio-ecological resilience of women's lives and livelihoods in PFTRF.

Chapter 5 presents a profile and the climatic changes in selected Post-Fast Track Resettlement Farms in Zvimba West District. The chapter presents the geophysical, socio-economic, and political set up of the three farms under study. Furthermore, the demographic components of women households are also discussed as well as the climate of Zvimba East District. Through this, the basis of argumentation of the way of life in regarding adaptation and resilience to climate change is examined.

Chapter 6 describes the research findings; specifically detailing the climate change impacts on women farmers in post-FTLRP in Zvimba East District. The chapter spells out clearly how women have been impacted by climate change negatively across the three farms. A holistic analysis of how the women's socio-economic, political, and ecological environment was directly and indirectly impacted by climate change is discussed.

Chapter Seven also presents the research findings with a specific focus on women's responses to climate change in Zvimba East District PFTRP farms. The chapter discusses mainly the on-farm, off-farm, and non-farm responses of women to climate change in the selected PFTRFs. In doing so, an analysis of how socio-ecologically resilient these means and ways adopted is done which

set the need and basis for the development of the transformative model for socio-ecological resilience to climate change in PFTRFs.

Chapter Eight is the final chapter of this thesis which discusses the research findings. It presents a model as well as the summary and conclusions of the study. The study discusses how the climate has been changing in the PFTRFs, and how this is impacting on the lives and livelihoods of women. However, in as much as women have been impacted, they have responded to these impacts through several on-farm, off-farm and non-farm innovations. Nevertheless, the chapter shows that the level of socio-ecological resilience of these innovations remains questionable as most of these are highly unsustainable. Based on this transformative model for socio-ecological resilience to climate change in PFTRFs has been developed to assist in boosting sustainability of adaptation innovations adopted by the women in PFTRFs.

### 1.5 Chapter Summary

The chapter set the tone of the whole study through giving a background on the problem of socio-ecological resilience to climate change in Post Fast Track Resettlement Farms in Zimbabwe. The chapter presented the background information on how the problem of climate change had been affecting communities that have been resettled; particularly the women in these farms in Zimbabwe. The chapter spelt out this problem which forms the crux warranting this study. The chapter set the foundational base upon which the need to understand how women farmers adapts to multiple negative factors since being resettled in the Post-Fast Track Resettlement Farms in Zimbabwe. Hence the investigation of how gender influences the socio-ecological resilience to climate change of women in Post-Fast Track Resettlement Farms in Zimbabwe is explored.

The chapter introduced the study, particularly focusing on the background of the problem at hand which is that of climate changing affecting women's lives and livelihoods in Zimbabwe in Post-Fast Track Resettlement Farms. The chapter further presented the statement of the problem and aims of the study which form the crux of the study at hand of the need to understand how gender influences the socio-ecological resilience of women to climate change and the need for development of a transformative approaches in these farms. The research questions from which the findings of the study are hinged in the ensuing chapters were also presented. The chapter then highlighted the contribution of the study which were spelt based on knowledge contribution and innovations set for the women farmers, donor community and governments in helping build socio-

ecological resilience of women farmers to climate change in Zimbabwe and all over the world. The chapter then closed off with the thesis structure that outlines how the thesis is structured.

## Chapter 2: Gender And Socio-Ecological Resilience To Climate Change: A Global, Regional And Local Perspective

### 2.1 Introduction

This chapter presents a review of literature on climate change, gender, and resilience to climate change in various parts of the world. The chapter begins by highlighting the various conceptual issues that are associated with the study at hand and moves on to the Anthropocene factors leading to climate change. The chapter further investigates the regional and local issues concerning climate change and gender. It goes on further to look at resilience in Zimbabwe and the means and ways that are currently being utilised by women in Zimbabwe to be climate change resilient. The chapter closes by also looking at the theoretical framework upon which the study is hinged on. The development of the model in the discussion chapter shall be stemming from the socio-ecological systems theory. The chapter concludes by highlighting the gaps that have been identified in literature and how the ensuing study will cover them.

### 2.2 Understanding gender, climate change and socioecological resilience

For this study on climate change, livelihood responses and their socio-ecological sustainability within the context of women, focus will be on the main concepts which are gender, climate change, livelihoods, and socio-ecological resilience. These concepts are further developed into a gender and socio-ecological resilience to climate change framework.

#### 2.2.1 Gender

The understanding of gender as a concept has been complex, as various schools of thought conceptualise it differently; based on the realities of the contexts they write in (Ryaparol, 2016). Most scholars postulate and conceptualise gender as both identity and practice, not just a concept as it is a fluid concept (Dancer and Tsikata, 2015). Linked to the above in homogenising women is the discourse of climate change (Winker and Degele, 2011). Studies integrate the experiences of women without reflecting on differences based on their social location of class and ethnicity, alongside geographical and agro-ecological contexts (Rao et al., in Babagura, 2009). However, in discussing the concept; the analytical and multi-layered gender struggles are not revealed beyond men and women dichotomies. For Kaijser and Kronsell (2014), an intersectional analysis of climate change illuminates how different individuals and groups relate differently to climate

change due to their situatedness in power structures based on context-specific and dynamic social categorisations.

Many scholars define ‘gender’ in different ways. According to Bhatasara (2015), the notion of ‘gender’ refers to the state of being male or female as socio-culturally prescribed and socialised. Other scholars such as Barnejee and Bell (2007) explain that gender refers to the roles and responsibilities of people that are created in the families, societies, and cultures. In line with this, Bakare-Yusuf, and Bibi (2003) note that the concept of gender also includes the expectations held about the characteristics, aptitudes and likely behaviours of both women and men (femininity and masculinity). Gender roles and expectations are learnt, and they influence the day to day running of societies (Doss et al., 2018). A key problematic tendency is conflation of gender and women in Zimbabwe (see Dube et al., 2017, Phiri et al. 2014, Chimanikire, 2013; Mudzengi et al., 2013; Musiyiwa et al. 2015).

#### 2.2.2 Climate change

According to Gallopin (2016), climate change is the long-term alteration of temperature and typical weather patterns in a place. Babagura (2008) notes that climate change then refers to the long-term change in the earth’s climate caused by the release of greenhouse gases – notably carbon dioxide and methane – that trap heat in the atmosphere. Intergovernmental Panel on Climate Change (IPCC) (2018) further notes that climate change includes major changes in temperature, rainfall, or wind patterns among others that occur over several decades or longer. Climate change varies from place to place and from position to position, depending from whose lenses one views it. From a scientific point of view, climate change has been characterised by various pointers (IPCC, 2014). It could refer to a particular location or the planet. Climate change may cause weather patterns to be less predictable (IPCC, 2017).

Nevertheless, from a sociological view; climate change is viewed differently by various scholars who shape interpretations of the phenomena (Bhatasara and Nyamwanza, 2018). In areas like Africa where there have been massive droughts and heat waves, locals have interpreted the occurrences from a socio-religious perspective, based on local legends. Mutasa (2011) argues that the 1992 and 2002 droughts in Zimbabwe were interpreted as effects of the anger of the gods upon the locals for profaning the land. The Masai and the Luo have often interpreted the occurrences of the shift in temperatures as the sign given by the gods for them to abandon the place and move to



better pastures, following the Inter-Tropical Convergence Zone (ITCZ) (Chikozho 2010). Thus, from this analysis, it can be noted that interpretations of the issues of climate change differs for local people in the rural areas as it is perceived differently, based on their understanding of the phenomenon. As most of its ravaging impacts such as diseases, droughts and floods have also a bearing in culture, their attribution to climate change remains vague as most of these have local cultural interpretations.

In understanding the causes of climate change, the IPCC (2021) report notes that among the most striking environmental challenges affecting the earth are anthropogenic changes. Climate change is defined by several factors, including temperature, humidity, rainfall, air pressure and wind and severe weather events (IPCC, 2018). The Intergovernmental Panel on Climate Change (2017) has reported that the average temperature of the earth's surface has risen by 0.74 °C since the late 1800s. Of the 12 warmest years in the record of global surface temperature since 1850, 11 occurred between 1995 and 2006. The linear warming trend over the 50 years from 1956 to 2005 (0.13 [0.10 to 0.16] °C per decade) is nearly twice that for the 100 years from 1906 to 2005 United Nations Framework Convention on Climate Change (UNFCCC 2019).

From another perspective, Bhatasara and Nyamwanza (2018) explained that global warming is causing adverse impacts on the biophysical environment; ranging from the melting of major glaciers and sea level rise to increased weather hazards and biodiversity loss. With reference to climate change trends experienced in sub-Saharan Africa, Chichewa (2019) points out that the region has experienced a warming trend and increased climate variability over the past few decades. Smith et al. (2018) suggest that temperatures in the sub-region have risen by over 0.5 °C during the last 100 years. During this period, the sub-region has also experienced a downward trend in rainfall (Musendo, 2020). In the early 1990s rainfall in the region was 20% lower than that in the 1970s, with significant droughts in the 1980s, early 1990s, and in 2002 (Thebe, 2015).

### 2.2.3 Livelihoods

The term 'livelihoods' refer to people's means of supporting themselves during their lifetime (Chambers and Cornwall, 1992). Livelihoods relate to 'locales' such as rural or urban livelihoods; 'occupations' like farming, pastoral or fishing livelihoods and 'social difference' such as gendered, age-defined livelihoods. It also refers to 'directions' like livelihood pathways and trajectories;

‘dynamic patterns’ such as sustainable or resilient livelihoods and many more. A variety of definitions are offered in scholarly literature, including, for example, “the means of gaining a living” (Chambers 1992:9) or “a combination of the resources used, and the activities undertaken in order to live” (Chambers, 1995:6)

## 2.2.4 Resilience

### 2.2.4.1 Definition of Resilience

The term ‘resilience’ may be perceived differently. Kasimba (2014) compiled the following definitions of ‘resilience’:

Mayunga (2007: 2)	“...the capacity or ability of a community to anticipate, prepare for, respond to, and recover quickly from impacts of disasters”.
Plodinec (2009: 7)	“...the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change”.
Holling (1973: 14)	A measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables.
Aldrich(2012: 7)	The ability of the neighbourhood, ward, or area to engage in a positive networked adaptation after a crisis or a neighbourhood capacity to weather crises such as disasters and engage in effective and efficient recovery through coordinated efforts and cooperative activities.
Ainuddin and Routray(2012: 26)	The ability of the social system to respond to and recover from disasters. It includes those inherent conditions that allow the system to absorb impacts and cope with an event.
Walker et al., (1981: 495)	“...the ability to adapt to change by exploiting instabilities” and that it is <i>not</i> simply “the ability to absorb disturbance by returning to a steady state after being disturbed”

Figure 2: Definitions of resilience: Adapted from Kasimba (2014)

### 2.2.4.2 The Disaster Resilience Paradigm

The disaster resilience paradigm has gained currency since the start of the new millennium. Central to the ‘resilience paradigm’ is stronger emphasis on capabilities and the ways people and communities deal with crises and disasters (Mazwi 2020, United Nations International Strategy for Disaster Reduction (UNISDR) 2010). A resilient community is ideally the safest possible disaster-prone community that has the ability to overcome the damages brought about by disasters; either by maintaining their pre-disaster social fabric or by accepting marginal or larger changes in order to survive (Mudimu, 2018). Manyena’s (2014) deconstruction of resilience illustrates that its evolution has not been straightforward. According to Gunderson et al., (2002: 5), “resilience can be defined from two different perspectives namely ecological and engineering perspective”. Engineering refers to “the speed of return to the steady state following perturbations” (Gunderson

et al., *ibid*). It also refers to “a single stable state or equilibrium, to which a system has to return after a major disturbance” (Wilhelm, 2011:35). This understanding of resilience is applicable in the disciplines of physical science and material engineering. “Ecological resilience recognises multiple equilibrium states or domains of attraction, within a basin of attraction” (Wilhelm, 2011: 35).

Allison and Hobbs (2004: 6) note that “ecological resilience focuses on three fundamental themes that include resilience and adaptive change from one state to the other in systems with multiple stable states; cross scale interactions (anarchy) and lastly, reorganisation and renewal after perturbations and disturbances using heuristic models or metaphors of adaptive cycles linked across spatial and temporal scales”. As a result of the existence of multiple, contradictory, and complementary definitions, Mayunga (2007: 31-32) postulates five main defining features of resilience as follows:

#### 2.2.4.3 Five Main Feature of Resilience

According to Mayunga, (2007), there are five main features of resilience namely its self-organising capacity, long-term recovery process, being the opposite to vulnerability, its ability to engender sustainability as well as adaptability.

##### 2.2.4.3.1 Self-organising Capacity

Resilience focuses on the functioning of the system and its self-reorganising capacity in the face of a disaster. This means that the community should be able to adapt quickly following a disaster and it should be able to function effectively, as was the case before it was hit by a disaster. However, this is to some extent questionable since a disaster can damage infrastructure and disrupt some livelihood activities. Such a scenario makes the lives of community members more vulnerable.

##### 2.2.4.3.2 Long-term Recovery Process

Resilience takes a long-term perspective which involves a long-term recovery process after a disaster. This means that resilience can be measured in terms of the time it takes to recover or come back to normalcy; often referred to as ‘equilibrium’. A resilient community in Mayunga’s (2007: 31-32) view is, “one that resumes its previous growth trajectory quickly”.

##### 2.2.4.3.3 Resilience as Opposite to Vulnerability

Resilience is understood as the opposite of vulnerability. This means that “the more resilient the community, the less vulnerable the community is regarded,” (Handmer and Dovers, 1996: 487).

#### 2.2.4.3.4 Sustainability

Resilience contains the notion of sustainability which Mayunga (2007: 4) defines as a “long-term survival at a non-decreasing quality of life”. This concept allows the community to use resources wisely and more sustainably.

#### 2.2.4.3.5 Adaptability

Adaptation is regarded as being of the core of community resilience. Adaptation is also the ability of a system to adjust to a disaster to reduce its vulnerability and enhance its resilience. That means individuals should be able to adapt or adjust to adverse conditions imposed by a disaster.

#### 2.2.5 Socio-ecological resilience

According to Folke (2006), social-ecological resilience is the capacity to adapt or transform in the face of change in social-ecological systems, particularly unexpected change in ways that continue to support human well-being (Margis, 2010). It recombines experience and knowledge, learning with change, turning crises into windows of opportunity and governing transformations for innovative pathways in tune with the resilience of the biosphere (Manyena 2014; Oparinde and Hodge, 2011). According to Cumming (2005), system components can be thought of as the pieces of the system that interact in a dynamic way. These components include; for example, human actors of various kinds, particular ecosystem types or habitat types, resources, goods and materials, as well as abiotic variables. System components interact or fit together. Examples of relationships are nutrient cycles, food webs, economic and ecological competition, land tenure, and interactions between human actors (Quismbing and Meinzen, 2001). To be able to analyse the rural area as a complex social-ecological system, the system should be divided into simple units.

Social-ecological systems are complex adaptive systems where agents often interact in unplanned and unpredictable ways (Meinzen et al., 2019). These interactions underlie the emergence of broader scale patterns that give feedback on the system and influence the interactions of the agents (Levin et al., 2013). Hence the properties of complex adaptive systems change because of the interplay between the adaptive responses of the parts (or agents) and the emergent properties of the whole (Levin, 1999; Lansing, 2003). Causation is often nonlinear in complex adaptive systems; with the potential for chaotic dynamics, multiple basins of attraction and shifts between pathways or regimes; some of which may be irreversible. The dynamic interaction of variables of slow and fast change makes it difficult to know when such dramatic changes may occur and to pinpoint cause-and-effect mechanisms (Scheffer, 2009; Rocha et al., 2015).

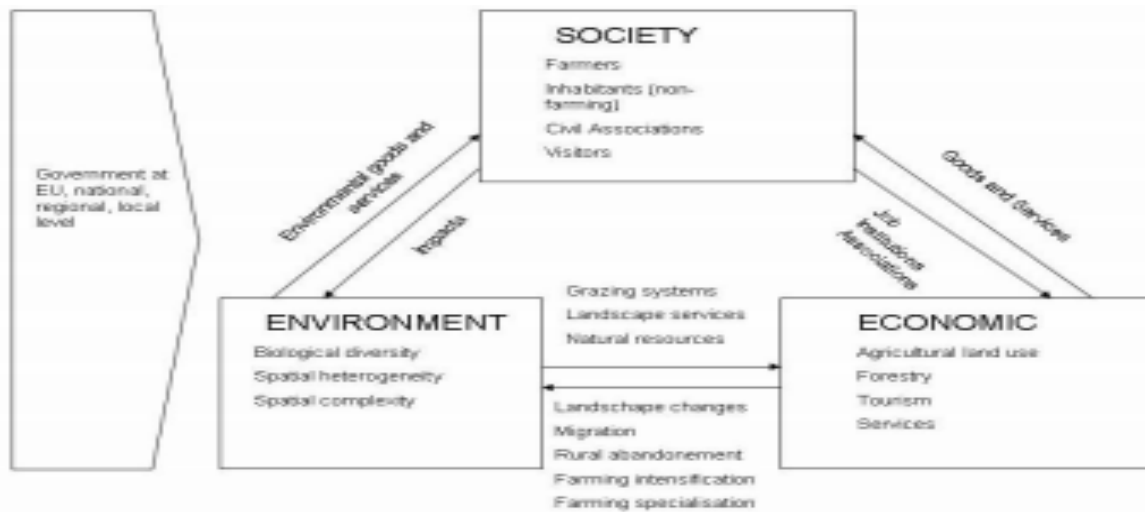


Figure 3: Relationship between society, economy, and environment in developing resilience in communities

### 2.3 Overview of climate change issues across different spaces in the world

Climate change has become a topical issue across the world as it has had devastating impacts on the socio-economic and political impacts. This section gives an overview of the global issues of climate change as well as the regional and local issues of climate change, particularly focusing on the different climate change issues happening across the world in the different developing communities around it.

#### 2.3.1 Global Perspective: Anthropocene factors leading to climate change

The period since the Second World War has been marked by rapid and accelerating changes to many aspects of human society and the environment (Clark et al., 2004; Steffen et al., 2011; Steffen et al., 2015a). There is accumulating evidence and rising concern about the potential consequences these changes hold for key earth system processes at a global scale, affecting human well-being and prosperity into the future (Krausmann et al., 2013; Steffen et al., 2015b). The ‘anthropocene’; as this new era of extensive human impact on the earth has come to be known (Crutzen, 2006), manifests in a closely intertwined set of social and ecological changes. Technological advances, increasing human population, rising levels of wealth and consumption, and the institutional arrangements we have developed to govern our economies and societies interplay with one another, and drastically affect the earth’s climate, biological diversity, freshwater and biogeochemical flows, and levels of novel pollutants in the environment (Steffen et al., 2015a).

In turn, these environmental changes contribute to increasingly frequent and severe droughts (Dai 2013; Trenberth et al., 2014), floods (Milly et al., 2002; Nicholls, 2004), heatwaves (Guo et al., 2018; Oliver et al., 2018) and the emergence of novel pathogens such as SARSCoV-2 (Everard et al., 2020; O’Callaghan-Gordo and Antò, 2020; Schmeller et al., 2020) that can lead to massive societal disruption and hardship, especially among the poor (Wheeler and Von Braun, 2013; Barbier and Hochard, 2018). The intertwined social and ecological changes that underlie the ‘anthropocene’ are further reflected in a world that has become highly connected through technology and trade (Green et al., 2019; Keys et al., 2019; Nyström et al., 2019). Nowadays, it is difficult to keep track of the geographic origin of our food, or to account for the various components making up the mobile phones we use every day.

Horcahrd (2018) explains that while this connectivity has brought about impressive improvements to many people in terms of the distribution of food and other resources around the world, it has also resulted in conglomerations of markets and resources; making it difficult to trace and hold accountable those polluting rivers and degrading ecosystems. Large and often geographically distant supply chains of resources have increased access to and human consumption of many goods, but have simultaneously had devastating consequences for biodiversity and species habitats, without consumers feeling accountable for or being aware of these impacts (Lenzen et al., 2012; Wilting et al., 2017; Liu et al., 2018). Vast global extensive supply chains have also contributed to widespread inequalities between and within countries (Costinot et al., 2012; Galaz et al., 2018). This multi-dimensional connectivity also means that decisions in one country or part of the world can have far-reaching consequences for other places or countries – economically, socially, and ecologically (Luemn, 2020).

As noted in scholarly literature, in some regions; small-scale fishers, for example, are now often directly and indirectly connected to distant markets, causing them to be more vulnerable to unrelated threats and disturbances such as economic changes in distant economies (Crona et al., 2015; Stoll et al., 2018). Similarly, the interdependence of countries in food supply reduces resilience and increases vulnerability as supply chains are broken (Kummu et al., 2020). The pressing environmental and social sustainability challenges we face in the 21st century is clearly deeply intertwined. These challenges result from the confluence and interaction of multiple,

mutually reinforcing social and ecological processes at multiple scales (Folke et al., 2016), where social processes include economic, political, cultural, and technological processes, and ecological processes include ‘biotic’ aspects like population dynamics and food web interactions as well as abiotic processes such as nutrient flows and climate patterns.

IPCC (2021) notes that the climate emergency and other environmental changes are underlain by a complex, interacting array of social changes; which themselves are shaped by the environment and environmental disruptions. Similarly, Posen (2020) explains that problems of poverty and inequality are often linked to and exacerbated by environmental change and disruption. Ethiopia, for example, has become one of the most food-insecure nations in the world due to complex interactions between environmental degradation, diminishing land holdings, outbreaks of crop and livestock disease, poor infrastructure, political insecurity, and pre- and post-harvest crop losses that have systematically eroded the productive assets of households (Mohamed, 2017; Bahru et al., 2019). Factors outside a country also play a role in perpetuating food insecurity in that country. This includes discourses about how to address these problems which are driven by notions of intensification, commercialisation (Jiren et al. 2020) and land acquisition by other countries for their own benefit (Hules and Singh 2017).

Nevertheless, the key sustainability challenges of the 21st century cannot be addressed without recognising the systemic, intertwined nature of these problems (Liu et al., 2015). The recognition that environmental and social sustainability challenges are inherently systemic and intertwined, and the escalating urgency to address these challenges have driven a paradigm shift in how social and natural systems are studied (Schoon and Van der Leeuw, 2015). In most scientific disciplines, humans and nature have been treated as separate entities (Folke et al., 2016). Ecology, for example, has often viewed social systems only as external drivers of ecosystem dynamics (Carpenter et al., 2012; Cumming 2014), whereas economics and other social sciences have considered natural systems simply as resources for extracting capital gains or providing a basis for livelihoods (Gunderson and Holling 2002; Berkes, Colding, and Folke 2003).

In recent decades, however, this thinking has been widely contested and is changing, partly influenced by the rise in systems sciences and complexity thinking (Preiser et al., 2018). Scholars

in different disciplines are increasingly viewing human systems as interdependent, inseparable, and intertwined with ecosystems, embedded within and dependent upon the biosphere and the broader Earth system (Folke et al., 2016; Reyers et al., 2018; Schlüter et al., 2019). Furthermore, there is growing recognition of the need for knowledge production processes that account for and engage with the complex interconnections and interplay between the social and the ecological, and the emergent and often unexpected processes, features, problems, and opportunities to which they give rise to (Preiser et al., 2018).

### 2.3.2 Regional perspective on climate change resilience and gender issues

In sub-Saharan Africa for example, even small temperature increases and changes in precipitation patterns could affect the dynamics of disease transmission and crop yields, with dire consequences for household health and income (World Bank, 2012). Spikes in global food prices can be attributed to a confluence of a myriad of factors. In spite of that, the intensification of the impacts of climate change will become amplified in the future; imposing pressure on cereal prices, especially maize and wheat, which will likely have dire and gender-differentiated implications for food and nutrition security as well as overall household well-being (Yohe, 2018). However, the impacts of climate change on cereal yields will be variable across Africa. Crop yield models show that the maize yield in southern Africa will decrease by 14 percent by mid-century and by 33 percent by the end of the century because of climate change (Chingarande, 2008).

Considering this, there is evidence that warming in the highlands of eastern Africa could lead to altitudinal range expansion of crop pests to areas where they have been cold; thus significantly reducing coffee and banana yields, which are important cash crops both for large and smallholder subsistence farmers (Mavhura et al., 2011). The Striga weed causes major cereal yield reduction in much of sub-Saharan Africa. Cotter et al., (2012) estimate that changes in temperature and variations in the seasonality of rainfall will increase the geographic range of suitable land for Striga in central Africa. It is estimated that the livestock sector contributes to the livelihoods of one billion of the poorest population in the world and employs nearly 1.1 billion people, most of whom are women (Banerjee and Bell., 2007).



Climate change has affected livestock production through competition for natural resources, quantity and quality of feeds, livestock diseases, heat stress, and biodiversity loss (Gallop et al., 2016). Temperature rises have increased cell wall and lignin components that will in turn reduce digestibility rates; leading to a decrease in nutrient availability in forage and feeds (Thornton et al., 2009). In non-pastoral mixed farming areas in East Africa, it is estimated that livestock production was affected indirectly by a decline in maize crop residue availability due to a decrease in maize production by 2050 (Thornton, 2010). Concerning human health, climate change influenced the incidence and geographic distribution of vector-borne diseases like malaria and Rift Valley fever (Thebe et al., 2015). Hence, interventions aimed at building adaptation and resilience must consider gendered impacts on pastoral households (Manyena, 2006). There is a growing understanding that the biophysical impacts of climate change are interlinked with socio-economic, institutional, and demographic factors and interact in complex and often non-linear ways to overwhelm the capacity of households or communities to adapt or cope. This is especially so where gender disparities and social and economic justice are not addressed.

UNFCCC (2020) notes that climate change is now acknowledged as an amplifier of existing socio-economic inequities. Long-standing socioeconomic disparities among people are amplified by large orders of magnitude often through punitive customs and social norms, control over or access rights to assets or capital endowments. Assets or capital endowments may include social, physical, financial, natural, political, and human capital (Meinzen-Dick et al., 2011). In the context of climate change impacts on livelihoods and household wellbeing, control over or access rights to assets is critical for women and the poor, where social capital, secure land rights, livestock, and technology can enhance the ability of households to adapt and cope with climate shocks. With the heightened focus on adaptation to climate change, the need to recognise and address the uneven distribution of vulnerability to and gender-differentiated impact of climate change is critical.

The Paris Agreement (2015) acknowledges that adaptive action should follow a gender-responsive approach. The enhanced gender action plan sets five priority areas that aim to advance knowledge and understanding of gender-responsive climate action. The review of available literature and data on the differentiated impact of climate change on women in Africa has shown that with available, albeit scanty and often non-disaggregated evidence, climate change impacts on the livelihoods of

women, with a focus on five areas, namely: (i) agricultural production; (ii) food and nutritional security; (iii) health; (iv) water and energy; (v) climate-related disaster, migration, and conflict (Gukurume, 2014). Mashizha (2014) reviews existing literature and identifies options for gender-responsive actions across the five impact areas in order to enhance adaptive and mitigation actions to secure the well-being and livelihoods of women.

### 2.3.3 Climate change Overview in Zimbabwe

In Zimbabwe, climate change has caused average temperatures to rise by about 1.5-2 degrees at the turn of the new millennium (Sigel and Siegel, 2021). Annual rainfall declined by between 5 % and 18%, especially in the south (Ndebele, Grab and Turasie, 2020) and rainfall has become more variable. One of the notable things happening in Zimbabwe is an increase in droughts, floods and storms. Chikonzi et al., (2013) note that climate implies the long-term average of the individual weather conditions that communities experience every day. Most scholars suggest that it is amongst the most important determinants of survival and human livelihoods (Gukurume 2014, Chiweshe, and Bhatasara, 2015). In Zimbabwe, the mean annual temperature has increased by ~0.01 to 0.02°C/year over the time period 1950-2002, with medium statistical confidence (Phukubye, 2022). According to the Zimbabwe Meteorological Service (Phkubye et al 2022), daily minimum temperatures have risen by approximately 2.6°C over the last century, while daily maximum temperatures have risen by 2°C during the same period. In addition, the number of cold days have decreased, and hot days have increased. An increase in hot days and nights, and a decrease in cold days and cold nights in recent decades is consistent with the general warming trend (IPCC 2018).

In addition to this, the reductions in average annual rainfall from 1950-2002 in Zimbabwe, have low statistical confidence. IPCC (2020) notes modest observed reductions in annual rainfall in Zimbabwe. The last 30 years have shown a trend towards heavy rainfall and drought occurring back-to-back in the same season in Zimbabwe (Dube, 2023). The frequency and length of dry spells during the rainy season have increased, while the of rainy days has declined. There is low to medium confidence in historical extreme temperature and heavy rainfall trends over most of Zimbabwe; partly due to lack of data and conflicting information (Matsa, 2020).

Furthermore, Mutasa (2018) notes that the timing and amount of rainfall received are becoming increasingly uncertain, with the last 30 years having shown a trend towards reduced rainfall or heavy rainfall and drought occurring back-to-back in the same season. Shifts in the onset of rains have been observed, with increases in the proportion of low rainfall years, and escalation in the frequency and intensity of mid-season dry-spells (Unganai, 2019). The frequency and length of dry spells during the rainy season have increased while the recurrence of rainy days has declined (Dube, 2023). In Zimbabwe, drought has increased in frequency and intensity. Due to climatic changes in the country, groundwater recharge rates have gone down, although there are no generally known estimates (Sigiel and Sigiel, 2021). This suggests evidence of the negative impact of climate change in Zimbabwe.

Mutopo (2018) highlights that given the growing evidence of climate change and its potential negative impacts on livelihoods; particularly those of the poor and vulnerable rural farming households and communities of Zimbabwe, vulnerability to the phenomenon of climate change has been growing. The level of vulnerability is particularly widespread, given that the rural population in Zimbabwe, as in other sub-Saharan countries, comprises about 70% of the national population (Climate Change Management Department, 2021). In line with this, Chiweshe (2019) underscores the adversity of the downstream externalities of global climate change which have ravaged livelihoods in the rural communities around Zimbabwe. While the body of knowledge on climate change, its negative impacts, vulnerability, and adaptation has grown significantly over the recent years, every local community has its own challenges associated with climate change (Musendo, 2020). In terms of knowledge gap, until recently, work investigating the impacts of and responses to climate change tended to be more prolific in the northern hemisphere. It is therefore pertinent that the long history of neglect of research on climate change and its impacts in the southern hemisphere be addressed; a gap which this study sought to fill.

#### [2.3.3 1. Climate change overview in Post-Fast Track Resettlement Farms in Zimbabwe](#)

Climate change has been affecting the world in different ways which are socio-economic and political in nature (Bhatasara, 2015). Developing nations have been increasingly on the receiving end as these have lacked the ability to be resilient in the times of climate change. In line with this, Folkes (2006) reveals that due to climate change; the relationship between human beings and the environment has been heavily manipulated, with human beings exploiting the environment more

due to the need to adapt to climatic changes affecting their livelihoods. In as much as this has been noted, analysis of the level of socio-ecological resilience of livelihoods employed by various groups of women that are found in the Post-Fast Track Resettlement Farms in Zimbabwe has been lacking (Musendo, 2020).

In the context of Africa and Zimbabwe in particular, most of the vulnerable populations of women and children have been suffering due to climate change because of their inability to adapt and become resilient (Berkes et al., 2013). In response to these scourges, they have responded through several livelihood options that function as safety nets. Mutopo (2009) observes that since the precolonial, colonial, and post-colonial times, women have contributed to the welfare of families. They have been responsible for farming, gathering of fruits, looking after children and the health of their family. Norris et al (2008) explains that from the pre-colonial up to current times, women have been involved in productive livelihoods such as gathering of fruits, farming and even fishing, which is considered important. They have contributed to the welfare of their families economically and in times of climate stresses. Nevertheless, the sustainability and level of socio-ecological resilience in times of climate change in the context of transformation of large commercial farms into A1/A2 farms has not been fully assessed in Zimbabwean scholarship.

Furthermore, because Zimbabwe is an agricultural state powered by women in its subsistence farming, climate change has affected the country's productive capacities more profoundly and has affected the resilience of families in rural areas (Sachikonye, 2012). Women have been engaging in various economic endeavours such as fishing, brick making, pottery and weaving to sustain themselves. In addition to this, Gallopin (2016) explains that rural women have been involved in many livelihood activities which include pottery, weaving, basketry, and brickmaking amongst others. However, an examination of how these activities are socio-ecologically sustainable and friendly has been lacking in most works on livelihoods in Zimbabwe. With the fast-changing climate, a danger has been posed on the socio-ecological set up of rural communities in Zimbabwe as these forms of resilience are affecting the environment. Hence considering this, this study sought to assess the level of socio-ecological resilience of women in Post-Fast Track Resettlement Farms livelihoods in Zimbabwe.

Challenges for the agricultural sector indicate that current trends in population growth will continue; with population more than doubling from 13.1 million in 2012 to 29.6 million in 2050

and further skyrocketing to 40.2 million in 2100 (Mtekwa, 2014). The rapid population growth of 2.8 percent per year (Gukurume, 2013) is likely to exacerbate the competition for and degradation of the natural resource base, contributing to an increase in Green House Gas (GHG) emissions, and intensifying vulnerability to climate-related hazards (Mtekwa, 2018).

Bhatasara (2017) pontificates that the country is already experiencing food insecurity as it is struggling to meet its strategic grain reserves which are targeted at 500,000 tonnes in physical stock, especially considering recurrent weather extremes such as droughts and prolonged dry periods. Drought is a major challenge for agriculture, affecting both crops and livestock. In 2015 agricultural output fell by 5 percent and in 2016 by a further 3.6 percent (Mutopo, 2018). Both years were associated with drought conditions, with the recent 2015/16 El Nino-induced drought, which left 2.8 million people food insecure in the country (GoZ, 2011).

Deforestation is a key risk factor to the natural environment and contributes to soil erosion in most farms in Zimbabwe (Scoones et al, 2010). Most soils in the country are already acidic and highly leached (Acrisols); requiring proper soil fertility management to maintain and enhance production through practices such as integrated soil fertility management, erosion management, livestock management and irrigation water management (Mtekwa, 2019). Government's investment has continued to decline in critical sectors such as agricultural extension, disease control, irrigation, livestock, and mechanisation. National budget allocations for agriculture have consistently gone down, and the country's allocation of 6 percent is below the recommendation suggested in the Maputo Agreement (GoZ, 2013).

Mutopo (2011) notes that critically, farmers lack access to finance from banks and microfinance institutes. The lack of land tenure security for smallholder farmers who acquired land under the FTLRP constrains access to finance, as this land cannot be used for collateral. The lack of title is a limiting factor for agrarian investment in A1 and A2 farms across the country (Musendo, 2017). The presence of crop and livestock pests and diseases is also a challenge, particularly given that climate change may cause changes in their range and occurrence (Bett et al, 2017). For example, 2016 saw the emergence of the fall armyworm which was not previously known in the country, but could cause up to 70 percent maize crop losses if not managed (Cross,2019).

Chiweshe (2018) argues that as Zimbabwe is susceptible to an array of extreme weather events such as droughts, heatwaves, heavy rains, flash floods, intense winds and hailstorms, farmers with

inadequate facilities in most farms allocated under FLTRP have been suffering losses. Even though Zimbabwe's rainfall pattern has always exhibited spatial and temporal variability, the timing and amount of rainfall received are becoming increasingly uncertain, thereby affecting poor farmers who have the land but do not have the means to produce (Chikozho, 2010). In line with this, there has been an overall decline of 5 percent in rainfall across Zimbabwe during the last century (Gallopín, 2016). There have been increased number of years with below normal rainfall since 1980 and escalations in the intensity of mid-season dry spells and/or droughts occurring back-to-back in the same season, which has affected farmers greatly Meterologica Service Department (MSD, 2016).

In the past, rains began in October/early November and ended in April/early May. However, most parts of the country are now only receiving rains as late as 18 December (MSD, 2020). Temperature data show the projected change in Temperature and Precipitation in Zimbabwe by 2050 Zimbabwe National Climate change reduction(ZNCCRS, 2018) Changes in annual mean temperature as well as changes in total precipitation and average temperature have been experienced. Precipitation trends show that there are more hot and fewer cold days than before; which are all factors that have been affecting farming a lot in Post-Fast Track Resettlement Farms (Mutopo, 2010). In addition, the country's mean ambient surface temperature since 1933 has shown a net warming of +0.3°C to 0.6°C (Moyo, 2010).

In line with this, projections of years up to 2070 indicate that average temperatures are expected to increase by up to 2.5 percent, while rainfall is expected to decrease by up to 5.9 percent (Moyo, 2018). As such, Zimbabwe may become both hotter and drier, with huge implications for agricultural production in resettlement areas where most people have little to no resources to cope with farming (Posen, 2010). The south-western parts of the country are expected to experience the greatest increases in temperature of up to 2.2°C increase, while rainfall is expected to decrease most in the central-eastern parts of the country; including parts of Mashonaland Central, Mashonaland East, Manicaland and Masvingo Provinces (Chiweshe., 2018).

#### 2.3.3.2 The Fast-Track Land Reform Programme and Gender Issues in Zimbabwe

According to Mutopo (2009), the fast-track land reform programme was a very critical point of departure in the history of land reform in Zimbabwe. Scoones (2012) explores the view that inasmuch as the reason for the land reform programme was genuine, the manner in which it was

carried out was devastating; leading to collapse of the economy, displacement of people and food scarcity, whilst environmental effects were tragic. According to Bhatasara (2015), though the need for racial equity and equality in sharing of resources was justified, the policy framework of the Fast Track Land Reform Programme in Zimbabwe was devoid of systematic gender considerations. He argues that it was politically motivated and exclusive. Thus, the limited spaces created for women to participate in the implementation process determined the extent to which their livelihoods were secured. In line with this, Chiweshe and Bhatasara (2020: 8) note that amidst all these, an analysis of the FTLRP Zimbabwe shows that it had devastating impact on “gendered subjects of state developmentalism.” In this context, the term “gendered subjects” was used also by Redcliffe (2016) in explaining the position of women in state policies. Not only was this affecting women, but also their socio-ecological resilience in Post-Fast Track Resettlement Farm communities in the context of climate change in Zimbabwe.

According to Chiweshe (2013) the FTLRP in Zimbabwe – code-named Third *Chimurenga* (war of liberation) or *jambanja* (violence) – was characterised by chaotic and violent land invasions which led to the destruction of property, sabotage, beatings and in some cases murder. However, the ordered nature and continued existence of communities that germinated from “*jambanja*” is sociologically intriguing (Scoones, 2013). The Zimbabwean case illuminates important insights into how communities borne out of conflict can sustain themselves through various forms of associational groupings at local level which; in this case, are resettlement farms (Chimurenga, 2013). This was also the case at in farms in Zvimba East District which was invaded from the period of late 1999-2002 where most of the people that gained access to this farm divided the farm amongst themselves (Ndebele, 2021).

In as much as the FTLRP was conducted in Zimbabwe, it did not have frameworks that could be able to support other challenges such as climatic changes which had already started in Zimbabwe (Bhatasara, 2015). Furthermore, it can be noted that in as much as many people got access to land, the ability to sustain themselves at the same time conserving the natural resources that they and found on the farm has been lacking. Gukurume (2018) notes that most A1 farmers in Zimbabwe have farms and plots that are characterised by massive deforestation and heavy soil erosion. Most dams on these farms have dried up as a result of siltation. Both men and women who occupy these

farms lack skills that are especially important for the management of agricultural land that they have been allocated. According to Redcliff (2006), it can be noted that the FTLRP that was done in Zimbabwe was not holistic in nature as it lacked major frameworks that support gender equality and prudent environmental conservation. Thus, during the post FTLRP in Zimbabwe, most farms exist like ghost farms and ghost plots because of how the resources were fast depleted in the scourges of climate change (Mutopo, 2018).

## 2.4 Climate change impacts on women and their responses

Women have been on the receiving end of climate change impacts in developing countries around the world (Prajesh, 2020). They have faced the wrath of climate change ramifications as they are the face of household production in farming communities. This is due to the fact that they are the primary tillers of the land in many developing countries in the world and Africa as a continent. Thus, this section outlines the different impacts of climate change on women in Zimbabwe as a developing countries.

### 2.4.1 Impacts of climate change on women

In as much as the impacts of climate change are felt by all in communities, the effects manifest and are felt more differently by people of different genders in communities. This is mainly so because of the socio-cultural impacts of setup of communities which has made males and females to be so different when it comes to the ability to withstand the impacts of climate change. Due to issues of access to resources in communities, men and women are thus different in how they are impacted by climate change and how they react to climatic changes happening in their communities.

#### 2.4.1.1 Impact of Climate Change on Agricultural Production

Bhatasara (2015) explains that increased climate variability reduces agricultural productivity; often with unequal effects on men and women's human, natural, physical, social, and financial assets. In the Sahel for example, women believe that they would lose access to rangeland and other livestock production resources due to increased climate variability (GoZ, 2012). Changes in crops grown by farm households in response to climate change have been shown to alter participation in decision making, division of labour, and control of income from crops. For example, while commercialisation has been identified as a key strategy in assisting farmers to adapt to climate change, it tends to weaken women's control by focusing on sales rather than consumption decisions in East Africa (Tavener et al., 2019).



Walker et al. (2022) show that livestock herd composition in response to drought is characterised by a shift from cattle or camel to sheep and goats for which women are responsible, leading to an increase in women's labour and responsibility when compared to men. In southern Tanzania, increased rainfall variability, declining soil fertility, yield variability, and declining crop yields are forcing households to cultivate more land, which demands more labour (Nelson and Stathers, 2009). Voluntary seasonal migration among male household members seeking off-farm work is exerting more pressure on women who must assume expanded domestic roles in the absence of male members of the household. Moreover, the need to replant more often as rains are unpredictable increases the demand on women's time because they must bear the brunt of replanting. Studies have shown that increasing livestock and crop diversity in response to climate change improved income (Makate et al., 2016) and food and nutrition security (Snapp and Fisher, 2015) for smallholder farm households. However, Teclwold et al., (2013) show that the adoption of crop diversification and the use of agricultural technology significantly increased agricultural labour demand for women in Ethiopia and diverted time away from childcare and food preparation.

Previous studies by Maertens and Swinnen (2009) show that increased labour demand for female heads of the household has a negative impact because girls are removed from school to replace their mothers in gender-determined household activities. Women have poor access to training, extension services, and technology necessary for effective adaptation to the impacts of climate change (Witinok-Huber et al., 2021). Moreover, constraints to technology adoption among women are evident across stages of technology adoption, which include awareness, testing, and continued adoption (Oyetunde-Usman et al., 2021). A comparative analysis of women's access to technologies for rice production in Ethiopia, Madagascar, and Tanzania showed that cultural and institutional factors were barriers to adoption (Achandi et al., 2018).

Moreover, constraints on women's time and spatial mobility significantly shape the way climate and weather forecast information is received by women (Goh, 2012). Survey data from Kenya (Saito et al., 1994) revealed that female headed households held less than one-half the total value of farming equipment of male-headed households. In response to input deficiencies, women-headed households are associated with low fertilizer application rates. For example, male-headed households in north-eastern Ethiopia were more likely to use organic fertiliser by about 52 percent when compared to female headed households (Abebe and Debebe, 2019).

Burke et al. (2018) found no evidence of a gender gap in skills after controlling for access to inputs, particularly for soil quality, suggesting that women are disproportionately disadvantaged. The comparatively low endowments in major productive inputs such as land labour, and capital make agricultural production among female headed households relatively more vulnerable and less adaptive to climate change (Musemi, 2018). Social norms and traditional gender roles, especially caregiving undermine women's capacity to reallocate time to work on family plots, diversify crop or livestock production or take up off-farm work (FAO, 2015). In some communities, only men have the right to cultivate certain crops or to access markets. In addition, many adaptation practices require investments in inputs, time or labour or technology or networks for collective action such as cooperatives and thus are costly for households with limited access to credit and with few, mostly female, working-age adults (Unganai, 2022). Gender and social differences between men and women may also affect investment needs or priorities and access to weather and climate information.

#### 2.4.1.2 Impact on Food and Nutrition Security

Chiweshe (2023) explains that climate change simultaneously affects food production, food availability, and access, diet quality, and nutrition at the household level. Climate change has affected the availability and access to food and nutritional security through direct pathways such as floods, drought, and land degradation and indirectly through income shocks and health effects resulting from enhanced viability of pathogenic microbes and their vectors (Sorensen et al., 2018). However, the adverse effects of climate change on food and nutrition security are not evenly distributed among men and women. In regions of high food insecurity such as sub-Saharan Africa, climate induced-food and nutritional insecurity has disproportionately affected women, given their vulnerability due to socially defined gender roles and limited access to resources compared to men (IPCC, 2014; Botreau and Cohen, 2020).

In line with this, Chikozho (2010) posits that climate-change-related risks to food and nutrition security include decreases in crop yields and crop failure, livestock loss, increased water scarcity, and destruction of other productive assets. Crop and livestock systems are subject to risks from climate variability and damage from extreme events such as drought, floods, disease outbreaks, and heat stress (Jones and Thornton, 2009). Research suggests that existing social, institutional, and structural biases and barriers exacerbate the negative impacts of climate change on food and nutrition security in women and female-headed households (Weiler et al., 2014). Extreme weather

events depress crop yields that supply essential nutrients such as calcium, folate, thiamine, and pyridoxine, which are crucial during pregnancy (Blakstad and Smith, 2020). Climate change can cause maternal malnutrition to worsen directly. In rain-fed production systems, unreliable rainfall affects rural households' ability to provide adequate food for their families.

Infectious diseases have serious consequences on maternal, feotal, neonatal, and child health, and this effect is exacerbated by maternal malnutrition (Pearson, 2021). In a systematic review of literature, Chishakwe (2019) shows that malnutrition among women; owing to the impact of climate change, occurs because women often skip meals to feed other family members in times of hunger and that they travelled further for water and fuel. Thebe (2011) showed that when food shortage was prevalent among communities in north-eastern Kenya, a common practice among women was to reduce their food consumption so that male members of the household could have enough to eat. In Ethiopia and Kenya, two of Eastern Africa's most drought-prone territories, children aged 5 years or younger born during drought are 36 to 50 percent more likely to be malnourished (Smith et al., 2014).

In measuring the impact of climate and weather variability on gender and food security, Tibesigwa et al. (2015) show that while weather-related crop failure due to poor rainfall or wind or hailstorms reduces food consumption levels for all households, reduction of consumption was much greater amongst households headed by widowed, divorced, separated or single women. Moreover, Tibesigwa et al. (2015) observed a statistically significant consumption gap of up to 21 percent, between female and male-headed households; where female headed-headed households were more likely to be food insecure. This is consistent with earlier work, which suggests that women-headed households were disproportionately vulnerable to weather and climate variability (Babugura, 2010).

#### 2.4.1.3 Impact on Health

The IPCC (2007) projects that climate change will undermine public health gains, especially in Africa where its impact on health will manifest through malnutrition from drought-induced food insecurity, exacerbating the effect of environmentally sensitive chronic diseases, reducing water quality as well as enhancing viability of pathogenic microbes and their vectors (Sorensen et al., 2018). Climate change's direct and indirect impact on women's health is mediated and amplified through socio-economic disparities. Moreover, gender differences in the impact of climate on

health are transmitted through physiological, cultural, and socio-economic factors. Women tend to suffer higher rates of chronic malnutrition and have a heightened sensitivity to climate-induced food and nutrition security, especially during pregnancy and breastfeeding (Sorensen et al., 2018).

Additionally, infectious diseases have more grave consequences on maternal-fetal and child health; an effect that is amplified by maternal malnutrition (Blakstad and Smith, 2020). Thiede et al. (2022) have shown that women exposed to spells of above-average temperatures and below average precipitation experience significant reductions in the probability of fertility in the subsequent year. Kaiser and Kronsell (2014) examined the relationship between birth weight, precipitation, and temperature in 19 African countries and showed that climate affects birth weight in ways that were correlated with the dependence on the dominant food production strategy. Scheffer and Rocha (2015) have demonstrated direct economic consequences of drought on women; from diminishing household assets to food insecurity, to increased risk of poor sexual and reproductive health outcomes.

Extreme events and natural disasters globally are projected to become more severe because of climate change. Neumayer and Plumper (2007) showed that culturally and socially determined gender-specific exposure and vulnerability of women that are built into everyday socio-economic patterns lead to disproportionately higher mortality among women in the wake of climate-induced disaster. In some famines, like the Ethiopian famine of 1984/85, more female than male victims die at a very young age or as infants largely due to inequitable access to food resources (Yohe et al., 2018). Furthermore, women giving birth during or in the period following a natural disaster have an increased risk of adverse reproductive outcomes, including preeclampsia (pregnancy characterised by high blood pressure and damage to vital organs), bleeding, premature delivery, and delivery complications (Tong et al., 2011).

Rising temperatures and changes in rainfall patterns may contribute to increased malaria transmission in sub-Saharan Africa. Nigeria, DR Congo, Uganda, Mozambique, Angola, and Burkina Faso account for 55 percent of the global malaria burden (World Bank, 2012). In the 33 countries that comprise the regions of West Africa, central Africa, and east and southern Africa; malaria infections during pregnancy resulted in 819,000 children with low birth weight (World Bank, 2012). It is estimated that pregnant women are three times more likely to suffer from a

severe illness from malaria infection when compared to non-pregnant women and have a nearly 50 percent mortality rate.

Moreover, children born to mothers with placental malaria were more than twice likely to be underweight at birth (Ofori et al., 2009). While most low-birth-weight children have normal outcomes, as a group; they generally have higher rates of subnormal growth, illnesses, problems in cognition, attention, and neuromotor functioning (Hack et al., 2010). Hence, the long-term developmental outcome of low birth infants increases the burden of care on female members of the family and could undermine a mother's time investment in other productive activities, increasing overall household vulnerability.

Malaria undermines their labour output, interrupts the production cycle, and causes resources to be diverted from farm inputs. Dancer and Tsikata (2015) have shown that in a single cabbage production cycle, farmers who reported being sick because of malaria for an average of 4.2 days had recorded 47 percent lower yields and 53 percent lower revenues when compared to farmers who reported sick for an average of 0.3 days. Similarly, Fink and Masiye (2015) report large positive effects of preventative health investment on productivity among Zambian farmers provided with access to bed nets, where harvest value increased by 14.7 percent of the average output value. The impact on water and energy was observed, with only nine percent of global renewable water resources recorded. Africa is the second driest continent on the globe after Australia. A decrease in total precipitation in the northernmost and southernmost regions of the continent were identified (Folke, 202). Climate change is projected to impact the hydraulic cycle, threatening water security, which plays a critical role in promoting health and well-being (Niang et al., 2014).

Women's vulnerabilities to inadequate supply of water for domestic use, especially in the dry season are related to socio-cultural norms around the division of labour for water collection (Doss et al., 2018). Studies have documented higher rates of disease; missed social, educational, and economic opportunities; and overall lower quality of life associated with this lack of access to clean water and energy sources. For example, Berkes et al., (2016) show that between 46 and 90 percent of adult females in 24 sub-Saharan African countries were the primary collectors of water, an activity that consumed more than 30 minutes of their time. Moreover, across all the 24 countries which include Liberia, Cote d'Ivoire, Nigeria, Niger, Ethiopia, Burundi, and Mozambique, 62

percent of female children, compared to 38 percent of male children were responsible for water collection (IPCC, 2014).

Bhatasara (2015) have shown that a 15-minute reduction in one-way commute time between home and water source could reduce the prevalence of diarrhoea by 41 percent and cause under-five mortality to decline by 11 percent. Climate change worsens the direct and indirect health outcomes of energy insecurity and exacerbates cumulative risk such that those already experiencing energy insecurity are most affected by climate events because they are less able to cope. An estimated 6.8 Mt of fine particulate matter (PM<sub>2.5</sub>) was emitted in Africa in 2018 of which about 85 percent was due to indoor burning of biomass for lighting and cooking (IPCC, 2019). Particulate matter is a leading contributor to household air pollution (HAP), which is associated with a range of morbidity, including acute chronic respiratory disease, low-birth weight, cardiovascular diseases, and cataracts (Gordon et al., 2014). Using data on 24-h personal exposure to HAP from participants in Ethiopia and Uganda, Okello et al., (2018) showed that PM<sub>2.5</sub> exposure concentrations were highest among adult females (177 to 205 µg/m<sup>3</sup>) compared to 26.3 to 30.3 µg/m<sup>3</sup> among young males (IPCC, 2018).

In the same study, Okello et al., (2018) recorded a median PM 2.5 exposure of 276.1 µg/m<sup>3</sup> among women who cooked with livestock dung compared to 185.7 µg/m<sup>3</sup> and 119.9 µg/m<sup>3</sup> exposure experienced by women who cooked with crop residues and wood respectively. The highest hourly median PM<sub>2.5</sub> concentration recorded by Okello et al. (2018) ranged between 308 to 386 µg/m<sup>3</sup> and was recorded between 11 am and 2 pm, which coincides with meal preparation time in the diurnal calendar for rural women. Water and fuelwood collection labour can negatively affect women's health, exerting significant demands on metabolism as well as causing musculoskeletal damage; leading to the early onset of arthritis (IPCC, 2014). Climate change will exacerbate the rate and magnitude of ongoing land degradation processes and introduce new degradation patterns. Therefore, land degradation and climate change singularly and in combination exacerbate the already precarious household water and energy situation for hundreds of millions of women and girls, often with severe health and livelihood consequences (IPCC, 2007).

#### 2.4.1.4 Impact of Climate-Induced Disaster, Migration, and Conflict

Invariably, the increase in disaster risk due to climate change will magnify the gender-specific impacts of climate-induced hazards (Babagura, 2009). Projected declines in soil fertility, crop

yields, energy, and water resources undermine the viability of smallholder subsistence livelihoods. While declines in natural-resource dependent livelihood push men to migrate to cities and other rural areas for off-farm work, such adaptation strategies by men have been shown to increase vulnerability among women (Djouidi and Brockhaus, 2011).

Furthermore, gendered migration often results in increased workload for women left behind who tend to have fewer off-farm options compared to men (Babagura, 2009). As noted previously, social and cultural norms, lack of decision-making authority, limited or unclear property rights, and time constraints prevent women from leveraging the full spectrum of on-farm opportunities to diversify their livelihood options and enhance their wellbeing in the absence of the male household head. In Zimbabwe, women's contribution to disaster risk mitigation and management is limited in communities that are strongly regulated by cultural and traditional norms of patriarchy that confer property rights and decision-making, especially over cattle (Ndlovu and Mjimba, 2021). Hence, men decide when to dispose of or transfer fungible assets to mitigate drought risk without reference to women.

Climate-induced disasters such as drought, famine, floods or disease outbreaks and the human displacement in their wake increase the risk of gender-based violence and harmful practices like child marriage (McLeod et al., 2019). Moreover, during climate induced natural disasters and conflicts, sexual and reproductive health needs are overlooked, often with bad outcomes such as high risk of maternal deaths, child marriage, and unintended pregnancies (Behrman and Weitzman, 2016). These patterns of exclusion or disenfranchisement further transmit and entrench disparities in wealth, health, educational attainment, and labour participation among women. Social and cultural norms as well as expectations limit the ability of women to get out of the way in the wake of climate-related disasters. IPCC (2014) explains that in the absence of data or evidence from sub-Saharan Africa, it is instructive to note that the impact of natural disasters is contingent on vulnerability and exposure, which differs across gender, age, ethnicity and economic class.

Neumayer and Plumper (2007) showed that women do not often move from harm's way promptly because socially produced gender relations such as caregiving cause them to prioritise the health and safety of more needy household members such as children and the elderly. Juran and Trivedi (2015) argue that women's exposure and vulnerability to natural disasters are socially constructed through gender; where women have access to limited information, health as well as food resources

and are granted less decision-making power. In northern Mali, women's vulnerability has been shown to increase when men migrate for employment, a fact exacerbated by the fact that the women left behind did not have men's rights to secure tenure of control of fungible resources. Moreover, disaster's impact may also be amplified by lack of gender perspective in humanitarian responses and recovery operations, where for example; women often face difficulties in proving ownership of property or suffer discrimination when authorities demand the distribution of property and assets that are made through male heads of households (IPCC, 2017).

More importantly, Neumayer and Plumper (2007) concluded that socially constructed gender-specific inequalities in access to resources, capabilities, and opportunities which females built into everyday socioeconomic patterns explain higher female disaster mortality rates when compared to men. Women in rural areas rely solely on natural resources as vital inputs and assets for livelihood for themselves and their families. However, increasingly, climate change and climate-induced degradation of vital resources such as fresh water, land, and pasture increases competition and often aggravates or amplifies the risk of violent conflict (Bhatasara and Nyamwanza, 2018). It is important to emphasise that climate change is a risk amplifier, which aggravates pre-existing political, socio-economic, and structural conditions and can push tensions over the threshold; giving rise to conflict and violence (Raleigh, 2010). For example, Sudan is highly vulnerable to climate change impacts and North Kordofan is stalked by drought, desertification, and extreme temperatures. These hazards are intensifying land degradation and crop failure, further stressing the already limited natural resources; including fresh water and pasture. Hence as the producers of food and primary water collectors, women and girls are more disproportionately affected by crop failure and water scarcity.

Hitherto, mobile pastoral communities are becoming sedentary, creating competition over depleting water, pasture, and land resources, which leads to tension and conflict with farming communities (Bronkhorst, 2011). Women and girls are disproportionately affected by water scarcity and the conflict it generates. Reviewed literature demonstrates that climate change induced vulnerabilities and their impacts on livelihoods and wellbeing are gendered (Mutsa,2022). Men and women have unequal access to decision-making power, knowledge, skills, assets, and networks (Nelson and Stathers, 2009), which translates into gender-differentiated exposure and sensitivity.



Essentially, climate change is likely to exacerbate gendered vulnerabilities and compound intersecting forms of discrimination against women (IPCC, 2018). However, policies aimed at developing the adaptive capacity at the community level, especially among agricultural and pastoral communities often fail to recognise and respond to the gendered nature of women's experiences. Hence, climate change response actions need to be gender-sensitive or responsive. However, there is no shared understanding among policymakers or the expert community about what constitutes gender-responsive solutions to climate vulnerability and risk. Even among key stakeholders, knowledge and understanding of the intersection between the socioeconomic and political dimensions of gender and climate change are both limited and uneven (Mavhura et al, 2013). Implementation of decisions with gender-specific mandates has been uneven and where there has been an attempt, gender dimensions were implemented in a superficial manner or as an add-on activity (Glemarec et al., 2016). Moreover, the categorisation of women as a vulnerable group serves to emphasise women's needs while their leadership and active participation are unsupported and not quantified. Systematically identifying and addressing gender gaps in policy and action when responding to the impacts of climate change is critical to building climate resilience at the household and community level.

#### 2.4.2 Women's responses to climate change impacts

Human beings are not just ordinary but are rational beings that respond to situations and in situations through using means and ways that help them survive. This section reviews literature that shows how women in different communities; particularly in the rural areas of developing countries, are responding to climate. As the bedrock of family production in terms of farming and in the face of climate change, women are on the forefront of reacting and responding to it in farming communities across Africa (Nyamwanza et al., 2021).

##### 2.4.2.1 Livelihood diversification

To reduce the risk of crop failure and livelihood vulnerability, peasant farmers in Post-Fast Track Resettlement Farms have not only resorted to diversification of crops; but have also diversified their livelihood activities (Musemi, 2019). Livelihood diversification refers to a process by which rural households embark on diversification of a portfolio of activities and social support capabilities for survival and to improve their standard of living (Gukurume, 2013). Literature has thus established that livelihood diversification has become fashionable in Mazungunye community as a risk cushioning mechanism from the unpredictability of agricultural activities (Matsa. 2020).

Hence rural households are indeed engaging in a plethora of livelihood activities and diversified income portfolios.

In line with this, Mutopo (2022) explains that the perpetual plunge in agricultural productivity leading to recurring episodes of drought in most Post-Fast Track Resettlement Farms has forced a considerable number of households to resort to relying on a multiplicity of economic activities within a year. Women's livelihood diversification strategies prevalent in the community include brick moulding, fencing, thatching, building, weeding, and harvesting in the neighbouring irrigated commercial farms in Zaka District (Musemi, 2020). For Kamwi et al., (2018), diversification of livelihoods warrants resilience in the face of adverse trends or sudden shocks such as climate change.

Furthermore, Mtekwa (2018) reveals that livelihood activities adopted by the community members are post-coping mechanisms to failed harvests owing to climate change. These activities are meant to ensure food security and sustainable livelihood. A significant number of studies in Post-Fast Track Resettlement Farms indicate that they are diversifying their livelihood portfolio to include activities like engaging in menial jobs “*maricho*”<sup>3</sup>, petty trading, commercial brick moulding, firewood trading and beer brewing among many other activities (Karuma, Bhatasara and Nyamwanza, 2021). Chazovachii et al., (2012) argued that livelihood diversification or working in different activities helps to spread risk and manage uncertainty in most rural communities of Masvingo Province. Oparinde and Hodge (2018) have found that insufficient returns from agriculture were the fundamental factor compelling several households in farming areas such as Mazungunye community into livelihood diversification. However, Chazovachii (2017) argue that some of the activities devised by the community as alternative livelihood strategies tend to have negative effects on the environment and environmental resources, thereby raising questions to the sustainability of such strategies. These activities include firewood selling which warrants the cutting down of trees, leading to deforestation as well as brick moulding that causes land degradation and soil erosion.

#### 2.4.2.2 Use of indigenous knowledge systems (IKS)

It was established in previous studies that in Mazungunye community, traditional knowledge and indigenous knowledge systems (IKS) have been useful in both climate change adaptation and

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<sup>3</sup> Maricho meaning piece job.

mitigation. Masoga and Kaya (2011) defines ‘traditional knowledge’ as a body of accumulated knowledge based on practice, belief and coordinated adaptive techniques passed through generations on cultural transmission basis, denoting how human beings create a relationship with the environment. For Chakwizira et al., (2010), most rural people have amassed traditional adaptation techniques through experience accumulated by interaction with the environment and knowledge which was transmitted orally across generations.

Scholars have explored how indigenous knowledge has mitigated on the problems of climate change across Africa. Awazi et al., (2019) carried out a study on the impacts of climate change and variability in Cameroon. Findings show that the local people perceived the changes in temperature and rainfall pattern and that the changes have affected crop and livestock productivity and that they have had a significant impact on rural livelihoods as well as food security. Awazi et al., (2019)’s study revealed that agriculture, forestry, water, coastal resources, livestock, and human health were adversely affected by climate change. The specific stressors of climate change in the study manifested in the form of increasing frequency of floods, drought, erratic rains, and other extreme events. The community perceptions of the most important factors undermining peasant livelihoods were, in decreasing order: increasingly unpredictable and declining amounts of rainfall, with unclear onset and ending; rising mean temperatures and pest prevalence; and increasing frequency, severity and duration of droughts (Chiweshe, 2017). Awazi et al., (2019) conclusion was that all livelihoods (including off-farm livelihoods) in the district were climate change sensitive, which implies that adaptation options to climate change in the district were not sustainable. With reference to the general climate response scenario in sub-Saharan Africa, Yohe (2018) reiterates that most rural households in the region are hardly coping with the climate change impacts and as such, the current response options are not sustainable both in socio-economic and ecological terms.

Furthermore, most resettled farming communities have developed convoluted traditional systems of gathering, predicting, interpreting and decision-making in relation to weather (Chiweshe, 2023). These systems of climate forecasts have been very helpful to the farmers in managing their vulnerability posed by climate change variability. Farmers normally predict good normal seasons by the following indicators, general wind direction presence of migratory birds, (e.g. swallows, black and white storks), good fruiting of *Lannea* species, presence of butterflies flying in from the

north in a southerly direction; starting October, a characteristic mist/ haze on hilly or mountainous terrain after the winter months, and a circular halo around the moon which is taken to mean that heavy rains are expected and very high temperatures during the dry months of September/ October/ beginning of November (Matondi, 2012). Through IKS, farmers predict bad seasons by the following abundance of edible fruiting bodies of common woodland tree species (for example Monkey orange –*Strychnos spinosa*), dry season skies becoming cloudy at least once every three-to-four day, meaning that the following rainy season is poor, with a higher frequency in cloudy days indicating a drought, warm winter months and extended winter (Oyeronke, 2014).

Bhatasara and Nyamwanza (2018) explain that through the meticulous study of plant and animal behaviour such as bird species (for example *Dendera* and *Mafudzamombe*), the community inhabitants could easily predict the likelihood of a severe drought or low rainfall and would be able to adequately prepare in advance for the impending climatic catastrophe. These traditional coping strategies are largely based on experience that has been accumulated over the years and transmitted from one generation to the other. In support of these finding, Ajani et al., (2013) alluded that there is a wealth of local knowledge based on predicting weather and climate. Mutekwa (2019) argued that lessons learnt from previous climatic stresses provide important entry points for social learning and enhanced adaptive capacity to both wetter and drier periods now and in the future. Makhubele, Shokane and Mabasa (2016) underscore that from time-to-time, rural people have used their experiences and local knowledge to cope with the changing climate. Historically, for hundreds of years, smallholder farmers have managed to develop complex agricultural systems, which are adaptive to the local environment using locally tested techniques and practices; leading to sustained food security at household and community levels without depending on influence including support from governments, scientists, and researchers. Indigenous knowledge and knowledge-based practice are the foundations of indigenous resilience (Nkomwa et al., 2014). The researchers argue that although rural people in some instances concede that they can no longer rely solely on their traditional knowledge, there is a need to marry the arts and sciences as resilience strategies to curb the pitfalls of indigenous systems.

#### 2.4.2.3 Crop diversification

Nyahunda et al., (2020) notes that peasant farmers in most farming communities are responding to climate change impacts by diversifying their range of crops; switching to drought-resistant crops like rapoko, millet and sorghum. Crops like finger millet are more drought-tolerant and therefore

resistant to temperature rises, which makes them attractive in drought prone areas like Bikita (Gukurume, 2014). This has also been corroborated by Chazovachii et al., (2016) who posit that the risk and uncertainty brought by climate change such as drought, encouraged society to engineer a variety of contingent responses including using a combination of options and diversification of crop varieties. In the wake of climate change crisis, the researchers argue that crop diversification could become a basis for broad-based adaptation strategy for sustainable livelihoods, thereby solving the community's food security challenges and climate variability catastrophe.

Nyahunda et al., (2020) reveal that the planting of butternuts, okra, pumpkin, chillies, cabbage, and African spinach was reported and observed in their study. These crops were reported to be important for household consumption and early market value. Drought resistant crops are doubling as both food and cash crops, allowing most rural women to adapt to climate change impacts. Small livestock production has also been on the increase in Mazungunye community. It was observed that animals like goats, sheep, indigenous chicken species called 'roadrunners', and traditional poultry are becoming dominant as people try to cope with droughts. Like small grains, these livestock are especially adapted to drier areas, making them ideal for drought – prone areas like Mazungunye.

These findings has been corroborated by Chazovachii et al., (2012) who argued that such crops are not only drought resistant, but also tend to be resilient to pests and diseases that may threaten them. These crops are vital for the people in Mazungunye community, given their socio – cultural and economic significance. The crops are also used to brew traditional beer locally known as '*Ndari*' or '7 days'. Traditional leaders have expressed their unwavering support towards growing these crops in the community. Gukurume (2018) cogently view that these drought resistant crops have thus become extremely important to the local community, given the fact that they double as both food and cash crops which enable the smallholder farmers to adapt to climate change and variability and attain sustainable livelihoods. What should be underscored here is that small grains can endure lengthy periods without rainfall and require less plant nutrients, hence they tend to mature early. Diversification into various crop varieties was reported as a pathway out of poverty for many smallholders in Mazungunye community.

#### 2.4.2.3 Conservation farming

In line with this, most studies have established that there is advent of new cropping systems as a resilience strategy to climate change in farming communities (Gukurume, 2018). New cropping systems such as zero tillage as well as minimum tillage have been widely introduced by various stakeholders such as Non-Governmental Organisations (NGOs) and are called ‘conservation farming’ (Musemi, 2019). This cropping system has been widely embraced by NGOs as ‘conservation agriculture’ which enhances food security in drought prone areas like Mazungunye. Gukurume (2013) noted that conservation farming has been embraced as the antidote to the impact of climate change and variability on agriculture in drought prone areas like Bikita. To improve crop production in marginal rainfall regions such as Mazungunye, rural farmers are consequently adopting farming practices that conserve fragile soils and improve its fertility (Mutopa, 2019). These practises are complemented by change in planting dates and cropping systems such as intercropping and crop rotation.

Due to climate change, conservation farming is being promoted as a panacea to the agricultural production challenges confronting rural smallholder families and A1 farmers in Mazungunye and the rest of Zimbabwe (Musemi, 2019). This gives credence to Mubaya et al., (2014) who argue that conservation farming practices hold the promise of providing both a strategy for mitigating climate change and working as an adaptive mechanism to cope with climate change and variability. In line with this, Gukurume (2014) assert that maize varieties dominant throughout the country by virtue of being the staple food are too physiologically taxing, and take between 90 to 200 days to mature. Hence during droughty periods, they do not do well as compared to small grains.

Chazovachii (2018) has retorted that conservation farming and the planting of drought resistant small grains emerged as an antidote to the food insecurity challenges confronting most villagers in the community and surrounding areas. Under the conservation farming practice, CARE International provides smallholder farmers with inputs, mostly seeds and fertilisers (Nyahune et al, 2018). Several participants submitted that advice from both Agricultural Extension Officers and NGOs that are involved in various food security activities in the community have been of paramount significance to them in adapting to climate change and variability.

Mutekwa (2009) denotes that conservation tillage, for instance, is a useful option for improving the storage of rainwater in the soil and can help mitigate agricultural drought. However, it is

prudent to note that it requires adequate draught power, appropriate machines, and good training of farmers to be effective; which is the area where the farming community dwellers are lagging behind. Against such a background, Mutekwa (2009) asserts that conservation farming is only for those farmers who are endowed with more livelihood assets that mainly adopt conservation tillage as compared to those with limited assets. The researchers contend that the number of households practising conservation farming in the community is increasing due to the increasing threat posed by climate change and variability. Nutrition gardens locally known as “*Mishandirapamwe*” (translated as ‘co-operatives’) have also been revived and are being supported by a number of NGOs in the community in an attempt to improve food security and adapt to the negative effects of climate change and variability on food security (Hanover, 2020).

#### 2.4.2.3 Destocking of livestock

Most inhabitants of new resettlement areas have gotten accustomed to the practice of destocking or reducing the number of their livestock as promptly as they perceive droughts, floods or any situation related to the effects of climate change (Musendo, 2020). This can be through selling some, of which it is difficult as the market is not always readily available. According to Mtekw (2010), destocking is done through slaughtering some of the livestock for both consumption and selling, even if this might seem a more viable way than to incur the loss if the livestock would have died of starvation. This means a great loss in wealth and loss of draught power for different homestead activities like ploughing, fetching water, firewood, poles or use as a means of transport to clinic or grain milling. Destocking can also take the form of lending relatives or friends who would be staying in better places. This system is the most effective as the owners would not lose their valuable assets (Masiiwa, 2005). This system is known in Shona as “*Kuronzera*<sup>4</sup>” The researchers underscore that the *Kuronzera* system seems to be lucrative for community members because they are not likely to face any losses as compared to selling or slaughtering for consumption.

#### 2.4.2.4 Barter trade

According to Mutopa (2011) barter trade is also another resilience strategy employed by the community dwellers of new farms in order to withstand the effects of climate change. Since they mostly grow small grain crops, they usually do not have crops like maize and their households’

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<sup>4</sup> *Kuronzera* is a system whereby one lends cattle to relatives for use for a certain period. The borrower is given rights to use the cattle for farming and milking but is not allowed to kill them for meat or sell them

gardens do not grow much to sustain them with vegetables, tomatoes or onions. Therefore, they have to practice barter trade, within Bikita and Zaka Districts. They usually practice barter trade in which 2kg of millet or sorghum can be exchanged with a bundle of vegetables, tomatoes, onions beans or fish. Poultry or livestock is usually traded with maize from other areas. The major setback with this resilience strategy is that sometimes the villagers may be treated unfairly in terms of the standard valuation of livestock and other asserts (Scoones et al, 2010). In some situations, livestock may be exchanged for very small quantities of grains.

## 2.5 Theoretical Framework

This section presents the various theoretical models that were utilised in forming the basis for the development of Gender and Socio-Ecological Resilience to Climate Change in Post-Fast Track Resettlement Farms. The Gender and Socio-Ecological model to climate change in Post-Fast Track Resettlement Farms is hinged on the already existing theories, but was modelled to suite the fast-track resettlement farms environment. In line with this, this chapter presents the theoretical framework on which analysis of the data was presented and hinged. The model was developed basing on concepts of gender and social-ecology. The chapter is divided into various sections which include the conceptualisation of terms, theories upon which resilience is premised and the developed conceptual framework or model of gender and socio-ecological resilience.

### 2.5.1 Socio ecological systems and resilience

Social-ecological systems' (SES) is an emerging concept for understanding the intertwined, interconnected and interdependent nature of human and natural systems. The SES concept developed in the early to mid-1990s through collaboration of scholars working in the interdisciplinary areas of ecological economics and common-pool resource systems (for example Berkes, 1989; Ostrom, 1990; Costanza, 1991). Specifically, the volume titled *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience* combined a systems approach and adaptive management with a focus on dynamic institutions and diverse systems of property rights; with 14 case studies analysing ecological resilience as well as local and traditional systems engaged in ecosystem management (Berkes and Folke, 1998).

The concept of SES is based on the notion that “the delineation between social and natural systems is artificial and arbitrary” (Berkes and Folke, 1998:10 ), emphasising that people and nature are intertwined. Nature no longer merely sets the space in which social interactions take place;



likewise, people are not just an external driver in ecosystem dynamics (Folke et al., 2011; Schoon and Van der Leeuw, 2015). Therefore, social-ecological systems are therefore not merely social plus ecological systems, but cohesive, integrated systems characterised by strong connections and feedbacks within and between social and ecological components that determine their overall dynamics (Folke et al., 2010; Biggs et al., 2015). As such, SES are a type of complex adaptive system. These systems comprise many interdependent parts that interact in ways that give rise to emergent, system-wide patterns that cannot be predicted from the properties of the individual system components. Furthermore, these system-wide patterns, in turn, influence the behaviour of the individual system parts and their interactions with other parts, creating a feedback process that shapes the evolution of the system over time and allows it to adapt to changing contexts (Lansing, 2003). The continuous interplay between microlevel entities to form emergent macrolevel patterns “implies that SES are more than the sum of the ecological or the social parts” (Reyers et al., 2018:).

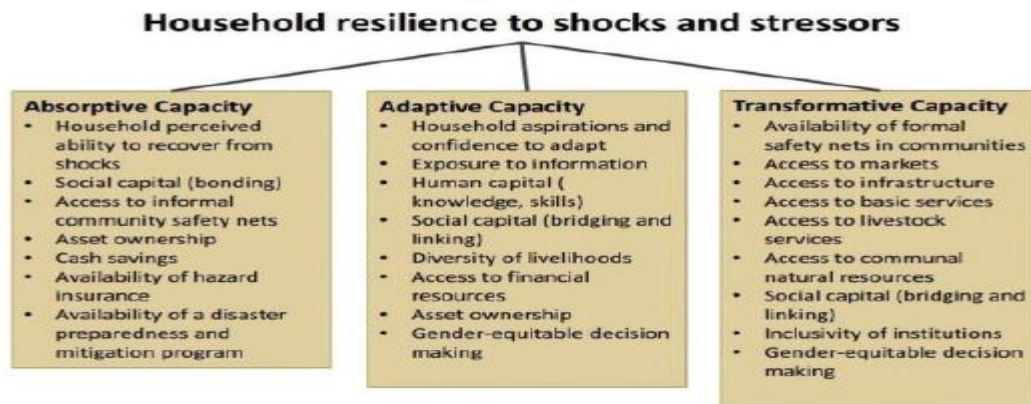
Furthermore, it means that SES can adapt to changing conditions, learning and self-organising in response to internal or external pressure (Levin et al., 2013). An example of these dynamics is the emergence of adaptive governance, where individuals interact and collaborate, often in response to a crisis, connecting and creating social networks around shared visions and narratives (Folke et al., 2005). As a result, bridging organisations and new institutions emerge and become connected to other levels of governance; not only influencing them, but also being influenced by them. It has been shown that an entire SES may shift and start to evolve new pathways as a result of this interplay. Examples range from landscape management in Sweden, to large-scale coral reef management in Australia, to a system of global adaptive governance of the regional resources of the Southern Ocean (Schultz et al., 2015).

#### 2.5.2 Resilience to climate change in communities

Patoni et al., (2003: 63) are of the view that the basis of community resilience derives from the idea of bouncing back. That means that the ability of the community to cope with a change is the core tenet of its resilience. In other words, community resilience can be described as the ability of the community to continuously cope with change. Community resilience can be broken down into three types and these are transformative, absorptive, and adaptive capacity. ‘Absorptive resilience’ is described as “the ability to minimise exposure or sensitivity to shocks and stressors through preventive measure and the appropriate coping strategies to avoid permanent, negative impacts”

(Starr and Tabaj, 2015: 5). ‘Adaptive resilience’ is also described as the ability to make proactive, informed choices and changes in livelihood strategies in response to long term social, economic, and environmental changes (Mayuna, 2015). ‘Transformative resilience’ involves government mechanisms, policies, regulations, cultural and gender norms, infrastructure, community networks, and formal and informal social protection mechanisms that constitute the enabling environment for systemic change (Kosimusi, 2018).

## Indicators of resilience Capacity



**Source: Starr and Tabaj, (2015: 14).**

*Figure 4: Indicators of resilience capacity: Adapted from Starr and Tabaj (2015:14)*

According to Gallopin (2016: 300), “adaptive capacity” is defined as “the capacity of any human system from the individual to humankind to increase (or at least maintain) the quality of its individual members in a given environment or range of environments”. Thus, what the term suggests is regarded as the ability of people to keep on conducting their day-to-day routines in different environments, regardless of whether a disaster occurs or not. However, this definition is too general. If the environmental change is too intense, people are more likely to be affected negatively; no matter how ready they might be.

Smit and Wandel (2016: 287), define “adaptive capacity” as the “general ability of institutions, systems and individuals to adjust to potential damage, to take advantage of opportunities or to cope with the consequence”. This definition is not limited to individuals or people, but includes institutions and systems and their ability to cope with changes. The researcher believes that this definition is watertight and therefore, appropriate for this research. It explains the ability of people, institutions, and systems to adjust to environmental and other potential changes. This definition

acknowledges the fact that people, institutions, or systems are more likely to be affected if there are environmental changes even though they might have the resources. It, therefore, encourages people, systems, and institutions to adjust and adapt to the changes.

After scrutiny of the terms, ‘adaptive capacity’ and ‘community resilience’, it can be observed that the two are complementary and their difference is unclear. Adaptive capacity can result in enhancing community resilience. In as much as the two are interrelated, it can be noted that adaptive capacity can result in enhancing community resilience. Both are used in the study of climate change and resilience. In addition, the burgeoning literature on community resilience and adaptive capacity has sparked a debate as to how the two are defined and related. In this regard, Adger et al., (2004: 168) state that “in practical terms, adaptive capacity is the ability to design and implement effective adaptation strategies or to react to evolving hazards and stresses so as to reduce the likelihood of occurrence and or magnitude of harmful outcomes resulting from climate related hazards”. This translates into resilience of the community to effects such as floods and droughts among others which are all results of climate change. Therefore, the researcher concurs with Hill and Engle (2013: 178) who argue that “adaptive capacity enables resilience”.

### 2.5.3 From ‘Bouncing Back’, ‘Bouncing Forward’ or ‘Moving On’: Resilience Transitions

In as much as resilience refers to ‘bouncing back’ after a fall, the concept has evolved in development studies and disaster management. The key argument that has been put forward is that societies normally do not return back to their original position, but move on after a crisis through adopting or adapting new ways of living (Musoni, 2018-19). Notwithstanding the fact that both constructs may rely on the same factors such as demographic, social, cultural, economic and political aspects, the two are arguably discrete constructs (Manyena 2014, Kelman Gaillard and Mercer 2015). The original notion of resilience, from the Latin word *resilio*, means “jump back” or “bounce-back”. This refers to people’s recovery within the shortest of possible time; with minimal or no assistance at all. The “bounce back” notion differentiates resilience from vulnerability, implying that the two constructs are discrete (Mavhura, 2021).

#### 2.5.3.1 Weaknesses of the notion of ‘bouncing back’

Manyena (2016) argues that the ‘bounce-back’ ability has its limitations as well in that it may be more acceptable to elastic material than to human systems. Elastic can be stretched, but not in necessarily disastrous situations and can return to its normal position without change. That

disasters are accompanied by change is a given. For example, in the Bam earthquake which occurred on 26 December 2003 in the south-east region of Iran; claiming more than 35,000 lives, injuring 23,620 people and leaving almost 20,000 homes destroyed; with essential services including water supply, power, telephone, health care, main roads and the city's only airport crippled (Akbarietal. 2014); major shifts in the social, economic and physical environments were registered. In Sri-Lanka, the 2004 Tsunami disaster had a major impact on the fishing community. Some 90% of the surviving fishing community lost their boats, fishing nets and homes, and this transformed their lives and livelihoods (Venkatachalam et al.2019). In Zimbabwe, a decade-long complex political emergency has triggered disasters such as the cholera epidemic. This affected some 100,000 people and claimed 4200 lives between mid-2008 and mid-2009 (Nelson 2009). This severely disrupted the social and economic stability. In Japan, the 2011 earthquake and subsequent Tsunami caused severe damage to homes, businesses, and infrastructure; including the near total destruction of the Fukushima nuclear power plant. In terms of change, the plight of the Fukushima nuclear plant has caused those countries that operate such facilities to re-think their power-generation strategies. As Paton and Johnston (2006) argue, these examples show that the “bouncing back” neither restores the changed reality nor encapsulates the new possibilities opened by the changes wrought by a disaster:

Arguably, the “bounce-back” notion does signal change, but returning to the original position does not signal change. Ironically, it might mean a turn back to vulnerability or bouncing back to the conditions that caused the disaster in the first place. Technically, this may re-create and strengthen the pre-disaster structures and institutions. Thus, the “bounce-back” notion can be associated with strengthening existing structures and institution to withstand disasters, which might also increase community vulnerability rather than its resilience to disasters.

#### 2.5.3.2 ‘Moving Forward’ or ‘Bouncing Forward’ Resilience

Resilience should be viewed as the ability to “bounce-forward” and “move on” following a disaster (Manyena, 2014:7). Although this might be considered rather simplistic, there could be merit in this thinking. As disasters can be conceptualised to be a catalyst for change (Paton and Johnston 2006), the ‘bounce-forward’ notion encapsulates social engineering, if not community agency in changing processes within the context of new realities brought about by a disaster. Community agency through advocacy programmes may influence disaster risk governance in circumstances where institutions may be reorganised to increase their capabilities to deal with the changing nature of risk. What is fundamental here is that the

disaster risk governance structures and institutions are subordinate to the community agency. Changes that may take place after a disaster are not by chance – they are a result of rational choices made by the affected communities and should be transformative (Manyena, 2019). They can include physical, economic, political, and psychological changes. Thus, disaster resilience could be viewed as the intrinsic capacity of a system, community or society predisposed to shock or stress to ‘bounce-forward’ and adapt to survive by changing its non-essential attributes and rebuilding itself.

A fundamental issue in conceptualising the ‘bounce-forward’ ability is the evaluation of current response systems and; more broadly, how communities would approach prevention and preparedness (Manyena, 2015). The ways in which societies have prepared themselves to deal with uncertainties and change have shaped norms, values, customs and practices and governance systems. Adjusting to changing circumstances and learning from experience have always been part of human development. Arguably, risk is a part of everyday life and risk-taking often brings rewards. The ancient Egyptians lived with the risk of annual flood, but the floods regenerated their agricultural capacity; showing an example of both risks and rewards. In instances where a rapid change has occurred, there has been little time for social learning processes to re-shape preparedness strategies (Manyani, 2017). Today, the state, in many instances, has taken the lead in dealing with hazardous events and rapid socio-technological and economic changes. There has been a drive to make people feel “safe”. Alongside this, there has been a drive towards the centre and the imposition of a command-and-control structure.

#### 2.5.4 The Gender and Socio-ecological Resilience Model to Climate Change in Post-Fast Track Resettlement Farms

In as much as the SES theory and community resilience have been developed to address issues of resilience, they have focused more on establishing systems that enhance resilience in various communities. As highlighted above, the SES emphasises that people and nature are intertwined. Nature no longer merely sets the space in which social interactions take place; likewise, people are not just an external driver in ecosystem dynamics. In as much as this is true of communities in different parts of the world, what the theoretical framework lacks is a complete understanding that systems in farming communities are also made up of various parts which influence their nature of resilience. Therefore, the gender component is something that is so huge in communities and contributes greatly to the resilience levels of farming communities such as the Post-Fast Track Resettlement Farms. Thus, this has been drafted into the model being developed so as to develop a strong model that can be used in making sure that resilience to climate change is holistic and socio-ecologically friendly.

#### 2.5.4 The Gender and socio-ecological resilience to climate change framework

From this premise, the gender and socio-ecological resilience framework that is going to be employed in this research provides a comprehensive outlook to resilience building that will enable the women in Post-Fast Track Resettlement farming communities and systems to anticipate, absorb and adapt in the face of natural climatic hazards, shocks and stresses that do arise in sustainable context specific system boundaries. The framework takes note of the fact that socio-ecological resilience in Post-Fast Track Resettlement Farms is driven through several factors which include gender, livelihood options and the environment that these people live in. As explained in the model below, the four factors have a bearing on the type of livelihood options that people may engage in at the farm, the sustainability of their livelihood option and the level of environmental integrity they choose to apply. These factors mainly influence the on-farm livelihood diversification options that people living in Post-Fast Track Resettlement Farms can engage in.

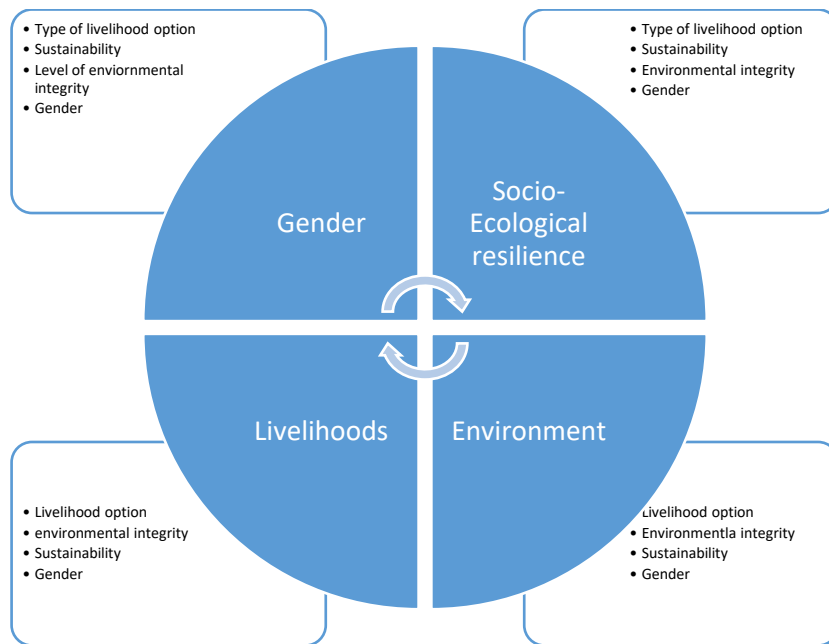


Figure 5: Gender and Socio-ecological Resilience to Climate Change

From the analysis of key terms above, this research will be hinged upon the Gender and Socio-Ecological Resilience to Climate Change Conceptual Framework. This framework is premised on three major ideas which are ‘people’ ‘livelihoods’ and ‘work’ in social systems that are inseparably connected with the ecological system in which they are installed. In the view of this study, an analysis of how the ‘women’ as ‘people’ in Post-Fast Track Resettlement Farms, their ‘way of life’

and ‘work’ are intertwined within the ecological system they live in. Considering this, Scoones (2010) conceptualises that the way one is socialised into being ‘male’ or ‘female’ determines the nature of livelihood options one may undertake and the level of socio-ecological resilience of the livelihood option. This, in turn, affects the environmental integrity of the area in which they are living in, and fosters an understanding of how it affects the Post-Fast Track Resettlement Farms in Zvimba East District which consequently determines the study’s way of analysing the issue.

## 2.6 Chapter Summary and gaps identified.

In conclusion, this chapter presented a review of literature on climate change, gender, and resilience to climate change in different parts of the world. It began by highlighting the various conceptual issues that are associated with the study at hand and moved on to the ‘anthropocene’ factors leading to climate change. The chapter further explored the regional and local issues concerning climate change and gender. The chapter went on further to examine resilience in Zimbabwe and the means and ways that are currently being utilised by women in Zimbabwe to be climate change resilient. It expanded by also looking at the theoretical framework upon which the study was hinged on. The chapter explored the development of a model stemming from which is the Socio-ecological Systems Theory. The chapter concludes by highlighting the gaps that have been identified in literature and how the ensuing study will cover those gaps.

In so doing, the main gaps that were highlighted in the chapter were included. Inasmuch as the studies have been done on issues on climate change, a focus on the nature, trends and patterns of climate change experienced in resettlement farms in Zvimba East District have not been fully focused on; which this study will also address. Another gap that has been identified and discussed is the realisation that although studies on women and climate change have been conducted in Zimbabwe, a particular focus on how this climate change-related phenomena has affected women farmers in selected Post-Fast Track Resettlement Farms in Zvimba East District has not been fully done. This was identified as the key focus that this study would investigate. The study particularly focused on the different livelihood options available or adopted by women in coping with climate change in the selected Post-Fast Track Resettlement Farms in Zvimba East District of Zimbabwe. This was the basis for analysing how socio-ecological resilience these livelihood options were. From such, a Model on Gender and Socio-ecological Resilience to climate change in Post-Fast Track Resettlement Farms was developed to assess women’s climate resilient livelihoods.

## Chapter 3: Research Methodology

### 3.1 Introduction

This chapter explores the research methodology. A research methodology clearly explains how the research process was done for a particular study in the designated context (Newman, 2020). The research methodology is the spine of all research projects, as it ensures the validity and reliability of the findings that would have been unearthed in a study. The study's replicability in different contexts is also hinged on how the study has been conducted; which is all enshrined in the research methodology (Kothari, 2004). The research methodology ensures the quality and authenticity of the results that would have been unearthed in the study. Through this, the research methodology explains how the research was conducted and why it has been conducted that way. The justification of how data was collected and why it has been done that way is what this chapter discusses.

In line with this, the chapter explains how the research on gender and socio-ecological resilience to climate change was conducted in Zvimba East District's Post-Fast Track Resettlement Farms in Zimbabwe. The chapter highlights how the research was conducted by showing the philosophy, approach and design adopted in the study. It also discusses the techniques used, how entry was gained into the selected farms and when it was conducted. The chapter further justifies the rationale for conducting the research in Zvimba East District. The ethics that were followed in the study and the challenges that the researcher faced in conducting the research are also highlighted. The chapter is concluded by giving a summary of everything that was presented.

### 3.2 Research Philosophy, Approach and Design

As the pinnacle for all the research procedures to be conducted in an investigation, the research philosophy, approach, and design are the critical foundations upon which all the research actions in the field are hinged (Pandey and Pandey, 2021). The research philosophy is the lens through which all research processes are seen, whilst the research approach is the campus that directs the research activities done in the field. In contrast, the research design is the packaging of the research activities finally done on the ground in the field. Thus, this section fully describes the foundations upon which the research on gender and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms was done. It focuses on women, thereby helping in bringing out a gendered perception of their agency in these farms. This section presents the research philosophy, research approach and research design.



### 3.2.1 Pragmatism as the Research Philosophy

According to Creswell (2007), ‘pragmatism’ is a research philosophy that combines both qualitative and quantitative approaches in order to create a holistic picture of the phenomena under research. As a philosophical dimension, pragmatism accepts concepts to be relevant only if they support action. In Creswell’s (2014), pragmatics recognise(s) that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities. According to pragmatism research philosophy, research question is the most important determinant of the research philosophy. Pragmatics combines both, positivist and interpretivism positions within the scope of a single research according to the nature of the research question (Hall, 2013). This makes it much suitable for the current study.

The researcher adopted the pragmatic research philosophy because of its ontological (objective) and axiological (ethical/moral philosophy) dimensions that are appropriate for this study. Kothari (2004) postulates that the pragmatic worldview is not committed to any philosophy and reality, but creates a synergy between qualitative and quantitative methods by bringing out symbiotic meaning and understanding of the phenomena under study, using the mixed methods approach. The combination of qualitative and quantitative approaches provides a more complete understanding of the research problem than the use of either of the two approaches alone (Creswell, 2005). The study used this philosophy to paint both subjective and objective truths around socio-ecological resilience levels of livelihood options adopted in Post-Fast Track Resettlement Farms in Zimbabwe. Through this research philosophy, the researcher understood the level of socio-ecological resilience in the Post-Fast Track Resettlement Farms across Zimbabwe. This helped to develop transformative approaches and paths needed in Zimbabwe in order to build resilient communities.

### 3.2.2. Research Approach: Q Squared Research Approach

The researcher adopted the Q-squared research approach or mixed method research approach for this study. Kothari (2004) defines a ‘mixed methods’ research approach as a research method that is hinged on the triangulation of qualitative and quantitative methods. Quantitative and qualitative techniques were used in this research to paint a complete picture of the socio-ecological resilience to climate change in Farms around Zvimba East District in Zimbabwe. Quantitative techniques

were mainly used to give an objective statistical picture of what is transpiring in the Post-Fast Track Resettlement Farms, whilst qualitative methods fleshed the statistics with the story of climatic changes and socio-ecological resilience in the area. These approaches were greatly helpful in understanding the socio-ecological resiliencies of livelihoods adopted in Post-Fast Track Resettlement Farms in the wake of climate change; as both gave a holistic and complimentary understanding emerging issues. The researcher adopted this approach because it made it possible to produce a clear understanding of how gender politics influence women’s socio-ecological resilience to climate change in PTFRFs.

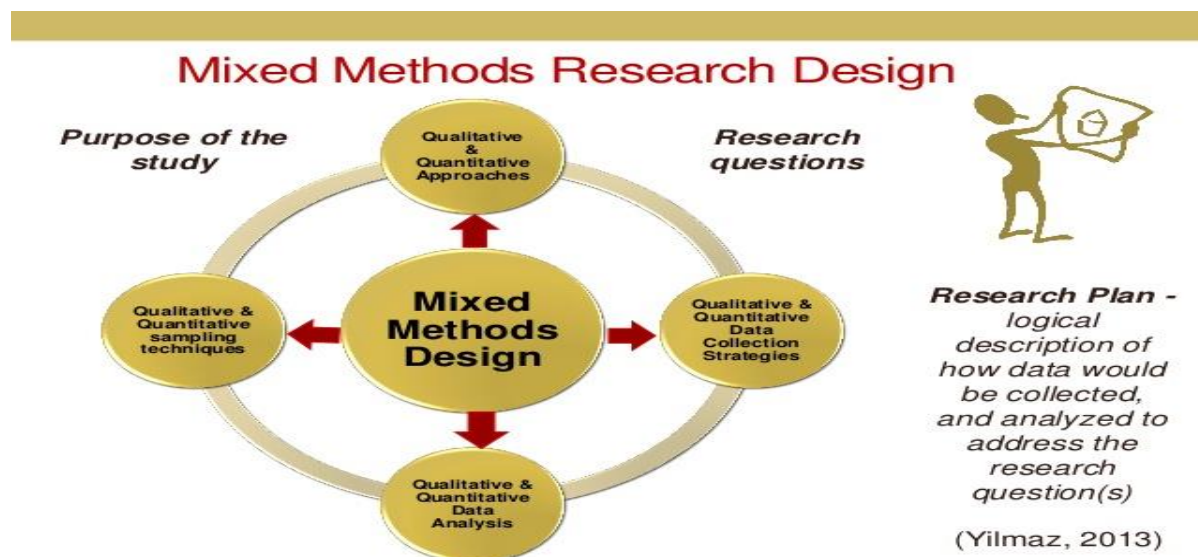


Figure 6: Mixed Methods Research Design adapted from Yilmaz (2013)

### 3.2.3 Research design: Concurrent mixed methods research design

The study employed a ‘concurrent mixed methods research design’ for this research. The Concurrent Mixed Methods Research Design mainly entails using qualitative and quantitative research methods concurrently in the research process; noting their points of divergence and convergence as the researcher does the fieldwork (Tedlie and Yu, 2006). In line with this, the researcher concurrently collected quantitative data, administered through a questionnaire. He collected and analysed qualitative data as they were the dominant methodological issue. He managed conduct interviews as well as collect survey data concurrently across the three farms. This helped in checking on how the data was coming out; particularly noting the gaps and the convergences in the research process. In doing so the researcher managed to paint a holistic picture

of issues of climate change and the socio-ecological resilience of women’s livelihoods in these Post-Fast Track Resettlement Farms across Zvimba East District in Zimbabwe. Data analysis was carried out soon after the data collection process. The analysis was guided by both quantitative and qualitative data analysis methods, as will be highlighted below in full.

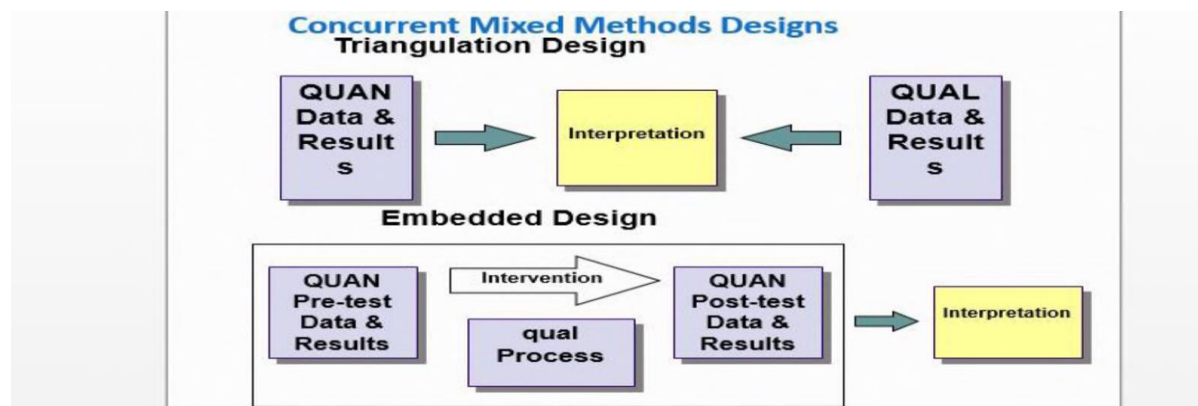


Figure 7: Concurrent Mixed Methods Designs

### 3.3 Gaining Entry, Sampling Procedures and Research Techniques

The section presents the process of entry together with sampling procedures and research techniques which the researcher considered when conducting field work in PFTRFs.

#### 3.3.1 Gaining Entry

According to Dubey and Kothari (2022), gaining entry is important in conducting field research through observations as it is an authentic and reliable. The section thoroughly explains the stages which the investigator took in each farm in order to gain full entry into the field. The section discusses how the field was entered to conduct the research. In as much as the entry into the field was challenging, through the various gatekeepers he had on the ground, work was made easy and the area became accessible. The three farms are all found in one ward; which is Ward 1 in Zvimba East District. It has about 8 farms all in all. The way the researcher gained access in each one of them is explained below.

##### 3.3.1.1 Amalinda Farm

In terms of entering the farms, several ways were used to establish rapport. The researcher started conducting fieldwork in June 2022. When he got onto the farm, he was introduced to the village head, who happened to be a woman who immediately became his gatekeeper. The village head helped him with the protocols that had to be done in the area, which was getting clearance from the village committee and some ZANU PF party leaders found in the area. After showing them the

approval letter from Zvimba Rural District Council and the Ethics clearance letter from the University of Pretoria, he was given the right to access the area and talk to the various people on the farm; which is Peter Hard Farm. In terms of moving from place to place, the councillor helped him do that in several ways, including introductions to key people in the area. As much as the leadership had cleared him, sometimes fieldwork visits clashed with political party meetings in the areas, but he was unharmed then. In Peter Hard Farm, the biggest day which the researcher covered much ground on was during Thursdays, which is traditionally a sacred resting day called *Chisi* in Shona language. In terms of times during the other days, interviews were conducted during mid-morning from 10 am to 3 pm, but during the farming season, this changed as the survey and interviews were done between 12 pm to 4.30 pm after people had left their fields. In terms of gaining entry, consent and rapport were negotiated every day to understand the people better.

#### 3.3.1.2 Pension Farm

Entering Pension farm was difficult as the set up was different from the Peter Hard one. At Pension Farm, the researcher had to get permission from the local farm manager from the City of Harare to talk to the farmers. The farmers in the area and their houses were a bit different from the ones in Peter Hard Farm as these had a compound set up, but with market gardens of fresh vegetables and other plots of land for farming other crops. In as much as Pension farm was much smaller in terms of size, its farming initiatives provided another dimension towards how the farmers managed issues of socio-ecological resilience and the gender dimension to climate change. The rapport and consent were negotiated daily so as not to clash with the people at the farm. The Harare City Council employs farm workers at Pension Farm, although the farm is deemed to be part of Zvimba Rural District. They are employed as herders for the city cattle. Interviews and surveys were conducted between 10 am to 4 pm daily during the research. The farm manager would meet the researcher daily and check on him and his team if he needed anything for fieldwork research to be more viable.

#### 3.3.1.3 Ingwe-Gomo farm

In terms of entry into Gomo Farm, authorisation was obtained from the village head in Amalinda Farm as he was also the one in charge there. The village's head secretary was the one who took the researcher to Ingwe-Gomo Farm. The Farm differed from the two as it has two types of inhabitants; the former war veterans and the former City of Harare workers who have also been

resettled. On this farm, through the village head secretary, who introduced him to the farm leadership, he was permitted to conduct research in the area. Consent was sought daily from household to household as the researcher and his team were doing the research. Challenges came around November and December when the farming season started, and the election period also started to warm up in the area. The researcher managed to negotiate these using the gatekeepers who explained who he was to the political authorities. He also produced proper documentation from the University of Pretoria and Zvimba RDC with the village head that helped to thaw the tensions that had arisen. However, besides this, the research went on well as access was gained into the farm and the people there knew him and the purpose of his visit there. The researcher stayed at Ingwe-Gomo farm for three weeks as he was conducting this study.

### 3.3.2 Population and Sample

A population is an entire group which one wants to conclude about, whilst a sample is a specific group from which the researcher would collect data from (Harrison et al.,2020). The population constituted of women and administrative personnel in Zvimba East rural community who were involved in different livelihood projects that had a socio-ecological resilience bearing; together with officials from the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD). Simple random, expert, and purposive sampling were used to identify the individuals who would participate in this study. Expert sampling was employed to recruit specialists who majored in areas of climate change, management of the environment and conservation.

#### 3.3.2.1 Sample Size Calculation

In conducting the survey, the sample size was calculated using Cronbach Alpha's formular for sample size calculation. The Cronbach's Alpha sample size calculation formular was adopted because it is a measure of the internal consistency or reliability between several items, measurements or ratings (Hajjar, 2018). This is so useful in this study because it estimates how reliable the responses of a questionnaire are or the domain of a questionnaire is. It is an instrumentation for rating which is evaluated by subjects who will then indicate the stability of the tools (Hajjar, 2018). The researcher used statistics from the selected Post-Fast Track Resettlement Farms which are found in the ward in Zvimba East District; which has a population of about 2675 people overall spaced across different areas. The researcher then used the formular below to calculate the sample size of his survey population as indicated:

$$\text{Sample Size Formula} = \frac{[z^2 * p(1-p)]}{e^2} / 1 + \frac{[z^2 * p(1-p)]}{e^2 * N}$$

Where,

- N is the population size
- z is the z-score
- e is the margin of error
- p is the standard of deviation

Figure 8: Sample size calculation formulae: Adapted from Cresswell (2007)

This was applied in situations where,

- N = Population Size
- Z = Z score (1.960)
- P = Standard Deviation (Assumed as 50% or 0.5)
- M = Margin of error

**Note:** Z score was determined based on the confidence level.

The sample size of the survey that the researcher got was 337 participants or households which were then included in the study.

As Amalinda farm is twice the number of people in Ingwe-Gomo Farm and thrice the number of households in Pension Farm, the researcher ended up also using the ration of 1:2:3 to ensure representability of cases in the sample. The number of households that were included in the study were as follows:

<b>Farm</b>	<b>Households</b>
<b>Amalinda Farm</b>	153
<b>Ingwe-Gomo Farm</b>	102
<b>Pension Farm</b>	82
<b>Total</b>	337

Table 3.1: Number of Households Included in the Study

### 3.3.2.2 Simple Random Sampling

When the researcher got to the farms, he adopted simple random sampling in order to correctly pick the houses that had to be included in the study. He explained clearly to the two research assistants who were working with him that after each house, they had to skip one house in the study to include the other one. He ensured that he included 337 households across the three farms

using this technique. Through this sampling procedure, the researcher ensured that he had 153 households in Amalinda Farm, 102 households in Pension Farm and 81 households in Gomo Farm as per the prescribed number of households found on these resettlements. Therefore, he recruited these participants into the survey through simple random sampling.

#### 3.3.2.3 Purposive Sampling

As the survey was conducted, as the principal researcher for the selected households under study, the researcher purposively chose individuals that would be involved in the in-depth interviews and focus group discussions that would be conducted in the study. He purposively selected 30 participants to be included in the study in these three farms. On each farm, eight female participants and two male participants were chosen. From these households selected using random sampling, 12 composed of 8 females and 4 men participants were selected purposively to be included in the Focus Group Discussions that were held on the Farms on Thursdays and Saturdays. The men were included in the study to also give a voice on how they saw women surviving through the scourges of climate change. Even though they were included, the female voice was amplified through the number of women included in the study as the study focused chiefly on women.

#### 3.3.2.3 Expert Sampling

In addition, expert sampling was used to recruit key experts that are crucial in painting the picture of socio-ecological resilience to climate change. The researcher made sure that he included the key informants, such as the headman, Zim Parks and Wildlife rangers, EMA Officers, AGRITEX officers, CCMDZ, Zvimba RDC, MoHCC and MoLAFWARD. Representatives from these organisations were also interviewed in the study in order to hear the expert analysis of gender and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms. In line with this, the investigator included eight key informants in the study as the basis of key insights on the issues under investigation so as to understand the subjects under study. The key experts were interviewed on the days and times when he had booked an appointment with them. Most of the interviews with these key informants were done during November to early December 2022.

#### 3.3.2.4 Summary of the sampling procedure

The sampling procedure was hinged on mainly three sampling techniques which are simple random sampling, purposive sampling, and expert sampling. For selecting participants across the farms, the sampling frame for Zvimba East District ward one was used with particular focus on

the three farms. Throughout these procedures, the study participants were recruited in line with the study's aims.

### 3.3.3 Research Techniques and Instruments

In conducting the research, the researcher used different research instruments and techniques to unearth data on issues of gender and socio-ecological resilience to climate change in selected Post-Fast Track Resettlement Farms in Zvimba East District. It particularly looking at the means and ways in which women are using the farms. Dubey and Kothari (2022) explain that research instruments are the tools used in conducting research. In this study, five different research instruments were used to collect participant data as outlined below.

#### 3.3.3.1 Questionnaires

A questionnaire contains a series of questions that the researcher asks respondents to obtain information for a research study (Flick, 2002). Questionnaire were designed, based on the research objectives and questions in order to understand socio-ecological resilience to climate change and gender in Post-Fast Track Resettlement Farms. The questionnaires were administered to 153 households on each farm in Amalinda Farm, 102 on Ingwe-Gomo farm and 82 on Pension Farm in Zvimba East District. The questionnaire used both closed-ended and open-ended questions to elicit views that would allow for more accessible analysis and comparability by the researcher (Saunders in Lincoln and Guba, 2009). The questionnaire helped to enumerate the different demographics of women in the area, the type of livelihood options they engage in, the frequency of the livelihood option engagement on the farm, and the nature of the livelihood option, to mention a few. 337 questionnaires were administered to the households in the three selected farms in Zvimba East District.

Participants in the in-depth interviews were purposively selected from these households, as explained below. The household surveys were conducted between the period of June and October 2022. Most surveys were conducted on weekdays between 10 am - 4 pm on the farms. However, during weekends, researchers only did the research on Saturday between 10 am - 1 pm in all the farms. Surveys were conducted first and followed up with in-depth interviews to check on the authenticity of the generated statistical data. This was done concurrently.



#### 3.3.3.2 In-depth Interviews

Another technique that was used in the collection of data was in-depth interviews. Hirose and Cresswell (2023) define an interview as a purposeful conversation. 30 interviews were carried out with women and men of different ages, including widows, single mothers, married women, and older generation women above 60. 10 participants from each farm were purposively selected from the households included in the study. This method was adopted because interviews are very flexible, allowing both the interviewee and interviewer to clarify and explain matters if they arise. They were conducted between October and December 2022 in these respective farms. The interviews were conducted on Mondays, Wednesdays, and Fridays. They were conducted a day after completing the surveys as per the prescribed method of concurrently conducting surveys and in-depth interviews.

#### 3.3.3.3 Key Informant Interviews

The researcher also conducted key informant interviews that were selected through expert sampling. Huff (2009) defines the key informant as an expert in a field or strategically knowledgeable person about the phenomenon under study. In this research, eight key informant interviews were done with participants from the Ministry of Environment, Water and Climate, Zim Park Rangers, RDCs, EMA, Village head and climate change scholars. The interviews with key informants helped to bring out expert views and analysis on the socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms in Zvimba East District. The key informant interviews were conducted from November to December 2022. Most of the interviews were done at the offices of the key informants on the dates the researcher had booked for the interviews with these experts. He mainly conducted the key informant interviews in order to gain expert information on climate change issues and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms.

#### 3.3.3.4 Observations

Marshall and Rossman in Kothari (2014) notes that observation is the systematic description of events, behaviours and artefacts in the social setting chosen for the study. Under this research tool, the information on gender and socio-ecological resilience to climate change was sought through investigators' direct observation without asking respondents, which helped create a connection and paint a picture of the facts already emerging from qualitative and quantitative research methods. The observation was conducted through transact walks with Agricultural Extension Officers, RDC officials and farm leadership in each farm and with the local people. With Agricultural Extension

Officers, the researcher visited gardens and fields (for ordinary people and the most vulnerable women's groups). He had one full-day visit to each farm with these officials. In these walks, he observed and asked questions to people working in various livelihood options used in these Post-Fast Track Resettlement Farms which helped him to understand the gender matrix in socio-ecological resilience to climate change within natural contexts.

#### 3.3.3.5 Focus Group Discussions (FGDs)

The researcher used Focus Group Discussions (FGDs) to get different views from the farmers on the nexus between gender and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms at Amalinda Farm. He carried out 3 FGDs with 12 participants each; including some key informants cited above, comprising one in each farm. However, a suggested FGD with key informants could not take off as some could not attend due to work commitments. These FGDs were done interchangeably with the in-depth interviews. The investigator conducted one FGD after every eight in-depth interviews to ensure that the information collected was rich, and it gave room for clarification and verification of received data. To bring out the intersectionality of gender and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms. Three FGDs were carried out with the various women and girls found in these three farms, with some men being included to help provide direction on the farm.

The FGDs yielded information on how women operate and survive in the scourge of climate change, linking these to gender and socio-ecological issues in the area. An FGD interview guide was used to guide the discussions in the FGDs, and the researcher and his assistant exchanged roles of moderating and recording information. These FGDs were held at the Amalinda Farm Primary School and the farm offices on different farms, respectively. They were conducted in a mixture of English and Shona languages in order to communicate well and clearly, soliciting rich responses from the participants and thereby limiting language barriers in the expression of facts.

### 3.4 Data Analysis Procedures and Research Integrity

This section presents the data analysis procedures and research integrity which was done in this study.

#### 3.4.1 Data Analysis Procedures

This section discusses how data across the three farms that were carried out on Gender and Socio-Ecological resilience to climate was analysed. It gives a detailed picture and a summary in the

table below, showing how the data was examined. As the study was a mixed methods research, a triangulation of analysis procedures was used to fully paint a picture on what was transpiring across the three farms in as far as women’s socio-ecological resilience to climate change is concerned.

#### 3.4.1.1 Triangulated data analysis

Data was presented in thematic and statistical form. The Thematic Data Analysis technique entails that the researcher determines and draws broad patterns and themes from the collected data that will allow him or her to gain insight and comprehension of the object under study (Denzin and Lincoln, 2009). In doing this, data was packaged in different themes based on principles of coherence, uniformity of ideas, flow of issues being discussed, and time frames of events. As the research uses mixed methods that partially acquire quantitative data, tables and charts were used to facilitate better clarity and to enable quick conclusions to be made briefly. The themes were generated based on the content similarity and coherence of the field data. The themes were mainly derived from the set objectives and were the key cogs of the chapters presenting findings. Statistical analysis was incorporated into the analysis as well. Statistical programmes such as SPSS V24, Excel and Tableau were used in the processing of data and visualisation for efficiency and accuracy. In presenting the data in themes, this statistical presentation was juxtaposed to the thematised text in order to tell a story about gender and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms.

#### 3.4.1.2 Summary of the data analysis process

The table below summarises the procedures that were followed when conducting data analysis from the fieldwork.

<b>Research Objective</b>	<b>Method used to inquire about it</b>	<b>How data was analysed</b>	<b>When it was done</b>
<b>What is the nature, trends and patterns of climate change experienced in resettlement farms in</b>	Survey, In-depth Interviews and Key Informant Interviews	Descriptive statistics, Thematic Analysis	January 2023

<b>Zvimba East District?</b>			
<b>How have these climate change-related phenomena affected women farmers in Zvimba East District?</b>	Survey In-depth Interviews and FGDs	Descriptive statistics, Thematic Analysis	February 2023
<b>What are the different livelihood options available/adopted by women in coping with climate change in Zvimba East District?</b>	Survey, FGDs, In-depth Interviews	Descriptive statistics, Thematic Analysis	March 2023
<b>How socio-ecologically resilient are the livelihoods options adopted by the women in post-FTLRP resettlement farms to cope with climate change in Zvimba East District?</b>	Survey, In-depth Interviews and FGDs	Descriptive statistics, Thematic Analysis	April 2023

*Table 3.2: Summary of the Data Analysis Process*

### 3.4.2 Methodological Challenges Faced in Ensuring Research Trustworthiness

For any research to be regarded as valid and reliable, there is a need to ensure that it is trustworthy and well-focused in everything that is done. This section, therefore, discusses how validity and reliability were ensured in this research. The section also discusses the methodological challenges that were faced in this research when it was conducted in the selected farms in Zvimba East District.

#### 3.4.2.1 Ensuring Research Trustworthiness (Validity and Reliability)

Validity and reliability are significant concepts to be considered in research. Findings of a study must be generalisable in different settings. Readers and other scholars should have trust in the findings. Dube and Kothari (2022) defined validity as the degree to which a research study measures what it intends to measure. Hirose and Cresswell (2023:25) note that there are two main types of validity: “internal validity,” which is the “approximate truth about inferences about cause-effect or causal relationships, whilst external validity is the ability to generalise the research findings to the target population”. Adding on to this, reliability is another facet that helps to measure the trustworthiness of the research. According to Newman (2020), reliability is the “stability of responses to multiple coders of data sets”. However, Drost in Pandey and Pandey (2021) defines reliability as the extent to which “measurement is dependable, repeatable and consistent”. Put, reliability refers to the repeatability of a measure.

To ensure the validity and reliability of the research process, the researcher conducted pilot testing of all the instruments before conducting the study. Pilot testing was done in August 2022. The researcher used 15 questionnaires in trial-testing the instrument. After the pilot test, a few translation errors were noted and rectified before the main research. In addition, the focused group discussions guide, key informant interview guide and in-depth interview guide were tested during the period, and the errors noted as well as rectified. Most of the mistakes noted were not significant but were minor, as these were recorded in translating the tools from English to Shona.

Furthermore, before commencing the study, the researcher also conducted intensive training for his assistants. As the lead researcher, he took the research assistants and worked with them through the research itinerary, following the process of concurrently collecting quantitative and qualitative data. The research assistants were trained over a period of two days where they learnt the process of entering the field, holding the survey as well as in-depth interviews, and facilitating FGDs. On

the final training day, the assistants were finally trained on maintaining ethics and some complexities to watch out for.

In addition, to enhance validity and reliability, the researcher also considered triangulation of methodologies, approaches, methods, and sampling techniques used in this research. To produce rich data that paints a complete picture of socio-ecological resilience to climate change of women in Post-Fast Track Resettlement Farms, he adopted the mixed methods, that is integration of qualitative and quantitative approaches. Through such research designs and methodology, he managed to reduce bias in both designs and methods by combining them in their strengths and weaknesses. Through triangulation, he managed to enhance the validity and reliability of the research.

In conducting the research, reflexivity was adopted after every research process to see whether processes being implemented were still in touch with what the study was set out to look for. According to Huff (2009), reflexivity is the researcher's scrutiny of his or her research experience, decisions and interpretations in ways that bring him or her into the process and allows the reader to assess how and to what extent the interest, position and assumptions influenced inquiry. This approach was adopted in order to understand how the contextual history of the data affected any knowledge claims that were made regarding research findings. According to Dubey and Kothari (2022: 10);

reflexivity requires an awareness of the researcher's contribution to the construction of meanings throughout the research process and an acknowledgement of the impossibility of remaining outside of one's subject matter while conducting research.

Therefore, it was necessary for the researcher to reflect on how his background might impact on the research findings. Accordingly, he would continuously reflect on how his actions, values and perceptions could impact on the research setting and how they might affect the data collection and analysis process in order to reduce bias. He ensured that the respondents' behaviours, beliefs, systems, and actions did not affect data analysis.

In addition to this, the researcher also used epistemological reflectivity which requires one to engage with questions such as how the research question definition might have limited what could be found. He also introspected on how the design of the study and analysis method used constructed the data and the findings. Other self-introspective questions considered how the research question could have been investigated differently, and to what extent this would have given rise to a different understanding of the phenomena under study. On critical language awareness, the researcher interacted with people more frequently in order to be familiarised with some words he did not understand well so that it would be easier to interpret the meaning as it is and report truthfully. Furthermore, an audit trail was done. According to Tedlie and Yu (2006), an audit trail is a process that encompasses a thorough collection of documents regarding all aspects of research. Thus, the researcher kept all records of study processes so as to take stock of the processes he would have embarked on and note if some inaccuracies and areas needed to be revisited. He kept all the documents used at every research stage to help map the steps he took in conducting this research. He stored all the videos and recordings on an external hard drive and ensured that no one could access the videos easily. All counter books with field notes, dates, and daily reports were kept safe and will be destroyed after ten years.

#### 3.4.2.2 Methodological Challenges Faced

In conducting the research, several challenges were faced which required the researcher's astuteness and brilliance to go around them. The first challenge was that the fieldwork process in Zvimba East District coincided with the election mode and frenzy a year before the elections. As Zimbabwe went through the elections in 2023, the researcher faced several challenges, including conducting some of the interviews and surveys that clashed with ZANU PF meetings and being questioned whenever he met some leaders. However, the researcher managed to go through this with the help of the gatekeepers, such as the village head and the councillor, who helped protect the researcher and explain his presence in the area. Also, through these, the researcher was informed of the days when meetings would be held beforehand, and the researcher would not conduct field visits during such days.

Another challenge which the researcher faced was clashing with the farming seasons that were about to start. As Zimbabwe and Zvimba East received early rains in 2022, which started as early

as the end of October, most people in the farms were then busy in the farms. However, to go around this, the researcher conducted his research during *Chisi*, the day of rest (Thursdays) in Amalinda Farm and any time after 11 am after people had come out of the field and were resting. This adjustment was done during the farming period from October to January when the research was going on. As the research was conducted soon after the COVID-19 pandemic, the fear of contracting COVID-19 was still there, especially amongst the experts whom he interviewed in their offices. Some experts even postponed meetings whilst others cancelled them due to this fear. However, when the investigator noted that; he became more vigilant on COVID-19 prevention techniques though these were relaxed over time. To make them feel safe and secure, the researcher maintained social distancing, used face masks where necessary, and always carried sanitisers and extra face masks.

### 3.5 Research Ethics

According to Creswell (2005), ethics concerns the moral principles and values influencing how a researcher or a group of researchers conducts their investigatory activities. This research was done under appropriate ethical standards to avoid potential ethical problems. The researcher ensured that harm to the participants was avoided at any cost in this research, as any infringement of the rights of the participants would mar the results that would have come out of this research. In this section, details of the various ethical procedures that were done to make sure that the research was conducted well and did not harm participants in any way are discussed.

#### 3.5.1 Informed Consent

Before starting any interview or survey process, participants were given the necessary information on the study aim, design, and procedure to empower them with the knowledge that would allow them to make informed decisions on whether to participate or not. After this, the researcher sought the consent of the participants by handing out consent forms. Those who agreed to participate by signing consent forms were included in the study, whilst those who denied were respected and were excused from the study. The researcher also explained that at any stage of the research process, the participants had the right to withdraw their participation; if they felt uncomfortable, or thought their rights were infringed in any way. He sought and was granted permission to use voice recorders and cameras for observations before conducting focus group discussions and when asking questions during observations. Throughout the research, though initially, the participant



had agreed to participate in the study, consent was constantly sought during the interview or survey process to check and confirm the comfortability of the participants to continue with the research process.

### 3.5.2 Anonymity and Confidentiality

Ethical values of anonymity and confidentiality were considered and highly prioritised from the data collection and presentation process to the final publication stage. Newman (2020) notes that the researcher should put into place the strategies and steps they will take to protect the identity of the participants from being discovered. This researcher held the perception that some participants might disclose their experiences, viewpoints, or perception, which they might not want to be attached to their names or information that helps identify them. Therefore, throughout the research process, pseudo-names were used to stand in place for the real names of informants. In the write-up of the presentation, pseudonyms were also used in all the information given in this project. The data was kept safe under lock and key after the research was done and will be shredded and burnt after the whole study.

### 3.5.3 No Harming of Participants

The investigator was attentive and critical of actions, inaction and any behaviour which could harm the participants physically, emotionally, and psychologically. He ensured that harm was avoided in any way and form for the study participants by reassuring them that if there was any infringement of their rights in the research process, they had the right to withdraw from the research process at any moment and time. As the lead researcher, he gave the research participants sanitisers and face masks. He ensured that social distance was maintained during interviews, FGDs and survey processes along the way and research processes. From the research design to the publication of the research findings, the researcher was always aware and tried to avoid any action or inaction that could harm the participants.

### 3.5.4 Debriefing and Dissemination of Information

After the study was completed, the researcher gave participants a debriefing on the research process and the study results. He also informed the participants that the research results would be published as a thesis and some information in journals for educational purposes. Reassurance of confidentiality and anonymity of the participants' identities in this process of dissemination of information was given and guaranteed in the debriefing meetings after the fieldwork.

### 3.6 Chapter Summary

This chapter explained how the research on gender and socio-ecological resilience to climate change was conducted in Zvimba East District. It highlighted how the research was conducted, which techniques were used, where the research was conducted and when it was conducted. The chapter further justified the rationale for conducting the study in Zvimba East District. The ethics that were followed in the research and the challenges that the researcher faced in conducting the research were also highlighted in the chapter. The chapter concludes by giving a summary of everything that was presented.

## Chapter 4: Background And Context Of The Study

### 4.1 Introduction

The approach adopted in this chapter is based on the understanding that any evaluation of the post-2000 Zimbabwe's gender and socio-ecological resilience to climate change dynamics in Fast Track Land Reform and Resettlement farms should begin with an analysis and assessment of the historical situation before the FTLRP process, and other natural dynamics that affected these processes. Such an examination provides a grounded understanding of the history of resettlement in Zimbabwe and economic circumstances prior to the 2000s, when the recurrent agricultural production crisis started in the country, and the role that agriculture has played in the livelihoods of farming households. Generally, in Zimbabwe agriculture has played a prominent role in rural households' livelihoods, and after 1980, rural households began to dominate maize production and markets in the country (Eicher, 1995; Eicher and Rukuni, 1994; Rohrbach, 1988). The analysis was thus grounded on diverse literature and key informants' accounts of the country's natural environments, livelihood experiences, agriculture and its transition, gender dynamics, and climatic changes.

The chapter is organised as follows. Immediately after this introduction, section 4.1 provides a short outline of the Zimbabwe's natural environment, focusing on climatic conditions and changes brought by climate change in the country. The section also interrogates the different agroecological zones of Zimbabwe in order to paint a full picture of what the country is like, thereby helping to set a foundation to understand socio-ecological resilience in Post-Fast Track Resettlement Farms. Section 4.2 focuses on the context and background of the settlements in Zimbabwe, focusing on the four types of settlement that exist in Zimbabwe; which are the commercial, communal, African purchase land and resettlement in the post-colonial times. This comprehensive description of the historical context of the resettlement zones in Zimbabwe, considering the type and nature of resettlement zones is particularly important as it provides the necessary foundation for tracing the profile of the section to be dealt with in chapter 5. The section also moves on to discuss the natural conditions and climate change in Zimbabwe. Section 4.3 discusses the climate change adaptations means and ways that have been used by farming communities in Zimbabwe. The section points out the fact that people are rational beings and are bound to react and act to situations, hence their adaptation to climate change. 4.5 provides a chapter summary.

## 4.2 Understanding Zimbabwe's natural environment

The section discusses Zimbabwe's natural environment in order to create a basis for understanding gender issues and socio-ecological resilience to climate change in Post-Fast Track Resettlement Farms. The section opens by first describing the natural conditions, climate change transformations in Zimbabwe and associated problems which have created the basis for the discussions that will follow later in the ensuing chapters. After presenting this, the chapter narrows down to the natural farming regions in Zimbabwe and how these have also changed because of climate change. The five natural farming regions or agroecological zones and their subdivisions are discussed and presented in-depth.

### 4.2.1 Natural Conditions, Climate and Changes Associated to Climate Change

The natural conditions and climate in Zimbabwe are the basis of the country's economy. The country is characterised by diverse climatic patterns; with the eastern highlands receiving more than 1500 mm of rainfall while the southern and western parts of the country are dry and characterised by erratic rainfall of less than 500 mm per year (Manyeruke, Hamauswa and Mhandara, 2013). On the other hand, mean annual temperature decreases from about 23°C in the low-lying areas in the southwestern parts of the country to about 18°C in the eastern highlands (Mapfumo et al., 2020). The diverse climatic pattern is a key determinant of vegetation pattern and soil characteristics. Mostly, in the regions that receive high rainfalls such as Region 1 and 2 of areas covering Manicaland and Mashonaland East, the soils are mostly clay in nature whilst are others mostly reddish brownish in nature or greyish blackish in colour. The areas that receive normal to medium rainfall; mostly Mashonaland Central, West and Midlands have red soils and mostly loam soils that are reddish- greyish in colour (Musiiwa, 2012). However, the regions that have receive medium to low rainfall such as Lower Gweru, Masvingo and Matabeleland have mostly sandy soils that are whitish in colour. As outline in the map below, Zimbabwe lies wholly within the tropics and experiences a sub-tropical climate that is influenced by its geographical position's altitude, effects of complex regional topography and the surrounding ocean currents. The map below further shows that Zimbabwe's climate can be classified into five climatic regions, namely the oceanic climate, wet dry tropical climate, humid subtropical climate, semi-arid climate, hot semi-arid climate, and desert climate. Based on this map, it can be noted that between 65% to 70% of the country is mostly semi-arid in nature.

In line with this, one key informant interviewed in the study explained that:

With the climatic changes happening in the country, most of the country's areas have now become semi-arid to arid in nature. This is mainly so because of the reduced rainfall patterns that are being experienced in the country in mostly the Midlands, Matabeleland and Masvingo province together with parts of Mashonaland provinces. The erratic rainfall patterns and drought spells across the country in the past 20 years have increased aridity in these areas (Meteorological Officer, Zvimba RDC, Fieldwork).

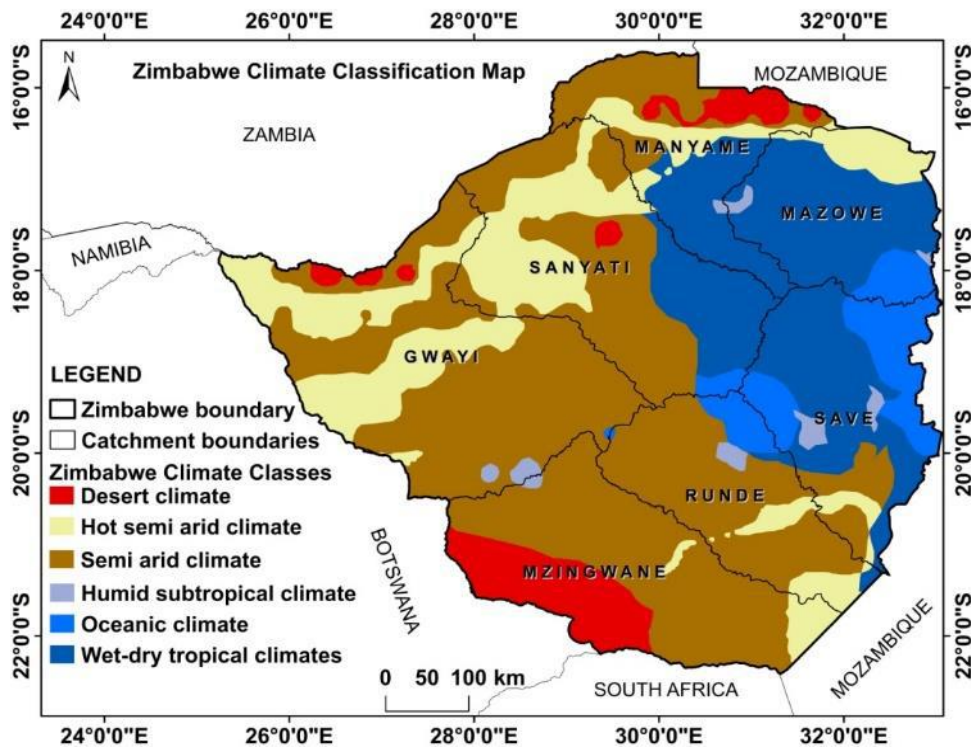


Figure 9: Zimbabwe Climate Classification Map: Adapted from ZINGSA AEZ (202)

Since climate is the main determinant of agricultural practice, delineation of geographical regions into homogenous zones where variations in climate determine the agricultural activities practised in these areas has been done Zimbabwe National GeoSpace Agency Agro-Ecological Zones (ZINGSA AEZ, 2020). To date, agricultural practice in Zimbabwe has been based on Agroecological Zones or Natural Regions, hereafter referred interchangeably as AEZs or simply Natural Regions (NRs), which were developed by Vincent and Thomas in the 1960s (Vincent and Thomas, 1960). These AEZs were later modified by the AGRITEX Department in 1984 and the revised map is hereafter referred to as AGRITEX (1984). Although the AEZs developed in the 1960s provided an adequate basis on which agricultural practice in the country was based, the changes induced by climate change has made the applicability of these zones difficult.

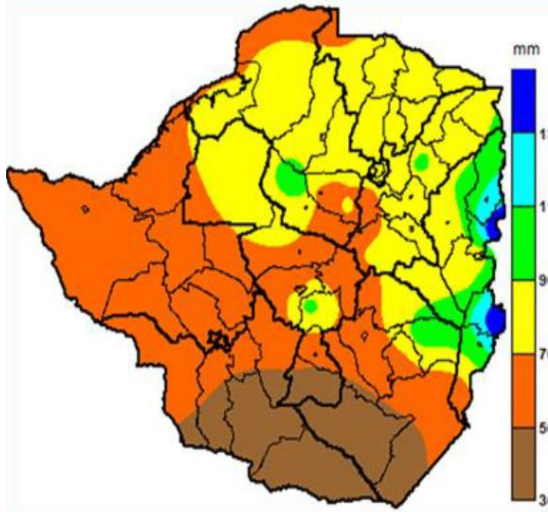


Figure 10: Annual Rainfall Distribution

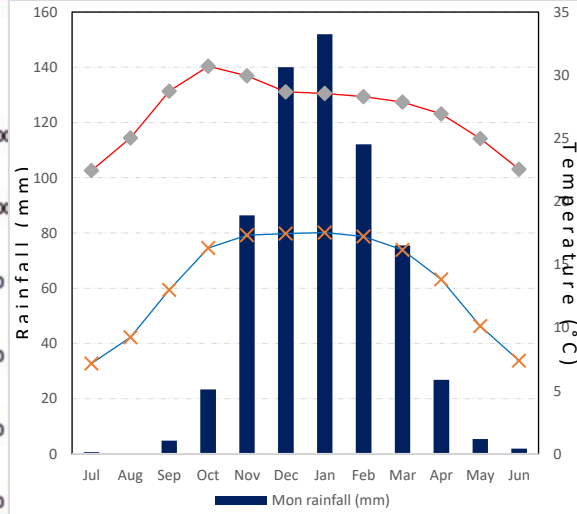


Figure 11: Monthly Rainfall Distribution

As highlighted in the maps above, Zimbabwe’s climate has been changing since the 1900s. Notable changes include:

- ✚ an increase in average temperatures,
- ✚ decrease in annual precipitation,
- ✚ change in the onset and cessation dates of the rainy season,
- ✚ an increase in the duration of the mid-season dry spell and
- ✚ change in the spatial extent of the country’s Agroecological Zones.

The country experiences four seasons namely Cool season (Mid-May to mid-August), Hot season (Mid-August to mid-November), Main rainy season (Mid-November to mid-March) and post rainy season (Mid-March to mid-May) (Manyeruke, Hamausawa and Mhandara, 2013). The country is experiencing extreme weather events with increased frequency, magnitude, and intensity. These include tropical cyclones, floods, hailstorms, droughts, increased and extended mid-season dry spells, and heatwaves (Karuma, Bhatasara and Nyamwanza, 2021). Based on this, it can be noted that climate change has altered temperature and rainfall regimes; thereby affecting patterns of agricultural practice relevant for different regions in the country. Current observations indicate that climate change has disrupted the normal climatic patterns in such a way that the traditionally recognized AEZs are no longer in tandem with the expected agricultural productivity (Unganai, 2022), hence the reduced agricultural yields.

Despite the observed changes in the climatic pattern which directly affects crop and livestock production, agricultural practice in the country is still being planned based on the traditional AEZs developed in the 1960s, with some slight modifications in 1984 (Mtekwa, 2009). This threatens the sustainability of the agricultural sector due to deployment of unsustainable agricultural practices which are incongruent with prevailing climatic conditions. This mismatch between land capability and agricultural practice leads to several undesirable outcomes such as land degradation, loss of biodiversity and ecosystem services and consequently results in poor performance of the sector, which is key to the economy of Zimbabwe.

In line with this, during an interview; one key informant from the climate change department in Zimbabwe highlighted that:

The agroecological zones of 1986 have largely now lost touch with the reality that is happening on the ground. Planning based on these zonal demarcations is now a trap, leading to losses on behalf of the farmers as the AEZ has far become disconnected with how the communities and places in Zimbabwe area in these current years are appearing like. For example, some areas in natural Region 1 such as Marondera, Macheke and parts of Headlands were now experiencing phenomenon of natural Region 2; showing that planning with the AEZ of 1960 and 1986 in mind is planning to fail due to climate change happening in Zimbabwe. (Interview with Climate Change Dept Officer, Harare, 2022)

The climatic changes as raised above, often lead to poor agricultural yields which reduce economic growth particularly for agro-based economies, hence the need to restructure the agricultural sector to reflect current trends in climate. As result of this, in response to the urgent need of aligning agricultural practice with the changing climatic patterns, the Government of Zimbabwe through the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development initiated a revision of the country's agro-ecological zones (ZINGSA, AEZ 2020). The following section discusses the new AEZ in Zimbabwe that are mainly hinged on the (ZINGSA, AEZ, 2020) study of 2020 which developed them after their national study of the state of the ecology and climate of Zimbabwe to have an updated AEZ in the nation.

#### 4.2.2 Zimbabwean Natural Farming Regions

Zimbabwe is divided into five agroecological regions, known as the Agroecological Zones, based on the rainfall regime, soil quality and vegetation among other factors (ZINGSA 2020). These natural ecological zones are presented in Fig. 4.1. Agricultural potential declines from Natural Region (NR) I through to NR V due to natural conditions such as climate and soil quality (Moyo,

2000; Vincent and Thomas, 1961). While the zoning is widely used in categorising regions, these categories are not without problems, and the zoning of these regions have been revised three times in since 1960 (1960, 1984 and 2020) due to the changes in the climatic conditions of the areas of the years (refs). Although the revised AEZ map has similar regions (that is Natural Regions I to V) to the previous work by Vincent and Thomas in 1960 and AGRITEX (1984), the categorisation was revised in 2020. The recategorisation was guided by changes in natural conditions due to changing climatic conditions. According to Mugandani (2012) the changes in the climate in Zimbabwe warrants the 1986 AEZ demarcations to be null and void as climate change is happening fast and spontaneously, causing vast changes in the agroecological zones in Zimbabwe.

#### 4.2.2.1 Natural Region I

Natural Region 1 is found in the eastern part of Zimbabwe. This is highly suitable for diversified cropping and covers 14, 439 km<sup>2</sup> which translates to almost 4 % of the whole country. However, farmers in this NR grow crops that include coffee, tea, and potatoes since these are high value crops and would, therefore, translate to more income (Mafangoya, Risinamhodzi and Siziba, 2016). In the previous agroecological classification, the area contributed only about 1.8% of the whole country (7024 km<sup>2</sup>), but according to this work (ZINGSA AEZ, 2020), the NR has moved westwards. The NR has increased by 106%. In addition to factors cited above, the mean annual temperature ranges from 15 to 18 °C, mean minimum temperatures of 10-12 °C and mean maximum temperature range of 19-23 °C also characterise the NR (ZINGSA AEZ, 2020). This and other factors listed in Table 3 make the NR highly suitable to cropping high value plantation crops. This region receives the highest amounts of rainfall in the country, exceeding 59 1000 mm per year on average.

#### 4.2.2.1 Natural region 2a and 2b

The area occupied by each AEZs of Zimbabwe based on the new classified zones has five natural regions with Region 2 and 5 being divided into subdivision A and B respectively (ZINGSA, 2020). R2 is divided into 2a and 2b which occupy 5.7% and 9.3% of the country respectively (ZINGSA, 2020). The main distinguishing feature of the two sub-regions is that NR 2b experiences more dry spells than NR 2a (Mugandani, 2012). The region is found within the central, north-eastern, and eastern parts of the country. The new Natural Region 2 covers 29,658.62 km<sup>2</sup>, translating to about 7.6% of the whole country. In the previous classification, the area covered 15% (58,536 km<sup>2</sup>) of the country. The results indicate that the NR has decreased by 49%. In this new classification,



Mhondoro has moved from NR 2 to 3. There is also a new narrow belt extending from Nyanga southwards, which is now part of NR 3 and appears to demarcate NR I from other regions. The shape of this region has also changed as part of it has been encroached by NR 3. Farmers in this NR grow maize, tobacco, cotton, and wheat, in addition to intensive livestock production. The new NR 2 is also characterised by mean maximum temperature range of 19-23 °C, mean minimum temperature range of 10-13 °C and mean annual temperature range of 16-19 °C.

#### 4.2.2.3 Natural Region 3

NR 3 is in the central, western, southern, and eastern parts of the country. The region is spread over 16.2% of the country. The new Natural Region 2 covers 29,658.62 km<sup>2</sup>, translating to about 7.6% of the whole country (see Fig. 3). In the previous classification, the area covered 15% (58,536 km<sup>2</sup>) (Fig. 2) of the country. The results indicate that the NR has decreased by 49%. In the new classification, Mhondoro has moved from NR 2 to 3. There is also a new narrow belt extending from Nyanga southwards, which is now part of NR 2 and appears to demarcate NR I from other regions. The shape of this region has also changed as part of it has been encroached by NR 3. Farmers in this NR grow maize, tobacco, cotton, and wheat, in addition to intensive livestock production. The new NR 3 is also characterised by mean maximum temperature range of 19-23 °C, mean minimum temperature range of 10-13 °C and mean annual temperature range of 16-19 °C.

#### 4.2.2.4 Natural Region 4

In terms of area, NR 4 is the second most extensive region and occupies 29.1% of the country (ZINGSA AEZ, 2020). It dominates the central and western parts of the country and borders NR 3 and NR 5. The area covers 155, 707 km<sup>2</sup> which translates to 39.9 % of the whole country (Fig. 3). In the previous classification, the area occupied about 37.8% of the country (Fig. 2). Other characteristics of this NR are, mean minimum temperature range of 11- 20 °C; mean maximum temperature range of 19-26 °C and a mean annual temperature range of 18-24 °C. The NR has increased by 5.6%, which is a result of the greater part of Gweru being downgraded from NR 3 to 4. However, this did not result in a significant increase since the Hwange area has been downgraded to NR V, mainly because of the new classification criteria since the greater part of that area has regosols. Natural Region IV is an extensive livestock production area with some drought tolerant crops such as sorghum, millet and rapoko. Farmers also grow some short season maize varieties.

#### 4.2.2.5 Natural Region 5A and 5B

The ZINGSA AEZ (2020) has classified Natural Region 5 into 5a and 5b. The classification into NRs 5a and 5b is reflective of the increased aridity in this region, which is being mostly driven by climate change. Specifically, the region has experienced a significant reduction in rainfall, coupled with increased dry spells and high evapotranspiration which all reduce effective moisture; rendering the region to be too dry for viable agriculture (ZINGSA AEZ, 2020). The most extensive of the AEZ is NR 5 with NR 5a and NR 5b occupying 29.4% and 8.8%, respectively. NR 5 is the driest in the country and predominates the major river valleys of the southern, western, and northern fringes of the country whilst relative to NR 5a, NR 5b is so dry that it cannot sustain any form of rain-fed agriculture and is restricted to the southern-most parts of the country (ZINGSA, AEZ 2020). These natural farming regions are spread across the ten provinces of Zimbabwe which are run by various resident ministers which include Harare, Bulawayo, Mashonaland East, West and Central, Matabeleland North and South, Manicaland, Masvingo and Midlands province (Chikodzi et al., 2013).

<b>Natural Regions, Annual and Systems Region</b>	<b>Area (000 ha)</b>	<b>% of total land area (%)</b>	<b>Annual rainfall (mm)</b>	<b>Farming Systems</b>
<b>1</b>	6008.8	1.5	> 1 000. Rain in all months of the year, relatively low temperatures	Suitable for dairy farming forestry, tea, coffee, fruit, beef and maize production
<b>2a</b>	22085.4	5.7	700-1 050. Rainfall confined to summer	Suitable for intensive farming, based on maize, tobacco, cotton and livestock
<b>2b</b>	36304.7	9.3	700-1 050. Rainfall confined to summer but more susceptible to dry spells	Suitable for intensive farming, based on maize, tobacco, cotton and livestock
<b>3</b>	63215.2	16.2	500-800. Relatively high temperatures and infrequent, heavy falls of rain, and subject to	Semi-intensive farming region. Suitable for livestock production, together with production of fodder

			seasonal droughts and severe mid-season dry spells	crops and cash crops under good farm management
<b>4</b>	113594.9	29.1	450-650. Rainfall subject to frequent seasonal droughts and severe dry spells during the rainy season	Semi-extensive region. Suitable for farm systems based on livestock and resistant fodder crops. Forestry, wildlife/tourism
<b>5a</b>	115041.2	29.4	< 450. Very erratic rainfall. Northern low veld may have more rain but the topography and soils are poor	Extensive farming region. Suitable for extensive cattle ranching. Zambezi Valley is infested with tsetse fly. Forestry, wildlife/tourism
<b>5b</b>	34499.8	8.8	< 400 so dry that it cannot sustain any form of rainfed agriculture and is restricted to the southern-most parts of the country.	

Table 4.1: Zimbabwe current natural regions adapted from ZINGSA AEZ (2020)

### 4.3 Analysis of settlements in Zimbabwe

In analysing the Zimbabwean settlements and land tenure systems, one can note that the country has undergone different tenure systems in its colonial and post-colonial times. This section discusses the various settlements that have been established in Zimbabwe from the colonial to the post-colonial times; with its apex which is the Fastrack Land Reform Programme in Zimbabwe.

#### 4.3.1 Communal areas

The arrival of the British in Zimbabwe in 1890 resulted in speedy social and political changes, especially the settlement patterns and land use systems which went through a radical transformation; with an expectant effect on animal and social structures (Chambati, 2013). The Pioneer Column invaded vast lands in most parts of Mashonaland, and this marked the initial occupation of land by white settlers (Mkodzongi, 2018). The evicted families had to move in groups according to their chieftainships and they were not paid any compensation on their land and assets which they might have left at their original homes. On the contrary, David Hasluck; director of the Commercial Farmers' Union (CFU) from 1984 to 2000 expressed that since the land was grabbed from Zimbabweans' ancestors without any compensation and it was often

chaotic; there was no one who recognised the violence. This discrepancy was ignored by the British colonial power and therefore, people had to live with the consequences (Matondi, 2012).

According to Masiwa (2005), of course the communal areas were established as labour reserves in the colonial period and were never meant to afford people the opportunity to accumulate wealth independently. The aim was to provide some level of social security in old age, and a place for women and children to live, while men migrated to town or to the farms and mines to work (Chiremba and Masters, 2011). This wage labour was then the source of income and agricultural production was just complementary subsistence. A study by Chazovachii et al., (2012) in Gutu district (Zimbabwe) revealed that most communal farmers in semi-arid and arid regions of the country committed at least 90% of their acreage to maize production and only 10% to small grains. Resultantly, there is a lot of acreage being wasted when the maize crop fails, even though farmers indicated that they experienced better yields on the acreage under small grains when compared to that under maize as both the soils and rains received in communal areas were not suitable for good crop cultivation.

Along with this, in an interview with one community elder in Amalinda he explained that:

Resettlement started with the white people when they placed us in areas called ‘reserves’. These reserves had poor soils, little rainfall and were not good for crop cultivation as they intended to push us men to the city to look for wage work. I remember some of my friends were even taken to as far as Gwaai, Shangani and even Bocha areas in Manicaland. This was done to reduce our productivity as the black people and keep us in poverty which is why then we went to war so we could get this land that we now have. (Interview with, Community Elder, Amalinda, 2022)

In line with this, Mkodzongi and Spiegel (2019) concur that the communal areas were established as labour reserves in the colonial period and were never meant to afford the opportunity to accumulate independently. The aim was to provide some level of social security in old age, and a place for women and children to live, while men migrated to town or to the farms and mines to work (Shonhe, 2018). This wage labour was then the source of income and agricultural production served as just complementary subsistence. Some black people managed to break away from these strictures in the past, and there were always a few communal area agricultural entrepreneurs – the *hurudza* – who ran large herds or farmed large fields, often through polygamous family labour. However, for most people, the colonial system of land use kept the reserves poor but surviving,

and purposely so. Following independence, this did not change hugely. Sifikile et al., (2021) posit that the post-independence resettlement schemes provided opportunities for a few, but most continued with patterns of circular migration to places elsewhere in Zimbabwe or from some areas to South Africa as part of a demographic cycle.

With employment opportunities drying up in the 1990s, this changed; thanks to the Economic Structural Adjustment Programme (ESAP), with new patterns of land use emerging in the communal areas, including some intensification (Chaumba et al., 2003). Nevertheless, the basic patterns persisted; within a dualistic agrarian structure in which the communal areas remained highly constrained. Only with the major land reform did this change radically, following the significant expansion of opportunities to gain access to land through the ‘fast-track’ land reform programme following 2000 (Chambati, 2013). However, from Zimbabwean rural communal sites, despite there being resettlement areas, relatively few moved from the households in our sample to the new areas. Even when they did, apart from moving to Mwenezi, connections between the old homes in the communal areas and the new resettlement areas have declined over time. However, there remains important exchanges of livestock, labour and food that continue (Mutasa, 2015). Those lucky enough to get land in the new resettlements were doing much better: having access to land, especially in the higher potential districts of Masvingo and Gutu. It made a big difference, and as research has shown over many years, there were opportunities for accumulation and livelihood improvement than for people in the communal areas.

In addition to their main land holdings, many people in the communal areas also have gardens. As more intensive areas of production, these have often been the focus for intervention but usually as group efforts rather than individual enterprises. Gardens can be near the home or further away to a suitable water source. These tend to be small, usually less than 0.1 ha, and are irrigated mostly by hand, with most vegetables being used for home consumption (Chambati, 2011). Most gardens are managed by women, and are an important source of relish year-round. This scenario is not necessarily because of men being the household heads, but it is due to the fact that a husband is deceased or they have divorced. The so-called ‘female headed households’ make around more than a third of the rural population of Zimbabwe (Kasimba, 2014). This is effected through household level arrangements as part of the marriage bargain. In most cases, this is in relation to the allocation

of certain land – including gardens – to women for sole management (Mkodzongi and Speigel, 2019). Very often, this involves crops; including groundnuts, Bambara nuts and so on.

Investment and rental markets are existent in communal areas despite these areas being under ‘communal tenure’ (Scoones et al., 2010). Some argue that a reform of tenure systems, and the offering of some form of private tenure will improve tenure security and increase production in communal areas. Despite this notionally being state land, these areas are held securely with usufruct rights, allocated through local institutions, usually a hybrid arrangement between local state officials such as councillors and ‘traditional’ leaders like headmen and chiefs, with allocation and inheritance processes mediated by close kin networks in extended household arrangements in family-based villages (Scoones et al., 2011). Through such arrangements, land rentals are permitted, but sales are seriously frowned upon. This puts a brake on the acceleration of land sales, so land consolidation is assured, although the odd corrupt local leader is not immune to the temptation to allow sales.

Therefore, in the communal areas, a mixture of *de facto* private and common property exists, which is recognised but not formalised (Sifikile et al., 2021). A hybrid bricolage of informal and formal institutions supports this, which by and large serves the function of delivering land security to land holders, as well as resolving conflicts and disputes over land. It is not neat – there are no bits of paper to formalise it all – but it mostly works (Mutasa, 2015). The economists and planners who yearn for formalised systems would be disappointed, as the constraint to production has nothing to do with tenure security, but results from structural constraints of finance, assets, and land access (Moyo and Chambati, 2013).

Nevertheless, some farmers in the ‘reserves’ were able to accumulate, even under such restrictive conditions. These traditional master farmers or ‘*hurudza*’ were the ‘big men’ of the reserves, often with many wives, large herds of cattle and big fields (Ranger, 1985). Making use of traditional positions as headmen, for example, meant that they could gain access to land and resources, while others relied on farming on small plots combined with off-farm work. Patterns of differentiation in the reserves in this period were increasingly stark, with important gender and age dimensions (Weinrich 1973, 1968). Apart from some ‘big men’, Chiweshe was increasingly a place for older people, retired from jobs elsewhere, and women and children, maintaining homes and farms, while husbands migrated (Chiweshe, 2023). The gender implications of dispossession were significant.

With limited farm assets, and many restrictions imposed by the state, the conditions for production and accumulation were poor, with a significant squeeze on basic capacities for social reproduction and multiple burdens taken on by women.

Overall, following land reform; the communal areas remained much as they did. There was of course, some reduction in population density but not enough to make a big difference (Mutasa,2015). The communal areas remained extremely land constrained, and in these conditions; the opportunities were subdued. With low yields and limited inputs, this is not enough to live from (Moyo, 2013). Since the 1980s, there have been loads of projects aimed to improve agricultural production and livelihoods in the communal areas, and these continue under various banners.

#### 4.3.2. Commercial Farming Areas

In the period after World War II, there was a renewed effort to facilitate European colonisation. Veterans of the Second World War were offered packages to settle, and the so-called European farming areas in Zimbabwe soon became much more occupied. A post-war investment push focused on boosting European commercial farming, with a range of incentives and subsidies. For tobacco, the 1947 post-war dollar shortage resulted in the ‘London Agreement’. Combined with Commonwealth preferential trade policies, it allowed Rhodesian farmers to sell to the UK as a guaranteed market at good prices (Dunlop, 1971). In Mazowe district, the area under tobacco went from 20,175 acres; yielding approximately 10 million lbs in 1950–1951 to 17,976 acres; yielding about 14 million lbs in 1956–1957, while that of the maize cropped area increased from 56,419 acres; yielding about 255,339 bags to 67,936 acres; yielding approximately 897,517 bags (Scoones et al, 2020). At the same time, additional crops such as groundnuts were added to the mix. This growth in production was reflected nationally (Table 1; Dunlop 1971: 61–3).

	1945	1965
Number of European farms	3,699	6,266
Area of European farms (acres)	22.5 million acres	33.7 million acres
Cropped area (acres)	545,000 acres	1,107,000 acres
Gross value of tobacco (£ million)	4.3 (46.7 m lb produced)	32.6 (232.8 m lb produced)
Gross value of maize (£ million)	1.2 (1.5 m x 200 lb bags)	7.9 (5.2 m x 200 lb bags)
Workers employed (male)	130,636	216,155
Tobacco barns	7,355	39,190
Tractors	1,155 (1947)	14,585

Figure 12: Commercial farming area during colonial times in Zimbabwe

This was the period when the classic white-owned large-scale commercial farm sector was consolidated. Fields were expanded as more tobacco and maize was planted, cattle populations grew, while homesteads were built, and labour compounds established (Scoones et al, 2020). Labour shortages were often felt, however. Crop production in this period was supported by heavy investment in technology by the colonial state (Weinmann, 1975). The famous hybrid maize variety, SR52, became available, and quickly revolutionised production; with yields reaching up to 10 t/ha (Scoones, 2010).

After the US, Zimbabwe was the second country in the world to introduce a hybrid seed maize variety after 28 years of local research (Hanlon et al., 2012). By 1955 to 1956, 85% of European maize produced was hybrid, and “yield levels nearly doubled between 1945 and 1965” (Dunlop, 1971: 48). Equally, tobacco farmers shifted from low-input Burley tobacco production to Virginia flue-cured tobacco (Cole and Cole, 2006; Kanduza, 1983; Stinson, 1956), requiring the building of barns and the use of substantial amounts of fuelwood, initially from clearing fields. Nationally, the number of registered flue-cured tobacco producers increased from 796 to 2,927 between 1945 and 1965, and yields increased significantly (Dunlop, 1971: 70). State-supported extension efforts increased, with the establishment of the Department of Conservation and Extension in 1948 and the Commercial Farmers’ Union (CFU), alongside voluntary farmer-led initiatives under the Intensive Conservation Areas (ICAs), formed following the Natural Resources Act of 1941 (Maravanyika, 2014).

Impressive state support for European agriculture via research and technological development was combined with other forms of infrastructure, including the building of roads and an increasing number of ponds, tanks and dams which were constructed with state subsidies (Mabuza, 2006). This allowed for the expansion of irrigation, and diversification into citrus and horticulture in particular. During this post-war period, state support also targeted white ex-servicemen under the ‘Soldier Resettlement Scheme’ (Scoones et al., 2010). Mabuza (2006) notes that commercial farmers also invested in tractors, resulting in a total of 265 in Mashonaland alone by 1956. As European farming commercialised, the demand for labour grew. By this stage, much stricter residence requirements were imposed, enforced under a slew of discriminatory colonial legislation. The ‘reserves’ were densely populated, as more and more people were crammed in them. Between 1919 and 1927, the population of employees in Chiweshe Reserve grew from 7,500 to 21,000



people (both indigenous and non-indigenous) whilst in 1930s it fluctuated until it reached 9,400 in 1935 (Scoones et al., 2010).

Land-use planning, notably following the Native Land Husbandry Act of 1952, meant that the earlier flexible forms of settlement were no longer permitted, and Africans were settled into village 'lines', with grazing and arable areas demarcated (Bessant, 2014; Drinkwater, 1986; Pendered and von Memerty, 1955). In attempts to encourage 'modern' farming techniques and reduce soil erosion, extension officers insisted on the building of contour ridges and the protection of wetlands and riverbanks (Scoones, 1997; Phimister, 1993). Stock numbers were also regulated, with the imposition of destocking policies if 'carrying capacities' were assumed to be excessive (Ranger, 1985). National Council reports from the 1950s emphasised attempts at 'improvement', including compulsory dipping of cattle, the construction of soil conservation works and education of the natives by demonstrators (Scoones et al, 2020). In 1951, the NC complained that such efforts only reached an "educated and enlightened few in a mass of backward people" (Scoones, et al, 2020).

Although many adult men, and some women too, migrated to white-owned farms to sell labour, this was insufficient to meet the growing demand. Recruitment of labour from nearby countries increased during this period, especially after the establishment of the Rhodesian Federation in 1953, linking Southern Rhodesia to Northern Rhodesia (Zambia) and Nyasaland (Malawi) (Mwatwara,2014). The total commercial farm labour force grew from 130,636 in 1945 to 206,781 in 1966, with 95,740 being 'foreigners' (Dunlop, 197:18). Those from elsewhere were accommodated in newly established farm compounds and in specially built 'townships. Flue-cured tobacco production is an incredibly labour-intensive and skilled production and processing system, and the control of labour by white commercial farmers was crucial. This involved the establishment of forms of 'domestic government' (Rutherford, 2001), whereby labour lived on the farm under the strict, sometimes violently draconian, control of the owner. At this time, there were no labour unions and no regulation of terms and conditions. Workers were at the mercy of farm owners, who were largely left to their own devices, resulting in often appalling conditions (Loewenson, 1992). This pattern of commercialisation boomed on the back of surplus accumulation emerging from the often-extreme exploitation of labour, and with state support and access to plentiful land and water. Family-run farms; often inherited across generations, became the mainstay of the white commercial farming sector in this period to the exclusion of African

farming systems, which, with a few exceptions, were driven towards subsistence survival, complemented by off-farm work.

Politically, white farming became tied in with the Rhodesian Front's 'independence' project, and technological development was largely undertaken independently using national resources. Despite the UDI-caused sanctions in 1965, and with continued access to markets in apartheid South Africa, commercial farming continued to expand (Scoones et al, 2020). Maize production in Mvurwi area was 108,800 200 lb bags in 1965,43 while national tobacco production was 250 million lbs, secured through the support of the Tobacco Corporation formed on 23 December 1965 (Mbanga, 1991). The UDI period was therefore a difficult era for white commercial agriculture and not all white farmers were able to survive. While there were 2,500 tobacco farmers in 1965, the number dropped by two-thirds by 1970 (Mbanga, 1991). However, some farms were doing well as this period and saw a period of consolidation.

#### 4.3.3 Resettlement in Zimbabwe

Zimbabwe inherited a thriving agro-based economy upon independence in 1980. However, the agricultural sector was characterised by duality and a racially skewed land ownership pattern (Mwatwara, 2014). The white, large-scale commercial farmers making up less than 1 percent of the population occupied 45 percent of all agricultural land; of which 75 percent was found in the most agriculturally productive areas (Mutasa, 2015). Indigenous Africans, on the other hand, constituted the small-scale communal agricultural sector with communal land ownership vested in the state, and rights of usufruct allocated to an individual; usually a male by the chief. This unbalanced access to land compelled the government of Zimbabwe to adopt land reform and a resettlement programme premised on land acquisition and redistribution.

Adding on to this, an official from the Ministry of Lands, Agriculture, Fisheries, Water, Climate and Rural Development further echoed this by highlighting that:

The Land Reform Resettlement Programme in Zimbabwe was conducted mainly to redress the inequalities in land distribution that had been existing during the colonial times. Most of the black people in Zimbabwe did not have access to productive land with much of the farms being owned by the minority white farmers. Hence there was need to address these imbalances hence the land reform programme came into play. Seeing the state of land distribution and ownership in Zimbabwe now, we see the process as having been an overwhelming success which has seen many gaining access to land. (Official From the

Ministry of Lands, Agriculture, Fisheries, Water, Climate and Rural Development, Zvimba RDC, 2022).

Moyo (2012) postulates that the main long-standing objectives of this programme have been to address the imbalances in land access while alleviating population pressure in the communal areas, extending and improving the base for productive agriculture in the smallholder farming sector, and bringing idle or under-utilised land into full production (Scoones et al., 2011). Zimbabwe's Fast Track Land Reform Programme (FTLRP) formally began with the Land Acquisition Act of 2002. The Programme, that effectively co-opted the farm occupations since 1998, redistributed land from white-owned farms and estates, as well as state lands, to more than 150,000 farmers under two models, A1 and A2 (Scoones et al., 2011). The A1 model allocated small plots for growing crops and grazing land to landless and poor farmers, while the A2 model allocated farms to new black commercial farmers who had the skills and resources to farm profitably, reinvest and raise agricultural productivity. The number of large capitalist farms, mainly white owned, fell by around 75%, while there was a 16% drop in the number of large foreign and domestically owned agro estates (Moyo, 2011a).

#### 4.3.3.1 Understanding the Land Reform Programme (LRP) in Zimbabwe

The agricultural sector has remained one of the key pillars of the Zimbabwean economy, providing employment and income to 60–70% of the population and contributing approximately 17% to Zimbabwe's Gross Domestic Product (GDP) (Moyo, 2008). With Zimbabwe having an agro-based economy, land remains a key asset, and the management of agricultural land plays a crucial role in ensuring that farming is sustainable. Two broad phases make up the land reform and resettlement programme. The government had the Fast-Track Land Reform Programme (FTLRP) in 2000 to address the colonial land imbalances, among other objectives. The farms were divided into large-scale (Model A2) and small-scale (Model A1) farms to ensure efficient utilisation of land (Moyo et al., 2009). Land reform can therefore be argued to have brought sustainable agriculture if it was accompanied by an increase in agricultural output, or at least if the disruptions were correct in two to five seasons. However, there is general growing evidence that FTLRP brought a fall in the agricultural sector (Moyo, 2021).

Studies such as Scoones (2010), Heliker et al., (2014) and Moyo (2012), which examined the effect of land reform, were descriptive and relied heavily on a short time period after the FTLRP. This would make the results be driven by what happened during that particular short period, such as

good rainfall or just sampling farmers in agricultural regions which have good soil and favourable rainfall. The generalisability of the findings to Zimbabwe's agricultural sector becomes constrained, which this paper addresses by using time series data covering the period 1980–2019 (Mkodzongi and Spiegel, 2019). Policies and programmes of redress, like any other interventions, need an evaluation of post-implementation to ensure the intended goals are achieved. Despite the anecdotal evidence of poor outcomes of the FTLRP, limited scientific work exists to guide the next steps- much so in the wake of the restoration programme that has been initiated (Masiwa, 2005). The FTLRP was conducted in different phases from which form the way in which the land reform programme was conducted in Zimbabwe. The main phases recorded in history; particularly after the independence, include Land Reform and Resettlement Programme Phase 1 (1980-1997), Phase 2 which started from September 1998- December 2004 which consisted of the FTLRP which was done speedily in the period July 2000- December 2001 (Heliker et al, 2014).

#### 4.3.3.2 Land-Reform and Resettlement Programme- Phase I (1980-1997)

Phase I of the land-reform programme was planned to redistribute 8.3 million hectares through four farm-settlement models of varying sizes and land use (Moyo, 2008). By 1997, only 3.5 million hectares had been either purchased or acquired and 71,000 families from communal areas had been settled, compared with a target of 162,000 (GoZ, 2007). Some larger farms had been allocated to a small number of individuals selected by the Zimbabwean government. Settlers on the small farms were provided with start-up tillage services and inputs for half a hectare of crops for each family (Heliker et al, 2014). Infrastructure development included boreholes, schools, clinics, staff houses, cattle dip tanks, toilets, and roads (Scoones et al., 2010). These were relatively small, but were by no means insignificant achievements, even if the process was constrained by the stringent rules of the Lancaster House Agreement (Moyo, 2021). The progress made was in large part due to the post liberation energy and enthusiasm of the Government in the context of urgently needed reconstruction, but also because the United Kingdom Government GBP 33 million over the decade to cover the acquisition and a portion of the resettlement costs (Heliker et al., 2015).

The first resettlement programme stretched from 1980 to 1997 and was based on a willing-seller/willing-buyer approach in line with the government's policy of national reconciliation and the restrictive Lancaster House Constitution (Moyo, 2008). The results of Phase I have been studied by the Government and others. Some conclusions were summarised in the draft Policy Framework and Project Document for Phase II (1998) of the Land-Reform and Resettlement

Programme that was tabled at the Donor Conference in September 1998 (Scoones et al, 2010). That document notes that there were some substantial problems with the earlier settlements (Chiweshe, 2013). For example, the willing seller-willing buyer approach meant that, inevitably, settlements were scattered. It was therefore difficult to generate economies of scale in the development of both settlement areas and infrastructure. Scoones (2011) notes that as a result, access roads to farmers' fields were often inadequate; with only about 10 per cent of planned roads within the scheme being constructed. Also, while 86 per cent of schools were built, they were often not within walking distance for young children. In addition, only 34 per cent of the planned Blair toilets were constructed (Heliker et al., 2015). The land purchase and acquisition processes were cumbersome and expensive, and there was a lack of transparency in the choice of settlers.

In an interview with village head X explained that:

As far as I know, the willing buyer and willing seller phase; though it was being done in Zimbabwe, was a bit slow and was not a process where the masses could benefit from. It needed most black people to have money, of which most did not have. Hence this closed doors for many people; including also the war veterans who had fought for the liberation of this country. It became a basis and necessity for a change in the land reform programme and process in Zimbabwe at that time. (Village Head X, Amalinda Farm Zvimba, 2022).

Despite the problems with the earlier settlements, it has been estimated that settlers; many of whom produced high-value crops such as tobacco, cotton and paprika as well as maize, in combination with livestock; earned higher incomes per family than in their previous occupations (often also farming) in communal areas (Shonhe, 2018). On the other hand, because family size often increased over time, per capita incomes did not always increase. The system of land tenure in resettlement areas during Phase I of the Land-Reform and Resettlement Programme was based on the Government of Zimbabwe providing settlers with written permits to reside and use the land on which they settled in a setting overseen by resettlement officers rather than by established local authorities (Moyo and Chambati, 2013). However, Mutasa (2015) notes that most settlers felt that the permit system was insecure because in theory, they could be withdrawn without adequate reason or protection of settlers by local institutions. This motivated Phase II to shift the land-tenure policy towards providing 99-year leases.

#### 4.3.3.3 Land-Reform and Resettlement Programme- Phase II (September 1998- December 2004)

Chiremba and Masters (2011) stipulate that in June 1998, the Government prepared the Land-Reform and Resettlement Programme - Phase II, in which it outlined a programme aimed at acquiring 5 million hectares and settling 91,000 families. The beneficiaries were to include the landless poor and overcrowded families and youths as well as graduates from agricultural colleges and others with experience in agriculture. These new settlers were to be selected in a gender-sensitive manner. Phase II was expected to bring the total redistributed area to about 8.5 million hectares (Masiwa and Chapungu, 2014). The basic objectives included reducing poverty, increasing agricultural GDP by escalating the number of commercialised small-scale farmers, promoting environmentally sustainable land use, and enhancing conditions for sustainable peace and social stability.

The Phase II programme was prepared in advance of a government-organised Donor Conference on Land Reform that heralded the Government's interest in entering a dialogue with donors on land reform (Moyo and Yeros, 2007). The Conference ended with an agreement on principles for effective land reform and consensus to begin with a two-year funded inception phase. The Government prepared the Inception-Phase Framework Plan that included a 24-month action plan covering one million hectares to benefit “as many beneficiaries as possible” using two approaches: improving the methods of land redistribution of the Government of Zimbabwe and initiatives by non-State actors, on an experimental basis (Shonhe,2018). However, as noted by Marongwe (2011), donors were not prepared to finance the Inception Phase and the only tangible result that emerged from the Donor Conference was a World Bank assisted pilot project (\$5 million) aimed at testing the feasibility of two possible models for land reform that were designed to be an integral part of the Inception Phase (Moyo, 2021). Only 4,697 families were settled under Phase II, amounting to an area of 145,000 hectares (Scoones et al, 2020). In as much as the resettlement had picked up its pace from the willing buyer and willing seller phase, a large number of people still remained outside and did not benefit from this process, leading to a further change and redevelopment of the resettlement programme to the Fast-Track Land Reform Programme which is explored in the following section.

#### 4.3.3.5 Fast Track Resettlement Phase (July 2000-December 2001)

Following the failure of a substantive follow-up to the Donor Conference and two years of relatively little activity, the Government resolved to implement Phase II at an accelerated pace,

code named “Fast Track” (Matondi, 2012). The objective was to accelerate the process of land acquisition of 5 million hectares planned for Phase II, completing it by December 2001. The objectives of the Fast Track programme were the same as those of Phase II. However, the targets of the programme in terms of land redistributed and beneficiaries shifted upwards to 9 million hectares to cover 160,000 (A1 land-reform model) beneficiaries from among the poor, and 51,000 small- to medium-scale indigenous commercial farmers (Chambati, 2011). The methods of land acquisition, settler selection and provision of settlement support were also changed to a completely government-driven approach in order to ensure the rapid completion of these three tasks while spreading infrastructure developments over 10 years (Chiweshe, 2013).

However, in 1997, the government of Zimbabwe initiated a process of radical land reform premised on extensive compulsory land acquisition and redistribution (Moyo, 2004). This marked the start of the second phase of the programme. The FTLRP, on which our analysis is based, was officially launched in July 2000 as part of the second phase (Scoones et al., 2017). The main objectives of the FTLRP are to speed up the identification of not less than five million hectares of land for compulsory acquisition for resettlement, to accelerate the planning and demarcation of acquired land and settler emplacement on this land, and to provide limited basic infrastructure and farmer support services (Zimbabwe, 2000; Moyo, 2006). Compulsory acquisition was largely to be made from white commercial farmers, private companies, and absentee landlords. The programme was comprised of two models which are the A1 and A2 models.

Supporting this, a key informant who is a female war veteran explained that:

The FTLRP was the spark that was needed to light the dry tinder of land redistribution in Zimbabwe. This radical stand by the government was critical in making sure that all who fought for this country benefit the land and many other Zimbabwean nationals that were alienated in the land tenure issues by the white settlers. I have heard that to this date, under the A1 and A2 models of redistribution; about 82% of the land in Zimbabwe is now under the control of black people which is what we fought for. The FTLRP quickened the process of redistribution which was happening but was a bit slow and made sure all people have access to land. (Interview with a Female War Veteran, Ingwe-Gomo, 2022).

However, FTLRP beneficiaries have been issued many different types of temporary licenses which the government intends to convert, in time, to permanent leases (Masiwa and Chapungu, 2014). This uncertainty regarding tenure arrangements within the FTLRP has been a source of tenure

insecurity among FTLRP beneficiaries (Munyuki-Hungwe and Matondi, 2006; Zikhali, 2008). In addition, different sets of laws, administrations, and policies on multiple tenure systems have created grounds for conflicts that have impacted adversely on agricultural production (Munyuki-Hungwe and Matondi, 2006). Under the FTLRP, the four main commercial field crops—wheat, tobacco, soya beans, and sunflowers—have experienced reduced area plantings and output levels due to low uptake and poor use of land, as well as the inexperience and lack of resources on the part of new farmers (Moyo, 2004). The main crops produced by smallholder farmers—maize, small grains, groundnuts, and cotton, among others—have also shown reduced output despite the marginal increase in area planted. In communal areas, maize yields halved from approximately 1.3 million tonnes per hectare in 1986 to approximately 0.8 tonnes per hectare in 2004 (FAO, 2007).

#### 4.3.4 Resettlement Models Adopted

In Zimbabwe, the government adopted resettlement models to ensure that land redistribution was done and gave everyone an equal chance to gain land in Zimbabwe. The current Fast Track provides for two basic resettlement models which are the A1 model and the A2 model (Scoones et al., 2010). The redistribution of land in Zimbabwe was done under the two models of A1 and A2 which were used as the basis of land allocation for different people in the country.

##### 4.3.4.1 A1 model of resettlement

In redistributing land in Zimbabwe, one of the government's objectives for the FTLRP, the A1 model was the decongestion of communal areas (Moyo, 2013). It provided for farms that were relatively small but adequate to sustain a family and produce a surplus. There were mainly of two types; which are the villagized and self-contained (Marongwe, 2011). For the former, settlers are provided with at least three hectares of arable land and communal grazing. Each village in the settlement scheme is provided with minimum social services. According to Mutasa (2015), the self-contained farm is one contiguous area that could be used for crops and livestock whilst a settlement scheme may be composed of several such units but without a village structure. Whether farms are of adequate size to provide a sufficient and sustainable income for an average settler household is difficult to judge (Matondi, 2012).

Most A1 schemes, and all 'informal' land reform sites were allocated following land invasions starting from 2000 (Moyo & Yeros, 2007; Chambati, 2011). These had diverse origins but were usually (but not always) led by war veterans and involved groups of people from surrounding



communal areas and nearby towns (Chaumba et al., 2003; Moyo, 2001). More formal allocation of plots happened later, with the pegging of fields and settlement sites as part of the ‘fast track land reform programme’ (FTLRP) and the issuing of ‘offer letters’ (Mutwara, 2014). Depending on the pressure on the land, the local demands and often the discretion of the planning officers, A1 sites were demarcated as villages that shared grazing and clustered homesteads or ‘self-contained’ plots, with houses, arable fields and grazing within a single area (Marongwe, 2011). The ‘informal’ A1 sites, by contrast, were usually organised in line with local preferences. These sites, with their origins in land invasions, took on a particular social and political character, organised initially by a “Seven Member Committee,” often with a war veteran base commander in the lead. Later, these became village committees and were incorporated into chiefly authorities and local government administrative systems (Scoones et al., 2010: 188-212).

In line with this, when giving the history of the farms, the village head X confirmed this organisation of A1 farms by retorting that:

When we came here, we came as the comrades. One called Ndlovu was our leader, and we invaded this farm. We had our committee that was in line with the level of organisation that was needed by government. Our committee was recognised by the government in 2006 and in 2008 I was installed as the village head under Chief Zvimba for the assorted farms in this community and I lead also with a committee that I have of 5 individuals. These are the people that help in administrative work in this community. (Village Head X, Amalinda Farm, 2022).

Nevertheless, the process used to select successful applicants for the A1 model was based on six steps (Scoones et al., 2011). While power over the applicant selection process is distributed to all levels of government, the power to make final decisions over applications is vested with the central government. It is also an unwieldy and cumbersome process. There are no published records of deliberations or of the reasons for selection of applicants at each step; therefore, the process is not transparent (Matondi, 2012). Those whose applications are rejected are typically not advised of the reasons and there is no provision for an appeal. Model A1 is intended to decongest communal areas and is targeted at land-constrained farmers in communal areas. This model is based on existing communal area organisation, whereby peasants produce mainly for subsistence. The bulk of the FTLRP is based on Model A1 and principle, the tenure arrangements within the FTLRP entail permits for Model A1 beneficiaries and a 99-year lease with an option to purchase the land for Model A2 beneficiaries (Mkodzongi, 2018).

In the A1 resettlement areas, the situation is different. There are fewer, long-standing local institutions and local kin networks to regulate land administration, and more formal systems are often required (although these are always hybrid combining resettlement committees of seven, war veterans, party officials and traditional leaders, sometimes involving the same people), to address land allocation, subdivision and inheritance, particular where there are disputes (Chambati, 2001). Unlike in the communal areas, where the land is being held as ‘home’, and production is limited, there are different stakes in the resettlement areas. The membership of each of these ‘schemes’ is thus highly dependent on the politics of the allocation process, with final outcomes highly contingent on local situations (Chiweshe, 2013). The land invasions, while of course highly politicised and supported by ZANU-PF and the military, had diverse origins and participation. Some were made up largely of poor, local villagers from nearby areas, while others involved a smaller group of organised war veterans (Hammar et al., 2003; Marongwe, 2003).

#### 4.3.4.2 A2 model of resettlement

Marongwe (2011) expounds that the A2 model is aimed at providing small-scale commercial farms to applicants with experience in agriculture, preferably those who have been trained to be master farmers. Applicants also need to show evidence of access to enough capital to develop the farms into viable production units (Moyo, 2012). By contrast, A2 schemes were allocated later (from around 2002) because of business plan applications to the Provincial and District Land Committees (Shonhe, 2018). In addition, they needed to demonstrate the ability to repay the cost of the farm as determined by the Government. Successful applicants were provided with 99-year leases, with the option to purchase. The Government refers to this model as a means of de-racialisation of commercial farms (Moyo, 2021). By 2011, only 51,000 applicants out of 99,000 had been approved and the Ministry of Land, Agriculture and Rural Resettlement was processing offer letters for 10,260 farms that were immediately available based on the A2 model (Scoones, et al., 2020). Information available to the mission was inadequate to enable it to judge the efficacy of the selection process for these farms.

Masiwa (2005) revealed that model A2, on the other hand, is a commercial settlement scheme comprising small-, medium-, and large-scale commercial settlements, intended to create a cadre of black commercial farmers. Masiwa and Chapungu (2004) highlight that this model is, in principle, targeted at any Zimbabwean citizen who can prove that he or she has farming experience and/or resource availability and is based on the concept of full cost recovery from the beneficiary

(Zimbabwe, 2000). Here, land is more extensive and valuable, and often significant levels of production are realised. Ensuring security for this is essential. According to Mkodzongi and Speigel (2019), in the A1 farming areas, this is less of a problem. However, they state that for the A2 medium-scale farms where finance for investment is vital, having a more formal arrangement so that land can be used as collateral, even though there is a lease agreement with the state, is important. For A1 areas, 'offer letters' or permits to occupy are issued, but their status remains unclear, especially in regard of financing (Marongwe, 2011).

Scoones et al., (2010:46-51) highlight that A2 schemes; by contrast, required a formal application process, and officially; there were strict criteria for acceptance. Many who applied were civil servants, often linked to the agriculture ministry and others who had few strong political connections if any. Although in some instances, applicants were able to manipulate the administrative procedures in their favour, conditions remained strict and strenuous (Mutasa, 2015). The most obvious, and often blatant, corrupt practices linked to political patronage were associated with the later allocation of larger A2 farms, especially around the time of the 2008 elections when the struggle for power and the deployment of political patronage by the ZANU-PF elite was at its height (Moyo, 2011). Moyo (2011a: 514) reported that 53 large-scale A2 farms in Masvingo province across 110,719ha were reallocated. In sum, the land reform has resulted in a very different farming sector, with a radically reconfigured agrarian structure. While the old dualism has been disrupted, with many more smallholder farmers on the land, elements of the large-scale farming structure remain (Scoones et al., 2010). Yet despite these major changes, the new setting, as we show below, is not without considerable challenges.

While land concentration and under-utilisation of land persists among a minority of A2 farmers, there is increasing landlessness; especially among heirs of land beneficiaries who were children in the early 2000s and are now in need of their own land (Scoones et al., 2020). This has led to many resorting to informal land markets, characterised by the sale of land by customary authorities such as chiefs and village heads, local state structures such as village development committees (VIDCOs), district administrators and private individuals (Moyo, 2011a). Although illegal, such markets have become an important avenue for the landless to access land and their broader dynamics need further investigation as limited empirical data show that they have led to conflicts between those selling land illegally and their clients (Scoones et al., 2020; and Mkodzongi, 2013b).

Moreover, the sale of state land has led to illegal settlements on consequently deteriorating common grazing lands (Moyo and Yeros, 2011). This is likely to lead to conflicts soon as people fight over finite land resources. Land tenure security has become an increasingly pertinent issue with many farmers, especially those on the A2 model, feeling that the current system based on 99-year leases is problematic and question its worth as collateral against bank credit, despite recent pronouncements by the government to the contrary (Mutasa, 2015). Very few A2 farmers have secured such leases because of the difficulties in so doing, thus fuelling suspicion among beneficiaries that only politically connected individuals can secure them (Shonhe, 2018). As a result, some of the new farmers have been forced to raise capital by mortgaging their homes or by raising money informally; which is expensive and risky as some have lost homes after defaulting on loans (Scoones et al., 2017).

Land tenure security has thus become a major issue, with those offered land wanting creditworthy tenures (Mutasa, 2015). The inability of the new farmers to leverage loans from the banks has also affected agricultural investment while the government has failed to provide financial support to such farmers (Chiweshe, 2023). There is thus a major debate about what kind of tenure regime is appropriate. The previous government was reluctant to reintroduce freehold tenure, especially after the land reforms. Although importantly; a few people still retained freehold tenure because most of the A2 farmers were offered land by the government for free (under leasehold), they were only required to pay for improvements on the land (Scoones et al., 2011). The government thus felt it could not extend freehold tenure to the new farmers as they might sell such land on the open market.

While the position of the new government; popularly referred to as The Second Republic (Moyo, 2021) on tenure issues was yet to be clarified, the previous Mugabe-led government was generally against the return of land markets as it feared the return of former white farmers who could potentially buy back their former farms redistributed under the FTLRP (Mkodzongi and Spiegel, 2019). Ironically, as noted above, some of the white farmers have indeed returned, albeit indirectly through contract farming arrangements (Chambati, 2019). Mkodzongi (2018) notes that another issue that tends to be ignored in debates about tenure security is that while the landed petty bourgeoisie have sought to force the state to extend 'secure tenure' (leasehold and freehold) to them to improve their accumulation trajectory, many, especially the more politically connected;

have failed to improve their land as a condition of their ‘offer’ letters. This has led to some resentment among those who have failed to leverage such leases from the state. As a result, intra-class conflicts, especially among A2 farmers, have become more evident (Scoones et al, 2020).

#### 4.4 Coping with the Challenges of Climate Change in Zimbabwe

Climate change has been real in Zimbabwe, with communities now also learning to live with it as the overwhelming impacts of it have pushed them to seek alternatives (Chiweshe, 2013). The hot summers and very cold winters being experienced in the nation and the phenomena of cyclones, flooding and drought which have been occurring more frequently in Zimbabwe have been clearly testimonials to the existence of climate change (ZNCCRS, 2017). This section provides an overview of the key trends observed within the biophysical environment. This provides a basis for understanding climatic changes in Zimbabwe. Specifically, it focuses on providing evidence of changes in the frequency and intensity of dry spells, precipitation and temperature; including their implications to Zimbabwe’s agricultural sector. Such parameters as seasonal rainfall characteristics (that is total rainfall, dry spells, and rainfall season’s length including onset and cessation dates), temperature regimes, and evapotranspiration are important in determining the quality of the growing period at specific locations, as they may influence crop growth.

##### 4.4.1 The state of climate change in Zimbabwe

Climate, mainly rainfall and temperature, is the key determinant of agricultural crop production. Human activities have resulted in an increase in greenhouse gases (GHGs) emissions into the atmosphere (IPCC, 2021). The GHGs affect the climate system through increasing temperature and shifting moisture regimes (UNFCCC, 2020). A long-term analysis of climate data indicate that global temperatures have increased by an average rate of 0.74°C from 1906 to 2005 (IPCC, 2019). Similarly, rainfall has changed by different magnitudes in different regions. The change in rainfall and temperature has influenced agricultural practice through shifting crop suitability in different regions. Previous studies have shown that the geographical suitability of crops is modified by changes in climate variables (Lane and Jarvis, 2007; Fischer et al., 2005; Matarira et al., 2004).

Climate change is negatively affecting many aspects of human development, especially in less economically advanced countries (Ayers and Huq 2009 cited in Dube and Phiri 2013; Aggarwal et al. 2019). In rain-fed agriculture production systems, climate change-induced high temperatures

and droughts are production risks which have major impacts on rural livelihoods. Current evidence shows that climate change is affecting crop productivity; with direct impacts on the nearly 70% of people in agro-based rural areas of developing countries (Vermeulen et al., 2012; 2019). In their analysis, Nhemachena et al., (2014) and Phiri et al. (2019) concur that there is limited support from the government and private grain marketing system to produce small grains, as higher competitive prices for maize and lower prices for small grains lower the incentive for smallholder farmers to continue to produce sorghum or millet. The farmers continue to put an increased acreage under maize despite its increasing risk of crop failure. This is an indication that national agricultural policies are not coordinating with climate change adaptation strategies (Nhemachena et al., 2014; IPCC, 2018).

Buttressing these findings, one AGRITEX officer in Zvimba East District further explained that:

With the lean seasons we are having which are heavily punctuated by droughts, most households in the farms have been plunged into poverty and deep food insecurities as most of these are even resisting change. As most of our farmers here largely depend on rain-fed agriculture, the climatic changes in this region have affected productivity greatly; with maize production being on the receiving end and the large livestock business too. Even in animal husbandry, several diseases that affect animals such as cattle goats and chickens have been on the increase since the turn of millennium. This has reduced production. (AGRITEX Officer, Zvimba East District, 2022).

Many climate change scholars concur that the most widespread impacts of climate change experienced by people living in communal Zimbabwe are increases in temperature, decrease in the amount of rainfall received as well as erratic and unpredictable rainfall patterns (Dube and Phiri 2013; Gukurume 2013; Apraku et al., 2018a). The combination of these factors has had a negative impact on rural livelihoods, which are heavily reliant on climate-sensitive resources. Consequently, food insecurity, water scarcity, loss of livestock, and increasing levels of poverty have deepened due to climate change (Dube and Phiri 2013; Gukurume 2013; Phiri et al., 2014; Makuvaro et al., 2014; Musarurwa and Lunga, 2012; Bodin 2017). In Zimbabwe, climate change has been observed and experienced over several decades. The projections of climatic changes in Zimbabwe continue to forecast and increase in temperatures and decreases in rainfall in most parts of the country between now up to 2080 in Zimbabwe (ZNCCRS, 2014)

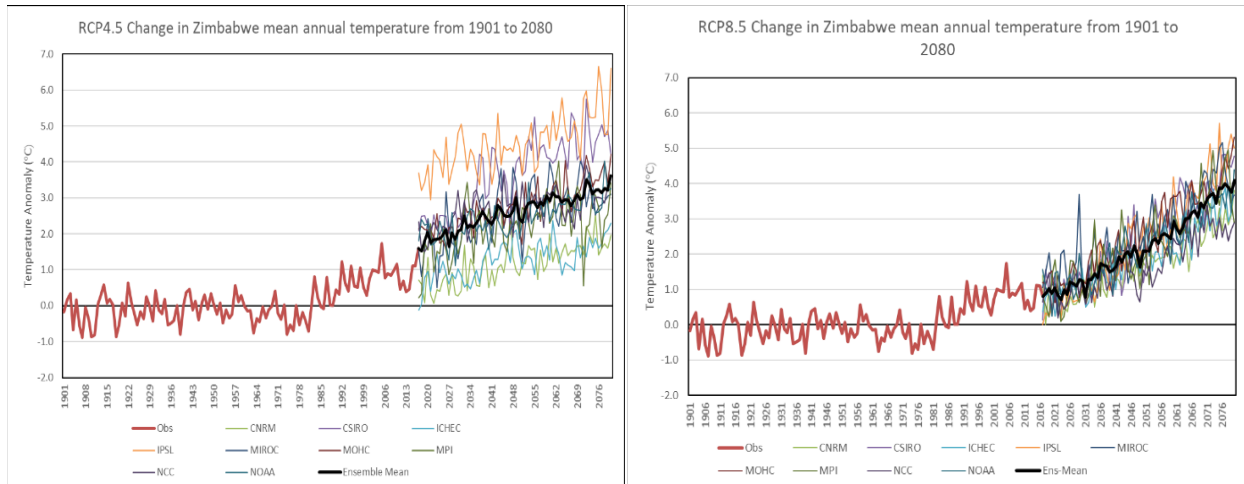


Figure 13:RCP4.5 showing changes in annual temperatures (1986-2005) Figure 14:RCP 8.5 showing projected annual temperatures (1901-2080)

According to the Zimbabwe Meteorological Service (2021), daily minimum temperatures have risen by approximately 2.6 °C over the last century, while daily maximum temperatures have risen by 2 °C during the same period. As highlighted in the Randomised Climate Projections (RCPs) presented in the graphs above, for the period 2020-2040, national annual average temperature is projected to increase by about 1.0-1.5°C above the climate of 1986-2005 under RCP4.5; with little difference in warming between RCPs. For the period 2041-2060 national annual average temperature is projected to increase by 1.5 to 2.0°C for RCP4.5 and 2.0 to 2.5°C for RCP8.5. The projected temperature range by the period 2061-2080 shows larger differences between the two RCPs, with increases greater than 2.0°C for RCP4.5 and 2.0 to 3.5°C for RCP8.5 (Zimbabwe Meteorological Service, 2021). Warming is greatest in the western and southern sections of the country. Consequently, these changes in climate have resulted and will continue to result in more arid environments for agricultural production, which has shifted Zimbabwe’s five main agro-ecological zones (Karuma, Bhatasara and Nyamwanza, 2021). For instance, the Chinhoyi, Chibero and surrounding areas (Mashonaland West province) have shifted from Natural Region 2 to Natural Region 3, while the Kwekwe area (Midlands Province) has shifted from Natural Region 3 to Natural Region 4. Natural Region I has reduced in size, while Natural Region 2 has shifted further east, and Natural Region 3 has shifted to the north (Adger et al., 2012). The major risk facing rural households in Zimbabwe is that of drought (Dube et al., 2017; Vermeulen et al., 2019; Munhande et al., 2013).

Correspondingly in an interview with an official X in the Ministry of Lands, Agriculture, Fisheries Water, Climate and Rural Development, he explained that:

Climate change is exacerbating crop failure, which in turn exposes communities to hunger. This has exposed many households; especially in rural areas and resettlement areas, to be exposed to heavy food insecurities as these are largely dependent on rain-fed agriculture for food security. The brand of food insecurity emanating from negative climatic changes in Zimbabwe is mostly bore by women and children, as these are the ones heavily affected by it as they spend most of their time on the farm or family house. (Interview with an official X in the Ministry of Lands, Agriculture, Fisheries Water, Climate and Rural Development, Zvimba, 2022).

Overall, Zimbabwe's climate has become generally warmer. These warmer and drier trends are a major threat to the economy and the livelihoods of the poor due to Zimbabwe's high dependence on rain-fed agriculture and climate-sensitive resources (Shonhe, 2018). Rainfall and runoff have decreased by approximately 2–30% over the past 40 years (Zvigadza et al., 2010). A study by Musarurwa and Lunga (2012) in Zimbabwe shows that climate change has exacerbated the frequency and intensity of climate-related risks and hazards. The most common hazards have been meteorological in origin – floods, droughts, tropical, and lightning storms. Other indirect or non-meteorological hazards include veld fires and siltation of water bodies, which are more related to environmental mismanagement (Musarurwa and Lunga, 2012; Sani and Chalchisa, 2016).

Murisa (2013) notes that climate change impact manifests adversely, economically, and socially for most populations in Africa and particularly in sub-Saharan Africa; with Zimbabwe included. Closely related to the above assertion is that climate change has created notable changes in the availability and quality of water for both domestic and agricultural purposes (Adger et al., 2012; Dube et al., 2018). The erratic availability of water has negative impacts on health. The incidence of contagious diseases, such as cholera, may increase as lack of sanitation is a health hazard (Chiweshe, 2023). About 32% of children in Zimbabwe live in households that do not have any type of toilet facility (ZIMSTAT, 2013). Climate change will make access to clean water and sanitation facilities even more difficult. Thus, it will be harder to tackle diarrhoea, one of the biggest killers of young children (Moyo et al, 2023). Another adverse effect of water shortages is



that as streams and water sources dry up, some communities may have to travel further to collect water (Stringer et al., 2019).

Climate change has also increased the geographical range of infectious disease vectors, for example, malaria, which has an impact on public health (IPCC, 2018). The malaria zone is predicted to expand to former malaria-free zones (Nwutopi, 2018). Climate induced water stresses threaten to decrease quantity and quality of drinking water in rural and urban centres in Zimbabwe and reduce run-off required to sustain the country's hydroelectric power generating projects (Adger et al., 2012).

Supporting this, in interview with Ministry of Health and Child Care official 1 for the district he categorically stated that climate change was also affecting human health in Zvimba as he noted that:

The resettlement farms in Zvimba have largely been on the receiving end when it comes to Malaria and Cholera. Areas around Ingwe Gomo and Amalinda farm which are close to Marimba River and Lake Chivero particularly, are prone to malaria cases as mosquitoes' breed in the reservoirs near them. When these areas flood; as the areas are susceptible to floods, we receive many such cases. In the case of cholera, these two farms have also deep-water shortages such that when cholera hits Budiriro; they are also on the receiving end as they do not have proper water sources. This affects them greatly. (Interview with Ministry of Health Official 1, Budiriro Polyclinic, 2022 Fieldwork).

Intergovernmental Panel on Climate Change (2018) postulates that floods will intensify in Zimbabwe as a direct consequence of climate change. In locations with no good drainage systems, water borne diseases are bound to happen and affect the people living in those areas. Adger et al., (2012) assert that increased frequency and intensity of extreme weather events are likely to worsen the existing natural hazard burdens of at-risk populations; damaging crops, infrastructure, and threatening livelihoods. When homes, schools, roads and communication lines, bridges, and dam walls are destroyed, years of infrastructural development are lost, and the socioeconomic impact hits the already vulnerable communities hardest. The timing and amount of rainfall received in Zimbabwe are becoming increasingly uncertain. There has been an overall decline of nearly 5% in rainfall across the country since 1901, with the early 1990s probably witnessing the driest period

of the last century (ZNCCP, 2017). The frequency and length of dry spells during the rainy season have increased while the frequency of rain days has been reducing.

Murisa (2018) highlights that rainfall distribution is erratic both in space and time across all the provinces of Zimbabwe. This erratic nature of rainfall patterns has had serious adverse impacts for agricultural production, with significant consequences on livelihoods, particularly for vulnerable groups. Such a scenario has impacts on Zimbabwe's economy which is primarily agro-based (IES, 2014). Research into the economic impact of climate change on Zimbabwe's agriculture indicates that smallholder farmers are highly vulnerable to the impacts of climate change (Gwimbi, 2009; Mano and Nhemachena, 2006). For instance, the period 1991–1992, which hit most of Southern Africa, led to a decline of 62% on the Zimbabwe stock market, causing the International Finance Corporation (IFC) to describe the country as the worst performer out of 54 world stock markets. The country's manufacturing sector declined by 9.3% in 1992 (UNEP, 2018).

In the same respect, drought caused a 25% reduction in the volume of manufacturing output and a 6% reduction in foreign currency receipts (UNDP, 2008). Other studies have shown that rural livelihood income strategies based on rain-fed small-scale farming have been negatively affected by increasingly changing climatic patterns, particularly in arid to semi-arid areas where drier periods have become more prevalent (Chagutah, 2006; Downing, 1992; Hulme, 1996; Magadza, 1994; Matarira et al., 1995; Muchena, 1991; Twomlow et al., 2008). To further cement the above-stated point, it has been revealed that in Zimbabwe, climate change is increasing the frequency of crop failure; especially among smallholder farmers (Munhande et al., 2013). This is because only 37% of Zimbabwe receives adequate rainfall for agriculture, yet more than 90% of Zimbabwe's smallholder farmers depend on rain-fed agriculture for their livelihoods (FAO, 2008). High climate variability means that crop yields are inconsistent from year to year, rendering rain-dependent agriculture alone to be unreliable as the main means of agricultural production and economic sustenance (Hulme, 1996). Furthermore, poor households in arid to semi-arid areas of Zimbabwe are vulnerable to climate change impacts because of their geographic exposure, low incomes, and greater reliance on agriculture as well as limited capacity to seek alternative livelihoods (Atiera and Koohafkan, 2008).

#### 4.4.2 Adaptation, coping and building resilience to climate change in Zimbabwe

Several studies have focused on the impact of climate change as well as small-scale farmers' adaptation towards this phenomenon and variability at the agriculture-wildlife interface in Zimbabwe (Bhatasara, 2015). Nyikahadzoi et al., (2010) studied the factors influencing climate change adaptation among small-scale farmers in Hurungwe District, Zimbabwe contend that successful adaptation to climate change requires understanding processes of social and biophysical change and their interactions within socioecological systems. In terms of adapting to climate change, Zimbabwe has developed several plans such as the National Adaptation Plan (2021); which is the blueprint used to inform the climate change adaptation process in Zimbabwe as proffered by UNFCCC. Through these steps, Zimbabwe has been pushing for climate change adaptation and focus at national level. On the local level, the communities have also adopted the local ecological knowledge (LEK) which is the adaptive practice that promotes resilience to environmental changes that have had negative effects on local livelihoods and sustainable development (Sithole, 2017). LEK has been adopted to supplement scientific data by providing primary and comprehensive descriptions of the biophysical and socioeconomic components of the biosphere landscapes that are experiencing climate change stresses (Matondi, 2012). In addition, local community traditional daily practices such as weather forecasting can provide a myriad of benefits, including making informed decisions to enhance agricultural food security (Shonhe, 2018).

Adaptation strategies such as use of drought-tolerant crop varieties have been one of the major strategies for managing water scarcity in agriculture (Rurinda et al., 2014). Long years of plant-breeding activities have led to yield increase in drought affected environments for many crop plants (Mutekwa, 2009). Drought tolerance in crops such as maize, pearl millet, cowpea, groundnut, and sorghum played an important role in fighting the worst droughts in the last half of the nineteenth century in the Sahel (Mertz et al., 2009). By exploiting drought-tolerance genes, several national and international research institutions have scored important gains in improving the drought tolerance of major grain crops in Zimbabwe (NAP, 2021).

Murisa (2018) explains that farmers in Zimbabwe have also discovered that legume crops are vital sources of low-cost protein for smallholder farmers. They generate farm income, serve as quality livestock feed, and restore soil fertility. Groundnut, followed by cowpea, is the most widely grown grain legume in the dry areas of Zimbabwe, and several countries have released improved cowpea

varieties with support from the International Institute of Tropical Agriculture (Matondi, 2012). Drought-tolerant varieties of common bean, groundnut, Bambara nut and pigeon pea are also grown in highly variable rainfall areas of Zimbabwe (Verchot et al., 2007). The choice of these drought-tolerant crops is against the background that most farmers in Africa rely on rainfall to grow maize. Dry conditions often have disastrous consequences, often leading to more vulnerability (Nhemachena, 2015).

Bhatasara (2015) notes that an increase in total livestock holding by one unit is likely to give an increase in the odds of adaptation to climate change by a factor of 1.74. Thornton et al., (2007) found livestock endowment to positively affect farmers' choice to adapt to climate change or not. Possession of livestock in a rural setting in Zimbabwe signifies better endowed households or in other words, wealthy households. This implies that households that are better off are likely to adapt to climate change because they have resources to enable them to adopt other means of livelihoods than those households without or with few resources at their disposal. The positive influence of agricultural extension information to adaptation decision-making is consistent with findings by Mano and Nhemachena (2007) who found that access to extension strongly and significantly influenced farmers' adaptation to climate change.

Gbetibouo (2009) noted that with access to extension, households would be aware of the climatic conditions and the various management practices needed to adapt to climate change. Soil nutrient depletion has become one of the major constraints to food security in sub-Saharan Africa because of low crop productivity that causes declining per-capita food production (Sanchez et al., 2004; Stocking, 2003). One of the reasons for under-investment in soil fertility inputs in rain-fed production systems in Africa is the uncertainty and risks associated with climate variability (IAC, 2004), mainly because nutrients are not used efficiently when water availability is inadequate; which results in considerable variability in profitability of fertiliser use and optimal application rates from year to year and season to season (Whitbread et al., 2004). One of the options for addressing this problem lies in seasonal climate forecasting which presents opportunity for increasing the efficiency of both water and nutrients through adaptive fertiliser management (Jiri et al., 2015a; Vanlauwe et al., 2013).

Improved drought management and preparedness depends on access to climate information and early warning systems (Chiremba and Masters, 2011). The value of climate information lies in its

ability to provide evidence of risk of a major climate shock in advance which helps in anticipating the costs and the scale of measures that may be needed at the national and regional level (Jost et al., 2015). Climate information systems can contribute to strengthening institutional capacity and coordination to support generation, communication, and application of early warning systems (NAP, 2021). As a component of disaster risk reduction, early warning systems in Zimbabwe have provided the information necessary to allow for early action that can reduce or mitigate potential disaster risks.

The negative influence of farm income's choice of adaptation is contrary to studies by Deressa (2010) and Gbetibouo (2009), which proffer the knowledge that income positively influenced household decision to adapt to climate change, as availability of income would allow farmers to purchase enough inputs and better varieties. Farmers with more farm income indicates farmers who already have better income from farming (Chiweshe, 2013). This means that these farmers with higher farm incomes have no incentives of adapting than those farmers with falling or lower farm incomes. In other words, lower farm income is an incentive to adapt and need to develop resilience (ZNCCP, 2017). Those households are realising already that higher farm incomes have lesser incentives to adapt to newer ways of farming because their current farming practices might already be optimum. This means that if the available methods promise no better off incentives, farmers are not willing to adopt or adapt.

For communities to escape chronic poverty, they must increase their resilience to withstand shocks and hazards associated with climate change and variability (Musendo, 2018). By building resilience between and throughout hazard cycles, livelihoods would be improved, and the cost and scale of future adaptation reduced. Analysis of adaptation and the need to build resilience in Zimbabwe indicated that there is a need for agriculture and structural changes in livelihood strategies in response to climate change and variability (ZNCCP, 2017). There is need for local climate information, informed by local indigenous knowledge and exogenous scientific data. Building climate change resilience has been strongly emphasised (UNISDR, 2011). Locally researched climate smart cropping options are key to building resilience and enhancing food security at the local level (Food and Agriculture Organization, 2013).

#### 4.5 Chapter summary

In summary, the approach adopted in this chapter was based on the understanding that any evaluation of the post-2000 Zimbabwe's gender and socio-ecological resilience to climate change crisis should begin with an analysis and assessment of the historical situation of Post-Fast Track Resettlement Farms. Such an examination provided a grounded understanding of the history of resettlement in Zimbabwe and existing economic circumstances prior to the 2000s, when the recurrent agricultural production crisis started in the country, and the role that agriculture has played in the livelihoods of farming households. The analysis was thus grounded on diverse literature accounts of the past livelihood experiences and agricultural performance as well as resilience to climate change in Zimbabwe traced back into the 2000s.

The chapter was organised as follows; such that immediately after the introduction, a short outline of the context and background of the resettlement in Zimbabwe was presented, focusing on the phases of resettlement in Zimbabwe. What followed next was a comprehensive description of the historical context of the resettlement zones in Zimbabwe; considering the type and nature of the zones from the colonial to the postcolonial times. This provided a necessary foundation for tracing the profile of the section to be dealt with in Chapter 5. The section also moved on to discuss the natural conditions and climate change in Zimbabwe. It interrogated and explained the different agroecological zones of Zimbabwe in order to paint a full picture of what the country is like. This helped to set the foundation of understanding socio-ecological resilience in Post-Fast Track Resettlement Farms. After that, the chapter discussed the climate change adaptations means and ways that have been used by farming communities in Zimbabwe, pointing out the fact that people are rational beings and are bound to react and act to situations; hence their adaptation to climate change. The next chapter presents the profile of the study area in detail.

## Chapter 5: The Profile, Climate, And Climatic Changes Of The Selected PFTRFs

### 5.1 Introduction

The approach adopted in this chapter is based on the understanding that any evaluation of the PFTRFs in Zvimba East District should begin with an analysis and assessment of the history and situation of farm households. Such an examination provides a grounded understanding of households' social and economic circumstances. The researcher took this approach to fully paint a picture of the situation happening in the selected PFTRFs in Zvimba East District. The analysis was grounded on secondary data on households and the households' own accounts of their past livelihood experiences as well as climatic changes happening in their area over time. The chapter traces these into the 2000s narrations by participants who represented targeted households in interviews and the survey aspect of the study. Through these divisions, the chapter sought to paint a picture of the profile of the area under study and to deepen understanding of the issues under investigation.

The chapter is organised as follows, immediately after this introduction, section 5.2 provides a short outline and outlook of the three selected farms which are Gomo-Ingwe, Pension and Amalinda Farm. In addition to this, in section 5.3 the biophysical state of the selected farms which have been included in this study are laid out clearly. The section touches on the natural, economic, socio-cultural, and political set up of the farms. Adding on to this, in section 5.4 households' historical context is explored; considering their demographic characteristics and status. This is particularly important as it provides a necessary foundation for tracing social changes to be dealt with in the preceding chapters. The section also discusses households' asset endowments since livelihoods are generally based on households' possessions and what they materially value. Section 5.5. continues the discussion by interrogating the nature of the climatic conditions that are being experienced in three selected farms. The section looks at the existing climatic changes and the trends that have been happening in the area over the past thirty years. Finally, section 4.6 provides a chapter summary.

### 5.2 The case studies

Focus was made on three post FTLRP farms in Zvimba East District in order to adequately understand the socio-ecological resilience to climate change in the context of the gender nexus. These farms include Pension Farm, Amalinda Farm and Ingwe-Gomo Farm. These farms consist

of between 150 to 250 families that live in the area as A1 resettled farmers. The farms are located 10-20 kilometres from Budiriro Township, but are regarded as part of Chief Zvimba's domain. They are located near the shores of Lake Chivero; which is a major source of water for irrigation for the farmers in its vicinity. They have a population of around between 150-500 households; each made up of resettled farmers during the times of fast-track land reforms programme in Zimbabwe. The farmers that are found in these farms were resettled between the year 2000 and 2005 during the fast-track land reform period. The plots were further regularised in the periods between 2008-2014 when there were further classifications of the farmers into A1 and A2 farmers (GoZ, 2019).

#### 5.2.1 Amalinda Farm

One of the farms that the researcher focused on is Amalinda Farm; now known as Portside Farm. Amalinda Farm is a farm that was formerly owned by a white farmer called Peter Hard (Zvimba Registry, 2015). The farm is close to Lake Chivero and has a river that runs through it flowing into Lake Chivero named Marimba River. The farm is close to 400ha big in terms of size. It was formerly used for dairy livestock production and growing tobacco, maize, green grass, and flowers for perfume. A labour pool of close to 200 workers were on the farm by the year 2000; with these workers living in 2 separate compounds. Most of the workers lived in the compound found, near the tobacco and perfume fields in houses that ranged from 1-3 rooms which had electricity. The supervisors and the dairy farm workers lived on the other side of the farm. They were close to seventy families that lived across the bridge near the house of Peter Hard (Zvimba Registry, 2015).

Key informants from Amalinda Farm highlighted that, in the year 2000, the farm was invaded by the war veterans; leading a part of it to be taken by them. An agreement was reached between the war veterans and the white farmer to share the farm in two equal halves. Peter Hard got the dairy section of the farm which was around 100 ha whilst the war veterans got the other half where tobacco was grown; which was close to 220ha (Village Head X, 2022). However, as time moved on, the white farmer sold all his dairy cattle in the year 2002 and only stayed on the farm, then doing farming of maize (Village Head X). The female war veteran interviewed highlighted that In the year 2006, the farm was invaded again by powerful war veterans who now took over the part that was left for the white farmer and the other part which was not used that was for the other war veterans. The two groups of people who invaded the farm were former army general,



Zvarevashe and another Ministry of Lands official called Chando (Interview with Female War Veteran, 2022). Thus, the farm was now allocated to three A2 farmers, and the rest of the war veterans were given 3Ha plots each for projects. The farm is now inhabited by close to three hundred families which are 100 war veteran families and 200 former white farmer's workers (Interview with Female War Veteran, 2022).

#### 5.2.2 Ingwe-Gomo Farm

The researcher also included Ingwe-Gomo Farm in his sample; which is a farm just 4 kilometres away from Amalinda Farm. Ingwe-Gomo Farm is partly owned by the City of Harare and the other part owned by an A2 farmer called Gomo (Zvimba Registry, 2015). The farm is located just 8-10 km away from Budiro 4 townships. Though it is owned by Harare City Council as a cattle ranching farm, the workers have benefited from the Fast Track Land Reform Programme. The farm has close to 145 families leaving on it, and in the year 2000 when the Fast Track Land Reform began, the City of Harare workers from this farm did not benefit much (Interview with Anna, Ingwe Gomo, 2022). However, in 2007-2009; when the meltdown of the economy started to heat up, that is when these agitated for land and they were given (Interview with Eliza Ingwe Gomo). Most of the people in Ingwe-Gomo Farms were given land ranging from 1-7 ha in the vicinity of the Harare City Council paddocks and cattle ranching farm (Interview with Shiela, Amalinda,2022). Observations made by the researcher during tour of the farm shows that farmers benefit more from the irrigation canals build to water the paddocks and the Marimba River that flows in areas where their farms are found. Most of the people in Ingwe-Gomo farm area have their farms located away from their homes in between 1km-2km form where they are staying.

In this area, only one farmer is an A2 farm holder who is called Gomo. Gomo has a farm that is close to 100 ha now, as the other part of the farm has been taken to be used to allocate stands to other people by ZANU PF (Interview with Community Elder 1, Ingwe-Gomo Farm). Gomo has a labour force of up to 20 families on his farm in this area. The farm usually produces maize and tobacco at large scale for commercial purposes (Interview with Anna, Ingwe-Gomo, 2022). The farm has electricity provision for the workers and the owner of the farm. It is mainly under the governance of the Headman (translated *Sabhuku*) who reports to Chief Zvimba. Unlike the Gomo section, the Ingwe section is controlled by a farm manager who works for Harare City, but when

it comes to control of the allocated farms, Chief Zvimba's *Sabhuku* is the one who controls the area.

### 5.2.3 Pension Farm

Adding on to this, the the researcher also focused on Pension Farm which is found about 6 km away from both Ingwe-Gomo and Amalinda farms. Pension Farm was formerly owned by the City of Harare, but is administer under Zvimba East District. It is located just between 5-8km away from Glen View 4 and Budiriro 2 residential areas in Harare. The farm has a population of about 110 households (Interview with Community Elder 2, Pension Farm). The people who inhabit the farm have been employees of Harare City but also have benefited from the FTLRP when it was conducted (Community Elder 2, Pension Farm, 2022). In colonial times, the farm was formerly used as cattle ranch by the City of Salisbury (GoZ, 2010); now Harare, and is still being used as such but has been cut for farming purposes for the people that live there to have land for farming (). These have benefited through acquiring farming land of between 1ha-7ha after the FTLRP which was done in the year 2000 (Eliza,Pension Farm, 2022). Observations carried out by the researcher shows that the farm is located near the mouth of Lake Chivero; which is where the Lake begins. Transect walks done on the farm also revealed that most of the people that are found in this farm have market gardens that supply fresh produce to the nearby towns of Budiriro, Glen View and Churu Farm area. As observed in the study, the farm is close to Churu farm. Just like Ingwe-Gomo Farm, the farm has been affected by the current competition for urban spaces as some of its parts have been cut to allocate people residential stands. The farm mainly thrives through the advantage of having irrigation canals and sub dams that are used for paddock irrigation which they have further channelled to their gardens thereby helping them to produce crops throughout the year and this is consumed by the local people and surrounding towns (Eliza, Pension Farm, 2022).

### 5.3 Biophysical state of the Three Post-Fast Track Resettlement Farms in Zvimba East

Understanding the biophysical state of the farms is crucial in painting the socio-ecological picture of what is transpiring in these farms as it provides a benchmark on the nature of the environment and the socio-ecological resilience mechanisms adopted in the area. As the farms are found in the same area that is within 0-20 km radius of each other, the biophysical statuses of these farms are similar, though differences can also be noted in them. The section thus discusses the geographical, economic, socio-cultural, political and governance set ups of the farms. In doing so, the state of

the farms will be painted to establish the extent to which they are socio-ecologically resilient to climate change in the ensuing chapters.

### 5.3.1 Geography of the selected three farms in Zvimba East District

The case study farms are in a region which is regarded as good for farming. Unlike other regions in the country, the soil quality is generally good to produce crops, which are produced by households. The most common soil types found in the three farms are loamy and sandy soils (Transect walks, Amalinda Farm, 2022). The study noted that Amalinda Farm and Pension farm mostly have loam and sandy soils that are used for farming in the area. According to the village head X of the area, during an interview; she stated that:

Most of the soil types found in these two farms were loamy soil. However, due to overgrazing and deforestation that has been happening in the area; soil erosion has increased greatly. It has now made most parts of the farm to become sandy, as these are close to riverbeds of Lake Chivero. (Interview with Village Head X, Amalinda Farm, 2022).

In as much as the two farms have these kinds of soils, isolated anti hills were observed by the researcher in the area which have red clay soils. Some farmers practice contour farming around these anthills. However, further separate observations carried out in Ingwe-Gomo Farm show that it is slightly different, as it is found on a mountainous area which has made its soils to be red and clay in nature. This has made this farm to produce very dark green-leafed maize crop which has bigger cobs than those produced in Pension and Amalinda farms.

The climatic conditions of the area mainly fall in the Savanah Climate region. In terms of the climatic conditions in the area, most participants (Jane, Anna, Muse and James) explained that the area receives good to very good rainfall. The amount of rainfall received is normally between 700mm-950mm per year which is very good for crop cultivation (Zimbabwe Meteorological Services, 2021). The average temperatures that are experienced in these farms is normally between 7-18 Degrees Celsius in winter and in summer is usually between 22-35 Degrees Celsius in these farms (ZIMVAC, 2018, Zimbabwe, Meterological Service, 2021). It was noted that the farms mostly receive more rainfall as they are close to the Lake Chivero which is one of the top three big Lakes in Zimbabwe. The rainfall received in the area has been conducive for farming crops such as maize and other leguminous plants (Interview with Village Head X). However, it was noted that in most recent years, the amount of rainfall has been going down in these farms as there has been

increased temperatures (Interview with AGRITEX Officer, Zvimba 2022). As a result, heat waves have been common in these farms as noted through the wilting of some of the plants at the farms.

The climate, vegetation and wildlife found in the three farms, was observed to be also part of the Savanah climate, a phenomenon also echoed by participants (Anna, Spiwe and James) during the interviews carried out. This is mainly so because of the type of trees and animals that are noted in the area together with the grass and soils. The type of trees found in the three farms are shady trees such as Msasa and acacia trees that are umbrella shaped in nature (Karuma, Bhatasara and Nyamwanza, 2021). The grass that was observed in the area is normally the tall, tufted grass and runner grass. In the FGDs conducted it was noted that animals that are reported to have been in the area are mostly herbivorous and omnivorous in nature and they rely on tree leaves and grass; which include bush bucks and many others. In Amalinda farm, during interviews; most participants (Muse, Eliza, Spiwe and Sheila) also explained that there are monkeys that can be seen roaming around the area. However, others (Jane and Shamiso) explained that bushbucks and impalas used to be found in the area but are now very scarce due to human activity. The natural endowments are consistent with the Savanna Climate (Karuma, Bhatasara and Nyamwanza, 2021).

The farms are also graced with good aqua life as was observed in the study as all the three farms which are found in the vicinity of Lake Chivero. As was noted during guided observations in the farms, the Lake passes through Pension and Amalinda Farm whilst Ingwe-Gomo Farm has Marimba River that feeds into the Lake Chivero. Amalinda Farm has the Budiro-Ingwe Canal that also feeds into Lake Chivero; which is highly flooded with catfish during the rainy season. Pension farm has the Mukuvisi river and Mangondo tributary that all flow into Lake Chivero. As the three farms are catchments of Lake Chivero, the aqua life found in the Lake is part and parcel of their livelihood options that they live on and with it (Zimparks ranger, Samak Interview 2022). Lake Chivero is characterised by having different type of fish, which include tilapia breams, cup fish, cash fish and tiger fish; together with other small kapenta fish (Karuma, Bhatasara and Nyamwanza, 2021). These are part of the type of fish which are on demand and which make the livelihood of fishing a viable option for many people living in the lake's catchment area. The Lake also is heavily infested by crocodiles which are also a hazard to the fishermen that go for fishing in and around the area (Mhlanga, 2012).

### 5.3.2 Economic activities done in the selected PFTF's

Diverse economic activities are done across the three farms; mainly hinged on the biophysical nature of the farm, profiles of its habitants and the political context of the area amongst other features. Confirming this, Chiweshe (2013) notes that a farm is an economy on its own; as it sustains the people on it through various on-farm and off-farm activities which form the core sustenance livelihoods for the inhabitant people. The study noted that in these farms, three types of economic activities exist which are the on-farm economic activities, off-farm economic activities and non-farm economic activities. They form the crux of the livelihood options that are used by the inhabitants of these farms to earn a living and as well as support their families.

Most resettled farmers in Zimbabwe's on-farm livelihoods include crop cultivation and animal rearing; together with selling of casual labour (Moyo and Matondi, 2008). The options that have been observed and noted across the three farms are crops cultivation, animals rearing and selling of casual labour. Though these are similar, the scale and capacity in which they are done in these three farms differs. In terms of crop cultivation, it was noted that at Amalinda farm, the farmers mainly grew maize and tobacco using rain-fed agricultural techniques whilst the A2 farmers in the area thrive on irrigation facilities such as overhead sprinklers and which are electricity and solar powered. The scale at which farming is done in these farms is also different; as A1 farmers only cultivate their 3Ha, but A2 farmers in this farm cultivate up to 100 ha of maize, soya beans or tobacco (AGRITEX Officer, Zvimba 2022). Maize and soyabeans are also cultivated in Ingwe Gomo and Pension farms, though at a hectarage of between 1-10ha; and at Gomo, the A2 farmer even goes above 80 ha (AGRITEX Officer, Zvimba, 2022). In addition, market gardening is also another farming endeavour undertaken at Pension farm. This is not done in other farms. Women produce vegetables, tomatoes and onions throughout the year using irrigation water channelled to the farm through the canals from paddocks.

Another farm activity that is done across the three farms is animal rearing. Mostly animals reared across the three farms include cattle, goats, sheep, and poultry animals (Interview with Jane, Amalinda Farm, 2022). Most the animals reared on these farms are household based as was noted at Amalinda farm. Mostly, the small holder farmers from which the women normally come from under this study have between 0-10 cattle, 0-20 goats and 0-30 fowls that are kept on the household which is part of their collateral security (Kutyauripo et al., 2021). This is the also the case in the selected farms in Zvimba East District. These are mainly reared for meat, milk and selling in order

to buy grocery supplements and sending children to school (Interview with Jane, Amalinda Farm, 2022). However, the farmers in Pension and Ingwe Gomo Farms rely also on herding cattle for the Harare City; from which they also get meat, milk and hide that they use for traditional purposes on the farm (Makhule, Ingwe Gomo Farm, 2022). Though some of these farmers work for the Harare City, they have supplemented their income by being part of the FLTRP which happened in the area.

Selling casual labour is another survival antique that the people on these farms use to survive on the farm. This was revealed by participants (Jane, Spiwe and Sheila) in the form of former farm labourers in Amalinda Farm and most workers in Pension and Ingwe-Gomo farm. Observations made by the researcher across the three farms confirmed that the selling of casual labour during the farming season is so widespread in these farms. Interviews with participant such as James, Makhule and Anna confirmed that labour is normally sold for USD3-USD5 a day for a day's work. Some do so in exchange for clothes and food. However, those resident in both Pension and Ingwe-Gomo farms sell their labour for a salary that normally comes once a month to Gomo or Harare City council (Makhule Ingwe-Gomo Farm, 2022). Normally, they received about US\$60-80 dollars a month for their services and could receive basic groceries such as 2kg sugar, 2l cooking oil, mealie meal and a bar of soap (Village Head X Interview, Amalinda Farm 2022).

On top of the on-farm livelihood options cited above, the inhabitants of three farms are also involved in other off-farm livelihood options in order to earn a living on the farm. According to Matondi and Rutherford (2021) off-farm activities refer to all non-agricultural activities that occur on the farm. Some of the off-farm livelihood options that were observed by the researcher on the farm include brick making which is mostly done in Amalinda Farm; where there are plenty of anthills that supply clay which is the main raw material. At Ingwe-Gomo farm, the researcher also observed that the women were involved in traditional beer brewing; known as *kachaso* or *niper* and 'seven days beer' (Anna, Amalinda Farm Interview, 2022). These are used to earn extra income which is very crucial for their daily expenses as households and families on the farm.

In line with this, it was observed that all the three farm's participants were also involved in firewood hawking business; in which firewood is poached and sold in nearby high-density suburbs such as Budiro and Glen View. In as much as Environmental Management Authority (EMA) and Harare City Council officers mount roadblocks to prevent this business, they are by-passed as

people use private footpaths to sell firewood to these locations (Mahule, Ingwe Gomo Farm Interview, 202).

Fishing was also observed by the researcher to be another economic activity that is done in all the three farms. Some women from Gomo Farm normally do this in Marimba River, whilst others from Pension Farm usually use Mangondo area for their fishing and those from Amalinda Farm mostly fish in Lake Chivero. However, for large scale fishing interviews with participants such as Zim Park Ranger and EMA Official revealed that the people do not have fishing licenses, hence they resort to poaching of fish in Lake Chivero as livelihood option.

Adding on to this, as through observations carried out ; hunting of wild animals such as wild bucks and wild geese together with gathering of wild fruits and berries such as *shumha*, *hacha* and *matamba* were also discovered to be another key livelihood activity that is done in all the three farms. Moreover, observations carried out across the farms also revealed that renting out farming land and selling of inputs through unethical means is one of the key livelihood options that the inhabitants of the tree farms mainly use to earn a living on these farms . The farming communities also thrive on government donations that help them in times of hunger and starvation as there are no donors who help these communities as they are deemed regime enablers as was observed in the study.

The farms under study are also involved in non-farm economic activities for sustenance in their day to day lives. Non-farm activities are now seen as the most viable way of being resilient to climate change in most resettlement areas; as these are mostly not environmentally dependent (Nhemachena et al, 2020). Most of the participants (Jane, Makhule, Anna, Spiwe and Sheila) that were interviewed explained that they relied on seeking work in nearby locations such as Budiro, Glen View and Mufakose. The females indicated that they work as house helpers. Adding on to this, other participants such as Eliza and Muse explained that they relied on remittances that were sent by relatives that migrated to other countries and locations in Zimbabwe. This as was also echoed by Thebe (2018) in his study on farming communities in Matabeleland. Women explained that they depended on monthly remittances that were sent through various mobile money facilities in Zimbabwe. Others such as Shami indicated that they survived by sole trading through being involved in grocery shops and small tuckshops found on the farms. Some participant such as Muse and Mahule stated that they are also involved in vending; which is something handy for many

people in Post-Fast Track Resettlement Farms. The vending initiatives mainly involved selling tomatoes, vegetable, fruits, and other small goods in smaller quantities which are affordable to the farming communities.

### 5.3.3 Socio-Cultural set up of the selected PFTFs

The socio-cultural state of the farms can be described as cosmopolitan in nature; as these are hybridised communities in terms of social ties and cultures. Cultures on the three farms in question are similar, though differences can be noted. Bhatasara (2015) explains that farms are cosmopolitan in nature, as they have people from different cultures such as the Shona, Ndebele, and foreigners from countries such as Malawi; which has been the case in the selected farms in Zvimba East District. As a result, these various cultural values have influence on the way of life that happens in the farms (Chikodzi et al, 2013). In case of Amalinda Farm; in the compounds, the people that migrated from Malawi during years of Federation (GoZ, 1980) are the ones that are mainly found, whilst mostly the Shona people from various dialects such as Manyika, Zezuru and Karanga are resident in the plots section; apart from a few people from the Ndebele cultures. Adding on to this, in Ingwe-Gomo and Pension farms respectively, Shona people are mostly found there, as these farms were resettled in the post-independence times; especially during the FTLRP (Moyo and Yeros, 2011). However, few people from Malawi have also been noted in these farms. Observations made by the researcher showed that the grave site for the three farms is situated in Amalinda farm.

According to Scoones et al., (2010), marriages that exist in these farms are also heavily influenced by the cultural values of the inhabitants. Mostly, the inhabitants of the farms that come from Shona and Ndebele cultures' families are highly patriarchal in nature; with the males being the head of the house and the centre of decision making in the household. However, amidst those that migrated from Malawi, the marriages and family life are highly matriarchal in nature as the mother and the mother's brother have the power to control the family and have ownership of the children (Chavhunduka, 2010). In the compounds on these farms; mostly in Amalinda Farm, marriages are highly fluid in nature as these can be broken at any moment. Women can get married even to their neighbour in previous marriage without any problems (Anna, Amalinda Farm, 2022). Even though this is the case, on all three farms, child marriages have also been noted to be high in these because of hunger and starvation on these farms.



Kabonga (2020) highlights that in terms of religion, people in the Post-Fast Track Resettlement Farms have different types of religions that they practise and they are cosmopolitan in nature. At Amalinda Farm, through interviews with village head x and observations made by the researcher; three main types of religions were noted, which include the Islamic, Christianity and ATR. In terms of these religions, there are clusters that were observed by the researcher on the farms. The main form of Christianity that was noted on the farm is Pentecostalism; with the new emerging churches and the apostolic white garment sects also being another addition. In terms of ATR; two strands were discovered through observations and interviews with traditional healer and community elder 1. There were hinged on ancestral worship of the Shona and Ndebele people; which was advanced by traditional healers and diviners and that stemming out of the Nyau culture of Malawi. In Ingwe Gomo farm the Nyau Cultural Religion and white garment apostolic sects mainly are the mainly religions found in the area same as also in Pension farm.

#### 5.3.4 Politics and governance

The Post-Fast Track Resettlement Farms are highly political in nature as these are the breeding grounds of votes for the ruling party ZANU-PF (Mandizadza, 2009). This is mainly so because the farms have their own local leadership which serves as the eyes and ears of the ruling party. As they are a community found in Zvimba East District, the village head who resides in Amalinda Farm is the one that controls mostly Amalinda and Ingwe-Gomo farms (Community Elder 1). The Amalinda and Ingwe Gomo farms are treated as a constituency that have a local councillor from the ZANU PF party. On the farms such as Amalinda, Ingwe-Gomo and Pension Farm; a local farm committee is found which has about 7 Members that run the affairs of the area; chaired by the chairperson (Village head X). However, in terms of Ingwe-Gomo and Pension farms; the farm managers who report to the farm owners are also in charge of the daily proceedings, especially of the big A2 project and Harare City Project (AGRITEX Officer, Zvimba 2022). The area is also regarded as a cell of ZANU PF; which is part of the Budiriro 5B district, though the votes in the area are counted under Zvimba East District (Community Elder 1). Thus, the District Chairperson is also responsible for the political landscape of the farms in Zvimba East District. However, there are also other political parties like the Citizens' Coalition for Change (CCC) which has small leadership structures in the area (Community Elder 1).

In terms of land allocation in the area, interviews with MoLAWFRD official revealed that land is now no longer being allocated locally, but one should go to Zvimba RDC in Murombedzi. In the

period between 2000-2005 when the FLTRP that was being implemented, land was only allocated to men who were war veterans (Female, War Veteran, Amalinda Farm 2022). The females got access to land through marriage and inheritance. Adding on to this, just as Mate (2002) noted; women had only ‘usufruct rights’ to land. This meant that the right to use the land was accessed through association with men. However, in terms of land rights; the farmland and all rural land belongs to the state. The A1 farmers have offer letters that spell out that they were given the rights to use the land in a manner stipulated in it, whilst A2 farmers are given 99-year leases for farming; not complete ownership. The government returns the right to return the farm if it is not used well as stipulated in the agreement (Moyo, 2012). The study also discovered that the farm audits are carried out regularly to see whether land is being used productively.

#### 5.3.5 Infrastructure on the farms

Infrastructure used on the farms has different levels of sophistication as was observed in the study. The three farms have different farming infrastructure, depending on the level of income that the inhabitants of areas have. A common type of housing was noted across the three farms; which includes houses built of farm bricks, with corrugated iron sheets for the houses built after the year 2000 whilst those that were built before by the whites have asbestos roof. The kitchens are normally round huts that are thatched using tufted grass. The houses on the three farms are built from the available resources on the farm such as brick and clay mortar, though the plastering of the houses would now be of cement; which helps to make the structure strong. The main houses normally range from one roomed to four-roomed houses for an average family of 5-8 people. On the household yard, fowl runs built using farm bricks and wood are also part of the infrastructure as well as goat pens and cattle kraals built of wood.

The spatial infrastructure observed by the researcher on the farms include roads, small dams, and bridges. The roads are mainly gravel roads that are used by the small traffic of vehicles seen on the farm. The main Amalinda road which connects Masvingo Road and Bulawayo Road was tarred on the part that connects the three farms, but has deteriorated into gravel road that has many potholes as the tar has been washed away by rains and bad weather and has not been fixed yet. The researcher observed that Amalinda Farm has two bridges that are found just before and after the dairy farm and it connects the dairy and tobacco plots. The bridge is built out of concrete but has now been heavily washed away by the heavy rains that have affected the area in recent years such as 2010, 2019 and 2021(Village Head X), hence is now weak with potholes; although it is still

functional. The researcher also observed that Pension and Ingwe Gomo farms have small paddock dams that irrigate the paddocks. The dams have sewerage seepage and the canals further irrigate other crops grown by the local farmers.

Agricultural infrastructure in the farms also varies from farm to farm as was observed by other scholars (Moyo, 2012). The A1 farmers in Amalinda farm do not have much sophisticated agricultural infrastructure. A few of these farms have cattle and ploughs, whilst many still use hoes for farming. In terms of granaries, their harvest is still stored on the open ones made of Msasa trees whilst some store their produce in the thatched granaries. However, the A2 farmers in the area use irrigation equipment and have centre pivots for watering purposes. This differs with Ingwe- Gomo farm that has many farmers still using hoes for farming, whilst the A2 farmers have modern equipment. In terms of Pension farm, the researcher observed that the small farmers thrive on the irrigation canals of Harare City which they use in their market gardening too. Hence in term of mechanisation, it has been noted that most of the farmers have the land but are still way behind in terms of modern 21<sup>st</sup> century farming equipment which they may need for their agricultural endeavours (Kabondo, 2020).

#### 5.4 Socio-economic profiles of the selected households in the three farms under study

In order to understand communities, there is need to decipher their socio-economic profiles so as to understand their way of life. The section below highlights the socio-economic profiles of the selected Post-Fast Track Resettlement Farm households which are the unit of analysis in this study. Through understanding the profiles of the households under study, the picture painted by the participants to represent the households became clearer. It helped to comprehend the level of socio ecological resilience to climate change which was revealed, thereby helping to know the practices done in the communities.

##### 5.4.1 Demographics of the selected households

Understanding the demographic characteristics of communities clearly helps in understanding the behavioural patterns of people and their attitudes towards the issues under study. The demographic characteristics of communities helped the researcher to examine the people's ways of life. In a bid to understand socio-ecological resilience to climate change for the three farms, the researcher sought to unravel the demographic characteristics of the population and the sample first. In doing

so it was discovered that across the three farms under study, the Post-Fast Track Resettlement Farms farms are made up of highly youthful populations.

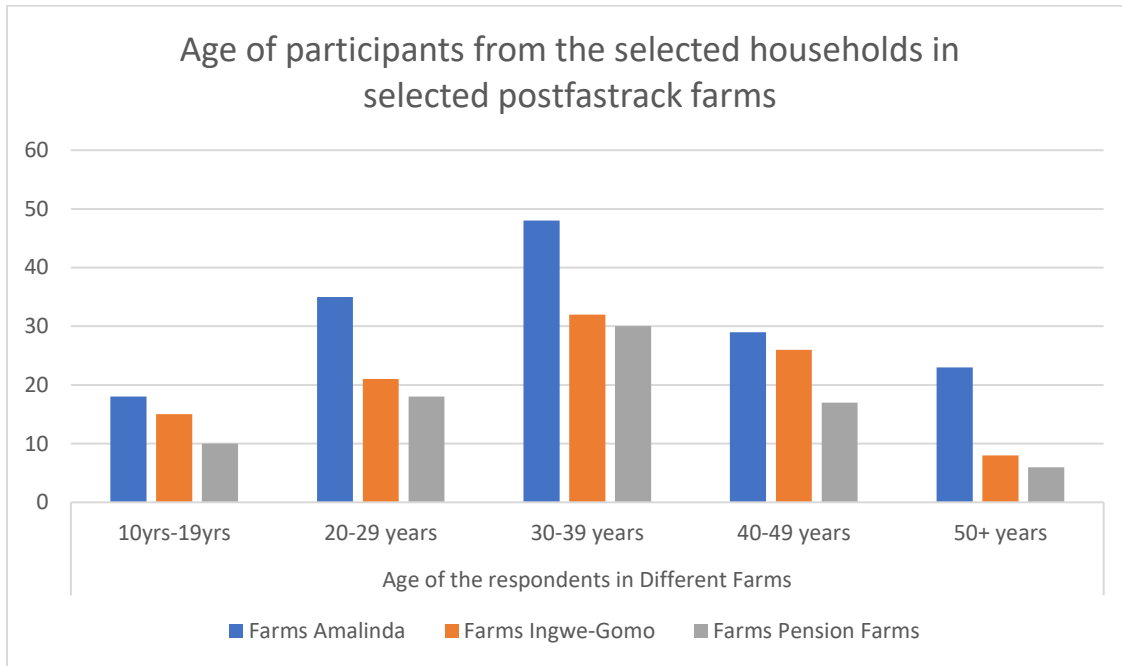


Figure 15: Age of participants from the selected PFTFs households

This is supported through the statistics drawn from questionnaires distributed in the area as indicated above; which reveal that most of the participants from the selected households who were involved in the study are the adults that are mostly economically active. This refers to those from the age of 10-49; who form about 89.9% of the population of people across the three selected Post-Fast Track Resettlement Farms (n=337=89.9%) whilst 10.1% are those ones above the age of 50. This clearly shows that the population in the area is very youthful, suggesting that the farms still have most productive ages found in them. Inasmuch as it is compared to other rural areas that have mostly elderly people, observations done showed that these farms still have young people anchoring their economies as they are found very close to the urban areas found near these three farms; which include Budiriro and Glen View and Glen Norah.

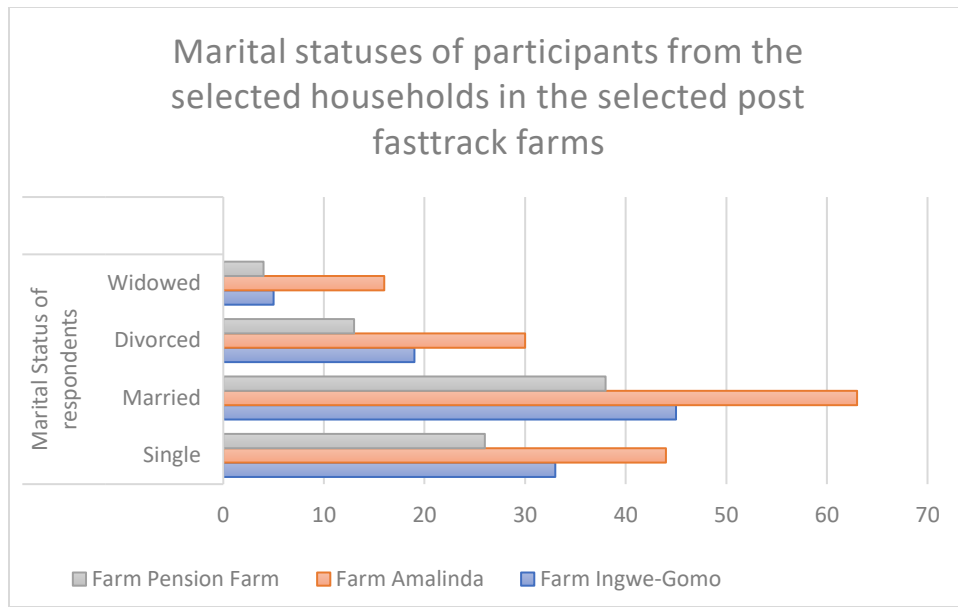


Figure 16: Marital statuses of participants from the selected PFTFs households

Marriage is still the dominant form and way in which most women and also children get access to land in PFTRFs (Scoones et al., 2020, Shonhe 2018 and Chiweshe 2023). Marriage is seen as a collateral and binding factor to get inheritance as was noted in the study. The dominant marital status noted across the three farms is that of being married as shown in Fig 5.2. Across the three farms it has been noted that most of people across the farms are mostly married as noted by (n=337=43.3%). This clearly shows that the access to land for most of women who form the bulk of the population in the farms is coming through secondary rights which come through marriage. Not only is this for women, but it is also the young men who would have become married and are given land by their fathers as a sign that these have grown up as echoed by Chiweshe (2013). Adding on to this, the statistics above show that the population is still youthful across the three farms, as most of these are not yet married. This shows how these agricultural communities are hinged on young blood. In terms of the divorced, it was noted that all the three farms have significant number of people that are divorced as data from Pension; (n=81=16%); Ingwe-Gomo (n=102=18.6%) and Amalinda Farm has (n=153=19.6%) have shown. This clearly shows that the nature of lives and livelihood options practised in the areas shake the marriage foundations, leading others to break. In terms of widowhood, statistics collated from questionnaires show that Amalinda Farm leads three farms with high percentage of widows (10.5%) whilst Ingwe-Gomo follows with (0.05%) and Pension is last with (0.05%). This suggests that the death rate has been

significantly higher in these farming communities; probably due to malnutrition, hunger and starvation as a result of climate change.

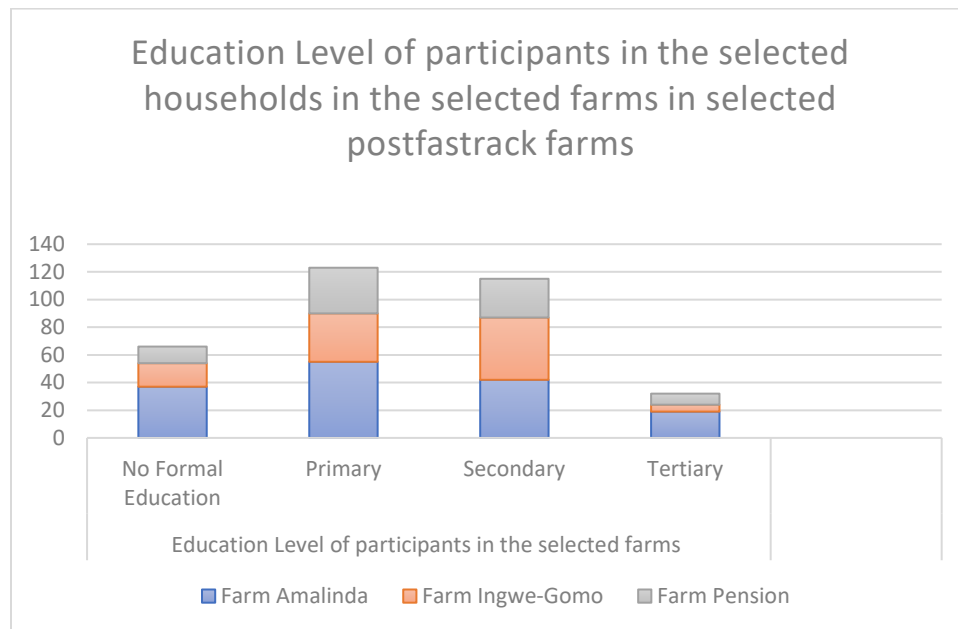


Figure 17: Participants' level of education

Inasmuch as the people in Post-Fast Track Resettlement Farms are mostly literate as they have attained primary education, getting to higher levels of education is proving to be difficult for these; as numbers begin to drop from secondary to tertiary level of education (Moyo et al., 2023). As shown by the statistics above (Fig 5.3) from the survey conducted, most of the participants selected from the households under study (80.4%) have formal education whilst 19.6% of the participants selected from the households do not have formal education. However, disaggregated statistically it can be noted that the graph begins to fall also after the primary education; with few people reaching tertiary level. This clearly shows that the population in Zvimba East District is highly literate but despite their literacy, a significant number of women remain without proper tertiary qualifications whilst also others do not even have the formal education. As noted through the disaggregation of data by farm, 24.2% of the participants at Amalinda Farm do not have formal education whilst 16.7% of the people at Ingwe-Gomo and 14.8% of the people in Pension farm do not have formal education. In line with these findings Kabondo (2020) notes that literacy in Post-Fast Track Resettlement Farms has been very low as most of these area do not have formal schools within their vicinities. This is mainly so because of the issues of affordability of the education and

the distance that children have to walk to go to school in the prior years before the introduction of Amalinda Farm Primary School in 2015. Thus as a result, the generation before the school was brought near the farm has not greatly obtained the chance to get good quality education. The cultural values and norms of early marriages have also been the one impinging the education of the girl child, particularly in Amalinda Farm where the no education rate is high as noted by several participants (Jane, Female War Veteran, Anna and Spiwe) in the interview conducted.

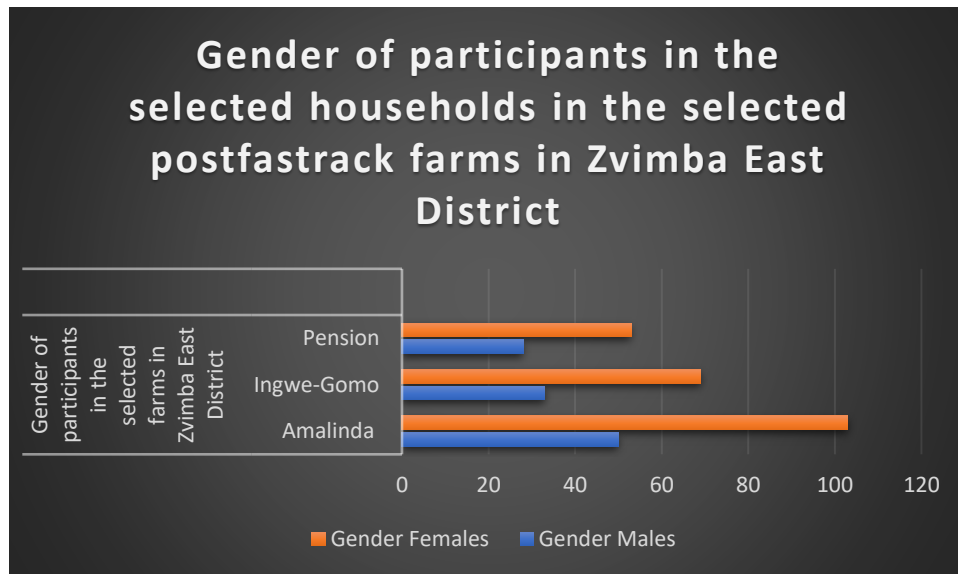


Figure 18: Gender of participants from the selected PTFs households

Gender is a very important component of communities which helps to understand the behaviour of societies around various issues. Kabonga (2020) posits that in most agrarian societies and communities, women are the most dominant gender as they are the custodians of agrarian production. In line with this, the statistics in Fig 5.5 echo these findings; as across the three farms, most of the participants from the selected households are the females who constitute of the 64.2% of participants whilst 35.8% of the participants are males. This clearly shows that most of the farming economies found in Zvimba East District are run by women, as they are always present on the farm and are knowledgeable of what needs to be done on a daily basis for there to be good output on the farm. Supporting these findings, Masoga and Kaya (2014) and Bhatasara (2015) explains that women are the main drivers of agricultural productivity in the farming communities across Africa. Though they do not have primary land ownership rights in most farms in Zimbabwe, they drive the production on the farms which is a key role in the farm economy.

### 5.4.2 Household Status

The household is the basic unit that helps to understand the level of economic standing in the community. The participants in this study came from households with differing wealth and social status. The unit of analysis and measurements in this study are the households. The household status of three farms was measured using various variables to paint a full picture of how they are. The variables measured include income of the head of house, household income, religious beliefs of the household, number of people per household, reasons for staying on the farm and the number of years they have been living on the farm. The variables above helped to understand the dynamics of households across the three farms as they are all Post-Fast Track Resettlement Farms though their nature is different.

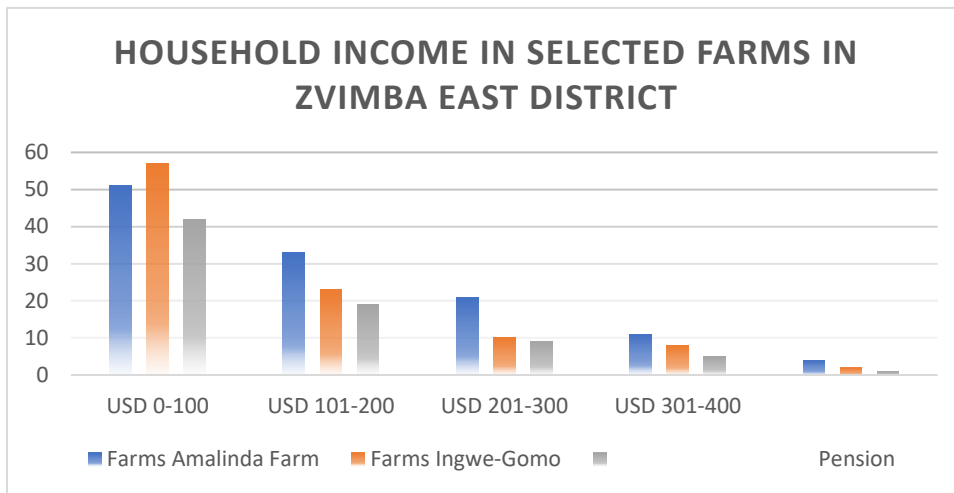


Figure 19: Incomes of households in selected PFTFs

Most of the households that are found in the Post-Fast Track Resettlement Farms are living in poverty as most of them are living below the poverty datum line; which is 350 USD per family of 3 per month. However, households across the three farms are far lagging as in terms of income. It was noted that most of the households in Amalinda Farm (51%), Pension Farm (42%) and Ingwe Gomo Farm (57%) have income ranged from USD0-100 dollars only per month whilst they also have 33%, 23% and 19% of the households having income that ranges from 101-200 dollars a month respectively. In addition to this, 21%, 10% and 9% of the households in Amalinda, Pension and Ingwe Gomo farms included in the study have income that range from 201-300 dollars only whilst 11%, 8% and 5% of these households have income ranging from 301-400 dollars only and 4%, 2% and 1% of these households have income ranging higher than 401 dollars per month.



From an analysis of the monthly income highlighted above, it can be noted that most of the families in the study are living well below the poverty datum line as noted through about 76% of the participants having an average income of only about 200 dollars and less.

In line with this, according to the ZIMSTAT (2022) report, the grocery basket for a family of four is now pegged at around 250-300 dollars a month. This clearly shows that most families in the farms are living way below the poverty datum line of Zimbabwe as nation which thus affects their resilience to climate change greatly as from the onset, they are already disadvantaged from the income that they have monthly. Hence money to buy and fund sustainable agriculture in the area for most households is hard to come by, thereby affecting their agency on climate change in the area, as they end up using available means to earn a living; whether authorised or not, to save themselves from hunger and starvation.

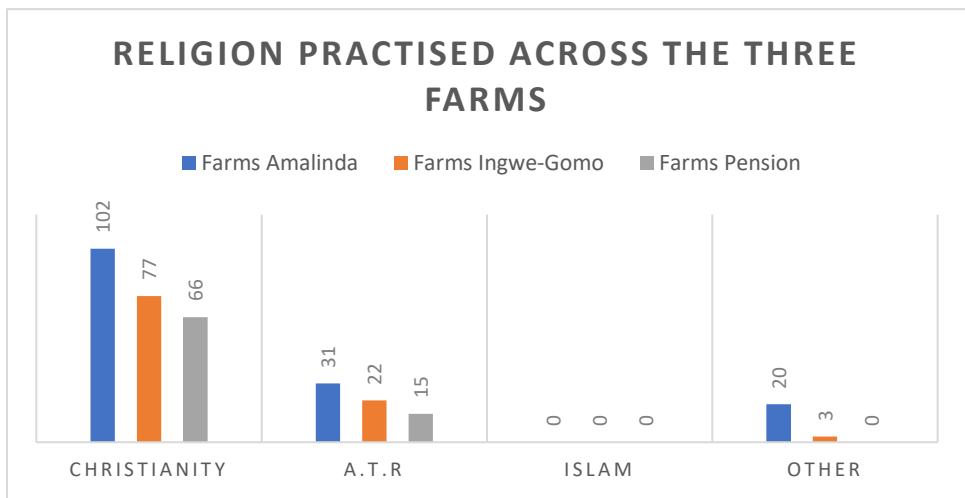


Figure 20: Religion of the selected PFTFs households

Scoones (2010) explains that in most Fast Track farms, two dominant religions exist; which are Christianity and ATR. However, the Christianity is mainly based on indigenous African churches whilst ATR is hinged on the *Gure* culture and the Shona ATR as was observed in the study. Supporting this, the bar graph above, shows that most of the participants in the area are affiliated to Christianity (72.7%) as a religion whilst about 20.2% of the participants are affiliated to A.T.R as a religion. In addition to this 0.07% of the participants are affiliated to other religions which are a blend of Christianity and ATR whilst none indicated affiliation to Islam in these three farms. Religions shape the various perceptions on how the environment should be treated (Eriksen, 2010).

Thus, in line with this, it can be noted that the nature of the religion participants were affiliated to also determined the nature of resilience practices to climate change that they got involved in. In this study, it was noted that those involved in A.T.R mostly knew more about indigenous ways of telling weather patterns and ways of conserving their environment; unlike those that were involved in other religions which in turn affected the level of socio-ecological resilience they had to climate change in their area.

In addition to this, the table above also shows that, the FTLRP was racial in nature as most of the people that then living on the farms were black people. As noted in the study, 100% of the people in all the farms that were included in this study were black people. The question remains as to where the white people, Indians, and mixed race are in FTLRP process. Mashizha et al., (2019) notes that the process of FLTRP was highly emotional in nature, as it was not properly planned. Socio-economically, it left other Zimbabwean citizens behind in the process. This clearly also paints a picture of how the process of FTLRP has been biased towards one race, leaving others behind in the issues of land redistribution in Zimbabwe.

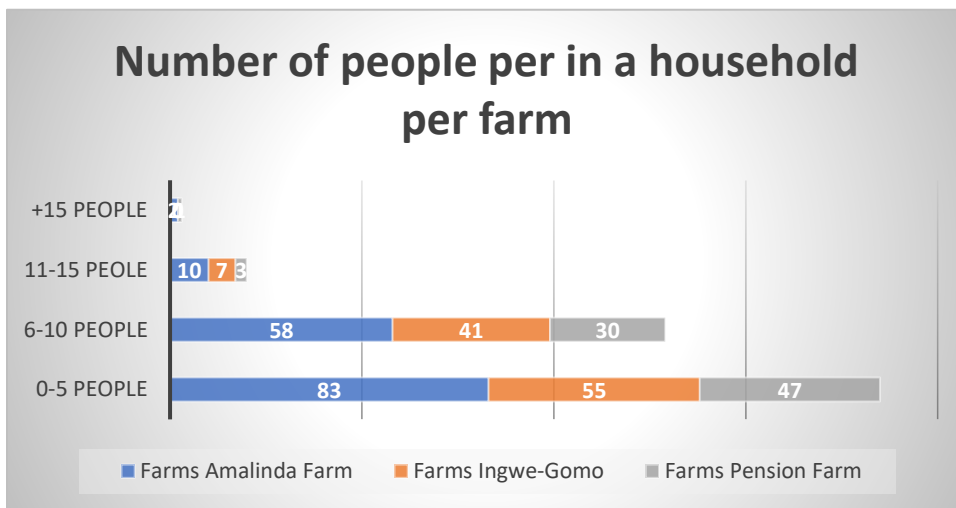


Figure 21: Number of people per household in selected PFTFs

The number of people living in household is crucial to paint a picture of the resilience building methods that these people are using to fight the scourge of climate change (Svinurai, 2018). As was noted in the study, the graph also shows the number of people per household on the farms where the survey was conducted in Zvimba East District. The graph highlights that on average about 54.9 % of the households have between 1-5 people in them whilst 38.3 % of the participants

indicated that other households have also between 6-10 people constituting them. Adding on to this, 0.06% of the participants indicated that households on the farm have about 11-15 people each whilst 0.009% indicated that they have household with more than 15 people. In line with this, it can be noted that the farming communities in Zvimba East mainly thrive on labour that can be provided on the household through procreation and other relationships in the family. As a result of demand for upkeep of the family in the farms amidst climate change, unorthodox means, and ways of becoming resilient to climate change end up being used; thereby threatening the integrity of the environment. Supporting this, Makhubele (2014) notes that most households in farming communities end up preying on the environment to sustain their families because of the pressures that would have come with climate change on the farm. This has been the case with most inhabitants on the farms in Zvimba East District.

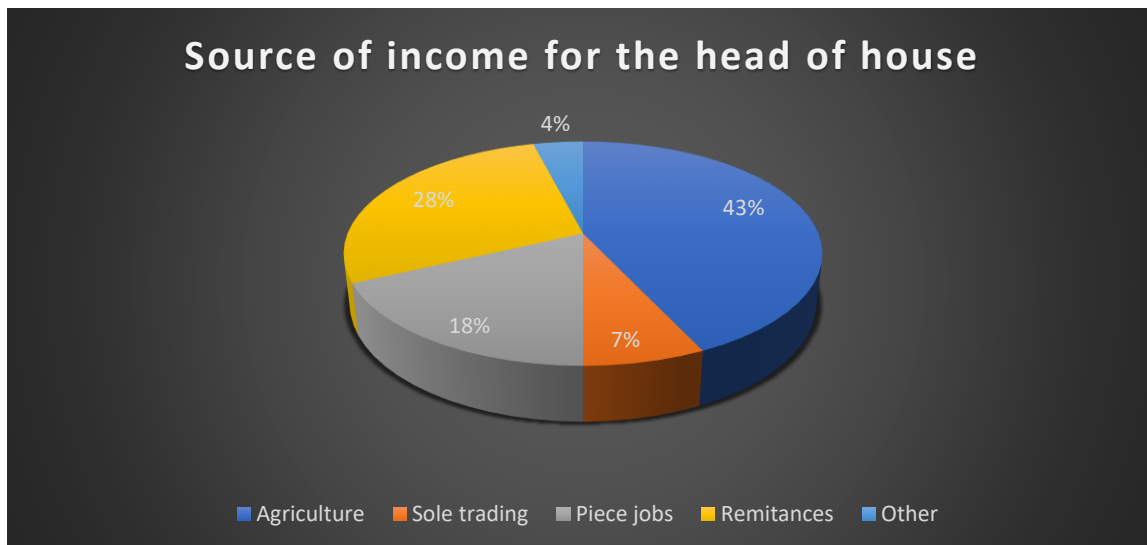


Figure 22: Source of Income for the households in the PFTFs

Sources of income determine the lifestyles and life that households under study mainly experience. Bryceron (2008) notes that the sources of income of community highlights the way of life in it, which makes it possible to understand the trends of phenomena happening in the area. In this study, the sources of income for the household head were also analysed. In this study, the most dominant streams of income for the household head amongst the many streams of income these have are indicated. The pie chart above clearly shows that 43% of the participants indicated that income of the household came from agriculture, whilst 28% of the participants explained that household income mainly came from remittances they received from relatives in the diaspora. Adding on to

this, 18% of the participants indicated that their income came from piece jobs whilst 7% of these highlighted that their income was obtained from their sole trading business. However, 4% of the participants explained that their income came from other sources; apart from the ones highlighted above.

As was highlighted above, most of the participants highlighted that most of their income comes from agriculture practised in these farms, thus indicating that the problems of climate change that may affect their agricultural process end up affecting their income. This has led them to find ways to cover for this gap in income through some means and ways that are not socio-ecologically friendly, thereby creating problems for the environment. Gukurume (2013) notes that alternatives for income generation for many resettled farmers are found on the farm, though these may not be socio-ecologically friendly; hence highly unsustainable. Considering this, it can be noted that any defect suffered on the source of income in Post-Fast Track Resettlement Farms is responded to through the nearby solutions, even those that end up affecting the environment.

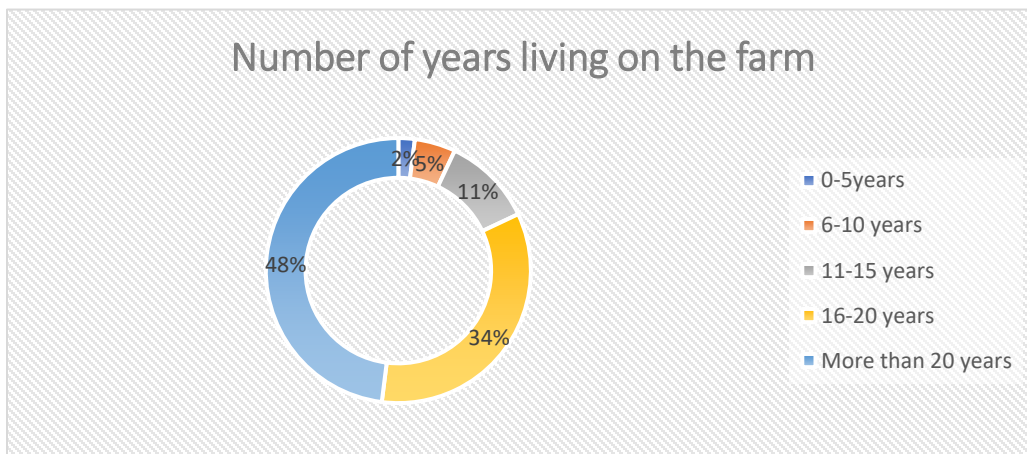


Figure 23: Number of years one has been living in PFTFs

Most Post-Fast Track Resettlement Farm dwellers have been living on the farms for between 7 years and 25 years. The longer one stays the more a culture is developed and implemented in their day to day living. In terms of the number of years the inhabitants of the farms have been living on the farm, it can be noted that most of the participants (48%) highlighted that they have been living on the farm for more than 20 years whilst 34% of these have been living on the farm for close to 16-20 years. Adding on to this 11% of the participants highlighted that they have been living on the farm for between 11-15 years whilst 7% of the participants highlighted that they have been

living in the selected farms for not more than ten years. The time spent on the farm clearly highlighted the level of understanding that the participants had with the environment and the nature found on the farms.

Supporting this argument, Gukurume (2013) highlights that the number of years one has been living in an environment determines the nature of understanding that one has with that environment and its state emanating from the relationship that is there. Hence, the participants that have been living on the farm for more than ten years are the ones that are mainly responsible for the state of the farms in the area in terms of the environment, as they know how to manipulate the existing laws and rules that prevent environmental degradation in the area. They also have the means and ways of renting out the plots and farming land to the people in the nearby locations for a fee to make sure that they survive the scourge of climate change that is affecting the farms and the people in these farms.

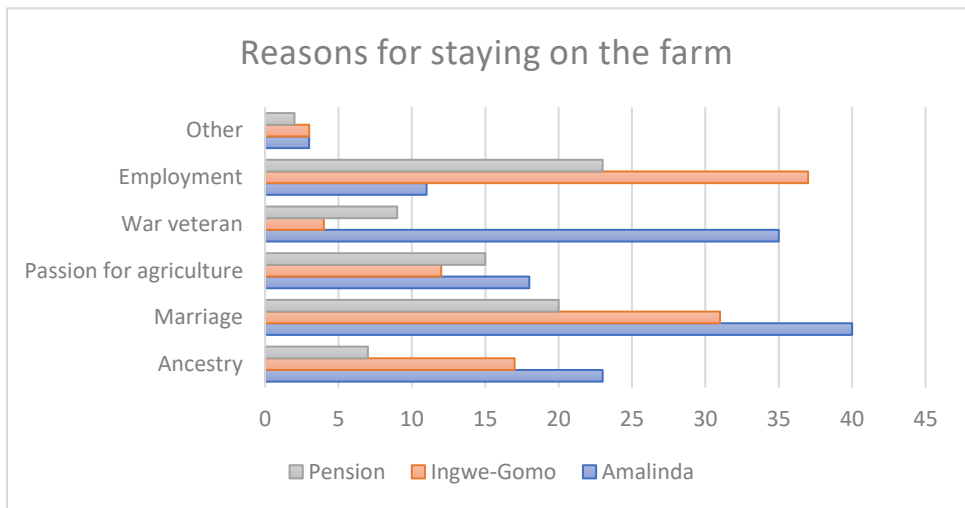


Figure 24: Reasons for staying on the farms.

Scoones et al (2010) reveal that after understanding the number of years one has stayed on the farm, the reasons why one has chosen to stay on the farm have to be understood as this paves way for evaluating their socio-ecological resilience to climate change. Moreover, in a bid to fully understand the households, the graph above also shows the reasons why these participants are staying on the farms. Most of the participants (31%) highlighted that they are staying on the farm due to marriage set up as they are women whilst 24% of the participants explained that they are staying on the farm for employment purposes as they are still employed by the City Council and

others by local farmers in the plots. Adding on to this, 15.9% of the participants highlighted that they are staying on the farm because of ancestry, as they grew up there whilst 15.2% highlighted that it was due to their passion for agriculture. However, 16.2% of participants highlighted that they are living on the farm because they fought during the liberation struggle. Of these participants, the majority are found in Amalinda Farm where most of the war veterans have decided to stay. The reasons for staying on the farms clearly help to inform the various activities that are conducted on them and the level of socio-ecological resilience to climate change that the inhabitants of the farm have. As noted in the data above, some of the reasons are highly emotional; which greatly affects the activities that are done on the farm as these may fail to be in line with ecological sustainability in the area.

#### 5.4.3 Household Livelihood option assessment

Farming households in Zimbabwe have different livelihoods that they base their lives on (Chingarande, 2020). Livelihoods are the means and ways used by people to support themselves in particular environments. The livelihood options are critical as these form the basis of economic sustenance for households (Matondi and Rutherford, 2021). Through these livelihood options, the people can live with the general of economic conditions set by their environment. This section also discusses the livelihood options that are conducted on the farm at household level which is the unit of analysis. The livelihood options done at household level presented in this section are exposed in order to give an economic picture of the farm household in the three farms that are under study. The livelihood options presented include crop cultivation, animal rearing and non-farm livelihood activities that are done on the farm.

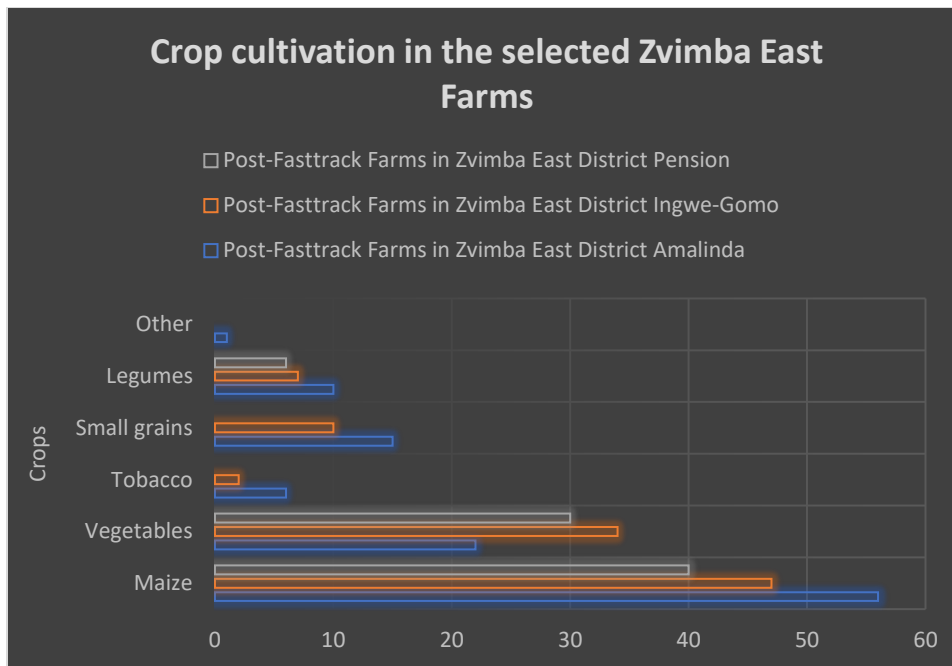


Figure 25: Crops cultivated in the selected PFTF

Crop cultivation is one of the biggest livelihood options that are practised in the Post-Fast Track Resettlement Farms. Matondi (2016) explains that livelihood options mostly widespread in the Post-Fast Track Resettlement Farms are hinged on agriculture; with crop cultivation being the most dominant option. Confirming this, the findings presented in the graph above show the livelihood options that households in the selected Post-Fast Track Resettlement Farms are pursuing in order to make ends meet in their communities. The study noted that in terms of crop cultivation, 48.3% of the participants highlighted that their households are into maize farming whilst 29.1% of the participants explained that they also are into vegetable farming. This clearly shows that maize and vegetables are the two main crops that are grown across all the farms, thereby highlighting these farms as the source of the products for nearby locations. Adding on to this, 8.5% of the participants highlighted that some households are into small grains farming whilst 7.7% revealed that leguminous plants farming was a source of livelihood; which shows that these are grown for diversifying their local household diet, though at Pension Farm people did not grow small grains. However, 2.7% of the participants highlighted that other households are into tobacco farming in the area, though at Pension Farm the farmers are not into tobacco farming as they focus more on market gardening. Households are into crop cultivation for the sake of food security at the household level as noted through the nature of the crops that they are farming. The cultivation

of cash crops such as tobacco that bring in quick returns in the area is very low. Probably, households do not have strong start-up capital to venture into such projects in the areas they are living in. In support of this, Moyo et al., (2023) posited that most farmers that have been resettled in Zimbabwe have the land at their disposal but not good start-up capital that enable them to be more productive. They may also lack knowledge of what to do with the land. Thus, as has been noted above, it can be deduced that the government has resettled farmers with cash cropping in mind whilst the resettled farmers are still subsistent in their thinking and response.

In some interviews with the participants from the selected households across the farms, it was noted that most of them grow maize, mostly because of financial difficulties. The majority of the participants explained that growing of maize and other crops for consumptions is their main goal as they are not financially stable to be involved in other cash crop farming. In his study of the Masvingo communal farmers, Svinurai et al., (2018) concurred that most resettled farmers grow crops for consumption than for resale as these are not financially stable. In line with this, Eliza explained that:

My son, most of us here are war veterans and we are now old. Some have even retired. The households you see in these farms are not financially well up, so we have decided to grow crops for our subsistence only. The type of crops we grow, we mainly grow them for consumption. More so, the plots we have are small only 3 Ha-5 Ha, so we can only produce as little as we can manage. I think those who are into tobacco are over ambitious, based on what we have on the ground. (Eliza Ingwe-Ingwe Gomo, 2022)

James from Amalinda Farm households explained that:

With the change of the environment and the problem that we, as households in this area, face; we have monkeys in this place. You would want to have invested much in farming. The climate is fast changing and anything can happen. Due to hunger, monekys are plundering our fields. In 2017, I planted nearly 20kgs of seed of maize. However, I was greatly disappointed as the rains came late and my plants were already wilting. This disappointed me a lot. (James, Amalinda Farm, 2022).

Inasmuch as the farmers are into crop farming, most of them are not financially sufficient to run big projects which has seen them plunge deep into poverty with the weighing of climate change. Supporting this view, Chiweshe (2012) explained that in as much as the FTLRP gave people land, most of them lacked the financial capital and knowledge of how to be productive in the farms. This has led to low productivity in the farms. The allocation of farms has also proved to be



problematic, as some people were allocated into areas that had animals such as monkeys. Participants such as Eliza and James raised the point that it has caused heavy human and wildlife conflict as they compete for space and sustenance. Moyo (2018) notes that the FLTRP has also caused human-wildlife conflicts in many areas around Zimbabwe, which has further been exacerbated by climate change as the demand for survival went high due to absence of food and resources for both animals and human beings that help them in their day to day lives. As a result, the conflicts have emerged as has been presented above.

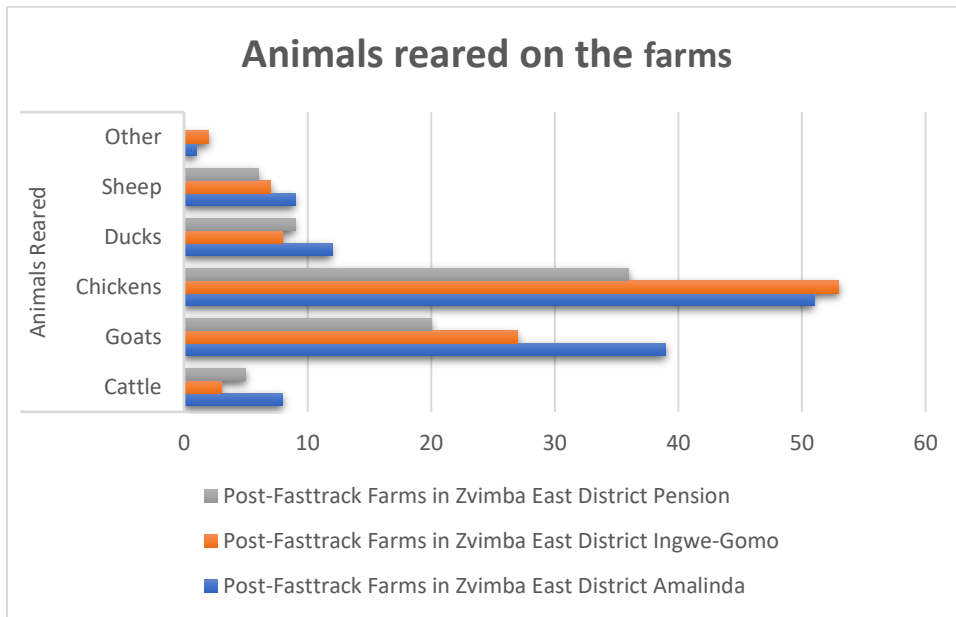


Figure 26: Livestock reared in the selected PFTFs

There are many animals that are reared in the Post-Fast Track Resettlement Farms depending on the level of income of the household (Moyo and Matondi, 2008). In line with this, it can be noted that, the table above shows that most of the farmers (43%) are into chicken farming whilst 29.1% of these are into goat farming. However, 9.8% of the farmers in the area are into duck rearing whilst another 7.43% are into sheep farming. Adding on to this, 5.41% are into cattle farming whilst 1.01% are into other animal rearing such as rabbits. Considering this, it can be noted that most of the farmers in the area have already diversified into small livestock production due to the climatic changes that are experienced in the area as noted by almost 90% of these who are into small livestock production. In line with this, Mtekwa (2019) explains that because of the changing climatic conditions in Zimbabwe, most of the resettled farmers have now ventured into small livestock production on both small and large scale in order to maximise their profits and

productivity on the farms. This has been the case with farmers that were found in Zvimba East District in Zimbabwe.

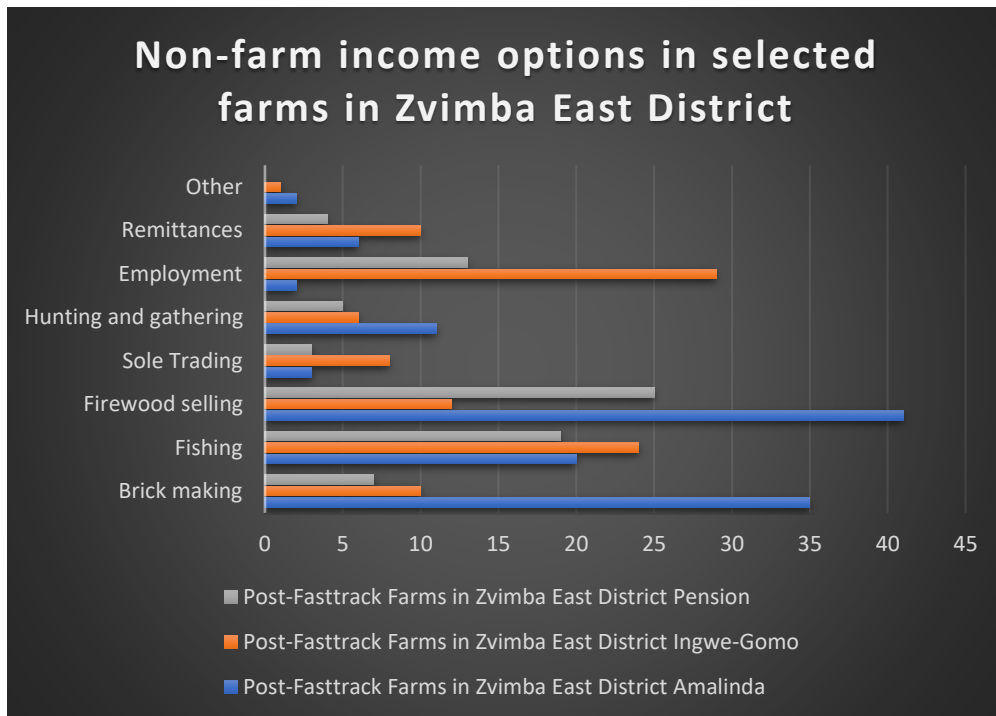


Figure 5.27: Non-farming income options in selected PFTRFs

Furthermore, though animal rearing is done in most Post-Fast Track Resettlement Farms, the farming communities also engage in other livelihood activities which are non-farm in nature (Svinurai et al., 2018). These livelihood activities may be the basis for falling back of plans within the farming communities. In the assessment of the other businesses that are done at the farm, it was noted that most of the households (17.6%) on the farms are into brick moulding whilst 26.4% participate in firewood selling. In addition to this, 21% of the participants are into fishing whilst 14.9% are into employment. However, 7.43% are into hunting and gathering whilst 4.7% of the participants are into sole trading and 1.01% do other initiatives for income generation. From this analysis, it can be noted that most of the participants in the area are into some alternative businesses that are highly unsustainable and very socio-ecologically unfriendly to the environment. This jeopardises their mitigation efforts towards climate change as the maladaptation mechanisms adopted by the communities make them more susceptible environmental degradation as they are adding to the anthropogenic factors leading to climate change. In support of this, Bhatasara (2015) notes that some of the on-farm adaptation strategies adopted by resettled farmers are causing more

harm than good, as they are adding to the anthropogenic factors leading to climate change rather than making them resilient to it. This has been the case in the selected farms in Zvimba East District which has seen most of the means being used appearing to be very environmentally unfriendly, hence highly unsustainable.

In support of this, in the interviews that were conducted; Participants such as Anna, Shami, Muse and Eliza highlighted that the natural resources on the farm were the ones sustaining them daily with their families, as farming was then fast losing value due to climate change. The farm environment was the one that was supporting most of the resettled farmers in Zimbabwe, as they exploit it in times of crisis (Chingarande et al., 2019). Supporting this view, the study noted that some participants go on as far as deforestation in order to earn a living on a farm; as was noted in the interview excerpts below:

As for us, we rely more on firewood selling. We sell firewood in new stands in Budiro and the surrounding areas such as Mufakose. A load of firewood goes for 3-5 dollars only; which is enough to sustain my family for about two days. Considering the past two seasons where we had mild droughts, the firewood business was the one that kept us afloat as a family. (Josie, Amalinda Farm, 2022).

In as much as firewood selling is being regarded as a business, it is being done without full knowledge of the impact of cutting down of trees on the environment in the area. The deforestation in the area is very high, thereby leading to high temperatures that are being experienced in the area. In line with this, Folke (2006) notes that the random cutting down of trees in most countries in sub-Saharan Africa is exposing these places to heat and high temperatures and the rest of the world. Hence these are the scourges of climate change. Though deforestation is being regarded as a quick fix to the problems of daily upkeep for families in Post-Fast Track Resettlement Farms, this is further causing serious problems; not only for the inhabitants of the farm but also for the world at large.

Nevertheless, in FGDs conducted in the farms, it was noted that other households are also involved in brick making. The participants explained that the bricks; though not very lucrative, were another way they used to survive; especially when it was off the farming season. Buttressing this argument in an interview, Chipu from the Pension Farm households highlighted that:

We make bricks from the anthill dust, and we burn these using firewood. As townships such as Budiro and Glen View are now ever increasing, with also Churu Farm township

coming into play, there is now demand for these bricks. The bricks normally cost 35 dollars for a thousand bricks; which is quite a fortune for us. We normally move from one anthill to another after one is depleted and we may leave deep holes that may develop into galleys as we go. (Chipo, Pension Farm, 2022).

Despite brick making being a very vibrant livelihood source for these, the environment is left dilapidated after such endeavours. This is mainly so because the holes left after the anthills are dug open. When it rains, they further develop into galleys and erosion continues; leading to the siltation of the lake and subsequently climate change. The business also thrives on cutting down of trees for burning the building bricks; which is another red flag when it comes to environmental integrity. Karuma et al., (2021) explains that brick making in most rural settlements has been leading to catastrophic environmental disaster, leading to climate change as it thrives on destruction of the environment through deforestation and galley formation. This has been one of the ways in which the farms are being fast depreciated through the means and ways that women are using to earn a living during the off season. As a result of the questionable sustainability in these initiatives, their socio-ecological friendliness also becomes highly detrimental.

In as much as fishing was raised as a livelihood option in the interviews conducted, the way it is conducted is illegal and highly unsustainable. In the interview with a member of the Zimbabwe National Parks Rangers, he explained that:

The farms are just in the vicinity of the Lake Chivero, and we must live with them as part of our community. Despite the good relationship we have with the community, sometimes our relationship gets sour as some members of the three farms (Peter Hard, Gomo and Pension) in the picture are into poaching of fish using nets. These can even rack up to 4 bags of fish a night. Daily, we catch some of the offenders and we destroy their canoes, but poaching is not ending as climate change has affected farming as their livelihood option. Thus, the Lake is now seen as a source of reprieve. (ZNP Ranger, Chivero, 2022).

Climate change impacts on farming communities and has caused the people to use unorthodox means of survival in a bid to adapt and become resilient (Nhemachena et al., 2020). This has been the case with people living in the farms found in Zvimba East who have now resorted to poaching of fish for survival. The communities have now become like enemies with the authorities such as EMA and Zimbabwe National Parks rangers, as their relationship; though initially cordial, has turned sour. Although members of the community claim ownership of the resources found in their area, these resources like fish are being depleted. It has warranted the need for strict enforcement

of the law in order to help conserve the wildlife. Thus, the wildlife threats due to human actions clearly point out to how some of the means and ways being used in the three farms in Zvimba East district are not very socio-ecologically resilient to the environment and the world at large.

### 5.5 Nature, trends, and patterns of climatic changes in the selected PFTRFs

Climate change is the change in the weather patterns being experienced in an area over a long period of years, which is normally more than 20-30 years. The nature of the climatic changes in the area have been varying in Zimbabwe; depending on place, time, anthropogenic influences on the environment and many other factors (Nhemachena and Chakwizira, 2014). This has been the case in Post-Fast Track Resettlement Farms whose nature of climatic change in Zvimba East district has remained fluid, based on human actions in the area and its surroundings. The changes in the climate in the area can end up forming noticeable trends and pattern that can later be ascribed to be the pattern of the place. Against this background, this section discusses the nature, trends and patterns of climatic changes experienced across the three farms in Zvimba East District.

#### 5.5.1 Nature of climatic changes experienced across the selected PFTFs

In the selected farms, the climate of the area has been changing drastically as was unearthed in the study. During FGDs, most of the household representatives concurred that over the last 20-30 years, the climate of the three farms has been changing drastically. In line with this, Svinurai (2020) notes that the climate has been changing greatly in Zimbabwe; with the nation now experiencing very hot summers, very cold winters and heavy rains that lead to flooding and periods of no rain that lead to droughts. This has been echoed through the findings that have been unearthed in the study in the kin survey conducted amongst the selected households.

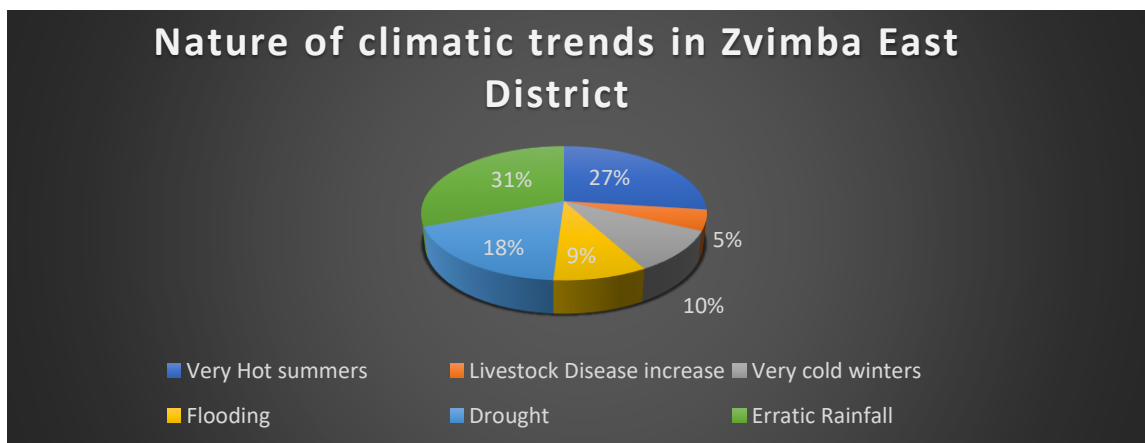


Figure 28: Nature of the climatic changes in Zvimba East District

As highlighted in the graph above, most of the participants (31%) highlighted that erratic rainfall was now a trend across the three farms, whilst 27% of the participants highlighted that there were very hot summers as a trend of the climate across the farms. Adding on to this, 18% of the participants pointed out to drought as a trend across the farms whilst 10% noted very cold winters as a recurring condition across the farms. However, other participants explained that flooding and livestock diseases were other key trends of climate change in the area. Supporting this, according to the IPCC (2021) report, climatic change trends in Southern African countries are now characterised by very hot summers and very cold winters; with also too much rainfall or too little rainfall because of global warming that is happening across the world. The study noted that the three farms have similar climate change patterns and trends as these are found in the same geographical areas and same natural regions in Zimbabwe and the SADC region. The climatic changes that have been noted in the study have their nature also similar to those of the other farms in Zvimba District. During an in-depth interviews conducted in the three farms, it was revealed that the climate of the three farms has changed over the last 20 years. Mutsa from Ingwe Gomo households explained that:

We were the first farming households to be resettled in this farm. That was over 20 years ago. Since we were resettled here, the climate has changed. It is now very hot and the rainfall we receive in this area is now low. Our planting seasons have slightly shifted, since we are now planting very late around the end of November. (Mutsa, Ingwe-Gomo, 2022)

Hence climate change has been real on the farms. It has affected the farming process of many farmers in the area as noticed through the erratic rainfall and increased temperatures. Erratic rainfall and increased temperatures are key characteristics that are not favourable for farming (Chagutah, 2010). Through this, it can be noted that heavy food insecurities have been affecting the families that have been left on the farm as the climate has not been conducive for farming. In line with this, Bhatasara (2015) notes that the nature of the climate changes happening across Zimbabwe has limited the agricultural outputs on these farms, as most resettled farmers rely on rain fed agriculture. Thus, as a result; though the farmers have land for farming, they have no adequate inputs that are needed to conduct sustainable productive farming in the area as have been exposed to various climatic changes.

Most of the households' plots that are found in the vicinities of Lake Chivero are in an area of between 500m-700m from the water body (Mhlanga and Mhlanga, 2012). Though these are close,

most women farmers in the area cannot draw water for irrigation from the Lake due to political and financial reasons. As highlighted above; as result of climate change, the water levels in the Lake are dropping fast, thereby affecting the farming process that might be conducted by women in the area (Mhlanga, 2010). As a result, the reliance capacities of women to climate change is heavily limited as they cannot be able to fund agricultural irrigation for themselves and their families. The low levels of water in the lake also mean that there is limited access to water for many of the people in the area, implying that production becomes stalled. Though the lake is there, irrigation schemes for the people in the area were not many, as farmers cannot afford the needed equipment.

In line with this, Winnie from the Amalinda Farm households explained that:

Due to the Lake, the households with plots here are found in low lying land and there is risk of flooding when heavy rains fall in the area. For example, in the year 2022 the plots near Lake Chivero, their houses and plants were flooded. As water was flowing down stream, it ended up affecting them. However, the floods are not severe, but their imprint cannot be ignored. (Winnie, Amalinda, 2022).

Thus, the faulty settlement patterns of the households found in these plots has led to some of households ending up facing floods. Though flooding in the area is not severe as the soil provides for leaching, the few households affected end up having their crops destroyed and animal pens affected; leading to the proliferation of diseases which affect both humans and animals. Considering this, Makunde et al (2022) explain that flooding is one of the trends of climate change in low lying area that are around lakes and rivers which can cause destruction of crops and animals. This has been the case in Amalinda Farm and it has greatly affected the women farmers.

Furthermore, Kuda participant from Ingwe-Gomo farming households further explained that:

Households found in this area are now experiencing very high temperatures. In the years such as 2003 and 2012, we faced very severe droughts in the area; which affected the productivity of the farms. Though we are found in region 2A in terms of climate, the weather patterns we are now seeing in the area is now consistent with farm found in region 3 or 4. (Kuda, Ingwe-Gomo, 2022)

Chiweshe (2023) explains that high temperatures have been one of the key characteristics of climate change in many areas around Zimbabwe. This has also been the case around farms in Zvimba East as reported above. In as much as the area is classified as region 2A, the temperatures

have been so high in the area and it has greatly affected agriculture. Climate Change Management Official explained that due to the change in temperatures and also low rainfall, they are now encouraging the farmers in the area to keep small livestock and also grow hybridised seeds with early maturity so as to reduce the effects of these high temperatures. In the FGDs conducted with some of the experts, it was noted that the average temperatures in the area; just like any other areas in Zimbabwe, had increased by nearly 2 degrees over the last 25 years.

As a result of climate change, there has also been livestock and human diseases that have hit their farms under study. In the FGDs that were conducted, it was noted that livestock in the area were being affected by some rare diseases due to the high temperatures and sometimes flooding that exists. The agricultural extension officer for the area explained that:

Some of the animals such as cattle are affected by diseases such as foot and mouth whilst goats are affected by diseases such as red flukes. Ticks are also hard to control during high temperatures. During high levels of flooding, the chickens in the area are affected by diseases such as chicken flu as well as some ticks. This limits the productivity of farmers in the area. (AGRITEX Officer, Zvimba RDC, 2022).

The trends that can be noted in the area are like those that have been noted by Mavhura (2016) in South-Eastern parts of Zimbabwe. Ajani et al., (2013) further explain that too much heat and wetness of an area because of climate change is not good for animal husbandry and the farmers should be prepared for that. Though the farmers now know these hazards that are coming seasonally and affecting their livestock, they are facing challenges in making sure that their livestock stays healthy. As a result, climate change is affecting them greatly in their farming renditions.

Persistent droughts that have been hitting the area for almost three to four years have been another threat to livelihood, affecting people's resilience to climate change in the area. Most participants in the FGDs explained that the area has faced droughts during 2002, 2007, 2012 and 2013. This has affected farming processes in the area and compromised the food security at household level. Not only has drought been affecting the people in the area, but it has also been negatively impinging on the livestock that are being reared in the area. Mavis from the Amalinda households highlighted that:



My family and I have been staying in this area for more than 20 years, but the drought that we saw in 2002 and that of 2012 affected us greatly. This affected our crops as we could not harvest anything whilst our livestock could not find any pastures. Pastures for animals were destroyed whilst granaries for people ran dry, exposing many people in the area to experience hunger and starvation. (Mavis, Amalinda, 2022)

Though the farms under study have good rainfall and climatic conditions, they have not been spared from the issues of droughts that affect the country whenever it occurs. Nkomwa et al (2014) note that droughts have been greatly affecting small holder famers in Zimbabwe, as they expose them and their livestock to hunger and starvation. It leaves them without fall back plans. This has been the case with selected farms in Amalinda in which people and livestock have been affected. In line with this, it has been noted by Kamwi et al (2018) that droughts mainly increase the susceptibility of households and livestock to hunger, starvation and diseases. Consequently, that may reduce the agricultural products of households.

#### 5.5.2 Trends and patterns of climate change across the selected PFTRFs

From the nature of the climatic changes that are being experienced in the selected Post-Fast Track Resettlement Farms in Zvimba East District, trends of how the changes in the climate are now moving can be established for the past 20 years. The study noted that most of the households in the area experience very cold winters that are usually wet and very hot summers that are mostly dry as well as delayed rainfall across the farms as was noted and observed in the study. As observed during my fieldwork, the first rains in the area were experienced during the last week of November in 2022, showing patterns of delay.

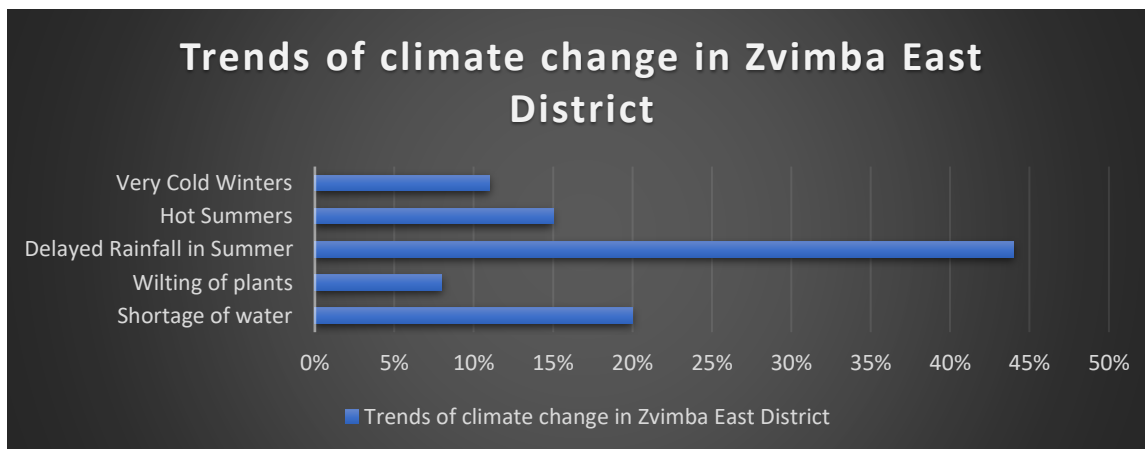


Figure 29: The main trends of climate change in the selected PFTRFs

As highlighted in the graph above, most of the participants (44%) highlighted that delayed summers have now become a trend and pattern of the climate in Zvimba East whilst 21% of the participants noted that shortages in water; because of the sinking water table, has become a common feature in the area. They indicated that it was due to climate change. In addition to this, 15% of the participants cited very hot summers as a characteristic of the climate in the area whilst 11% noted that very cold winters characterised the climate of the area. Nevertheless, 8% of the participants explained that another phenomenon they gauged was change of the climate in the area. This was observed by the researcher through the wilting of plants in the field; which had become more common in the area.

Confirming these findings, in the interviews conducted; most households' representatives in the study such as Kuda, Mavis and Shami highlighted that delayed rainfall was now their major challenge across all the three farms. This delay caused shortages of water, which was then a major trend that had been noted in Zvimba East farms in Zimbabwe. Nhemachena et al (2020) highlights that the change in the climatic conditions in sub-Saharan African regions have caused the sinking of the water table in most countries, leaving communities scrambling for clean water. Thus, the study confirmed this as most of the participants in FGDs that have been conducted have concurred that from August up until early December before the rains come, the area is heavily affected by water shortages as wells run dry and boreholes sometimes also run dry too. This is mainly caused by the water table that would have sunk so low, such that water in wells will be very low. The village head X supported this by saying:

As a result of climatic changes in the area, our household wells are now running dry so early. From as late as August to early December, water becomes a very scarce resource. The competition becomes so serious between us and the animals as we need water. We cannot even run our gardens smoothly as the wetlands where we have our gardens also run dry, making it very difficult for us to have edibles such as vegetables, tomatoes, and fruits. (Village head X, Amalinda, 2022).

In support of this, Mavhura et al (2017) highlighted that climate change has also caused the sinking of the water tables in most places in Zimbabwe due to high temperatures that are being experienced. This has been the phenomenon that has also been noted in Zvimba East district where the study was conducted. Heavy scarcity of water has been noted; affecting the production of vegetables, tomatoes, and fruits in the area. Having edible diets in the area was then a challenge

because of the shortage of water. The communities have further been exposed to sicknesses such as diarrhoea and typhoid due to the scarcity of clean water which exposes them to some unclean sources of water in the area. Gukurume (2013) explains that because of scarcity of water in some areas in Zimbabwe, most communities have been left at the mercy of water borne disease such as cholera, typhoid, and diarrhoea.

Due to low rainfall, a common trend that is noted in the farming seasons in these farms is the wilting of plants (Chakwizira et al., 2014). In as much as most households in the area are into subsistence farming, as noted in the study, the low rainfall has been leading to the wilting of plants ;leading these households to become more susceptible to hunger and starvation. In the areas around Ingwe-Gomo Farm and Peter Hard Farms where the soils are becoming poorer, plants wilt very fast; which is causing the stunted growth of crops. One participant from the Ingwe Gomo farms households highlighted:

The soils in this farm are too drained. As such, they dry quickly; causing the wilting of plants in the area. After two weeks when it has rained, most of the plants such as maize and beans begin to wilt because of the lack of water. The wilting of plants happens mostly between mid-December and January when the rainfall may be minimal. (Makhule, Ingwe-Gomo, 2023)

Such problems being experienced in Zvimba East farms have been noted also in a study by Gukurume (2013) in Masvingo, where he noted that inasmuch as there may be projections of good rains, there are about two-three weeks that may be dry in around December-January; when we may be expecting rains, thereby causing the wilting of plants in the area. As a result of this, it may lead to low yield of plants as the water may be in adequate for them to produce very good harvest. Thus, most of the farmers have only enough to feed their families and sustain them till the next coming season.

In the past 15-25 years, resettled households across the three farms have greatly experienced delayed rainfall in summer. Most participants in FGDs such as Jakarasi, Kuda, Mavis and Shami highlighted that there has been great delay in rainfall in terms of the seasons. Participants explained that the rains were then being expected between mid-December up to end of April. In line with this, Zhakata, Jakarasi and Moyo (2017) note that most of the farming seasons in Zimbabwe have shifted. The country is now receiving first rains between early December to Mid-December whilst

the last rains are expected between end of March to Mid-March each season. In support of this AGRITEX Officer explained that:

The farming seasons for the area have greatly changed. Now rainfall is being expected early December to early April. This implies that the season is now shorter than it was before in this area. Back in the year 2000, we knew that we would receive the first rains in around end of September to October and last rains in late April or early May. Thus, this has now affected how farming is now being conducted in the area. (AGRITEX Officer, Zvimba RDC, 2022).

The change in seasons has greatly affected the people of Zvimba East farms as they are now forced to grow early maturity plants. As supported by Chazovachii (2012), the change in the seasons and shortening of the farming because of climate change has thus affected how agriculture is carried out in most areas in Zimbabwe, as there is greater demand to rethink the methods being utilised in farming in the country. The change in climate and seasons in the area thus warrants the need to rethink the strategies and methodologies that are currently being used in Zvimba East District so as to make sure that agriculture produces good and sustainable yields that can save both the household and the community at large.

In the interviews conducted, it was noted that the area was now also characterised by long hot summers. Most of the participants highlighted that the summers starting from mid-August up to December have become very hot. In line with this, MEWC Official explained that:

These farms in Zvimba East as well as the rest of Mashonaland West has been characterised by very hot summers since the year 2000 going onwards. We even get to an extent of experiencing heat waves, which have become a characteristic of the area. This is now greatly affecting the agricultural processes that are being conducted in the area. Crops, livestock, and human beings are now more susceptible to sicknesses that come with very hot temperatures. (MEWC Official, Harare CBD, 2022)

Not only were there hot winters, but the study also noted that the farms have now become very cold in winter. In line with this, Chiweshe (2023) explains that because of climate change, it can be noted that most areas are now characterised by very hot summers and very cold winters; especially in sub-Saharan African countries. Supporting this, Mercy a participant from Ingwe-Gomo households revealed that:

It is increasingly becoming very cold in this area for many households. Yes, there is a Lake nearby and in winter; the place used to be cold, but now it has become much colder. For

example, in June; whenever my children are going to school, they end up developing frost bites because of the coldness. Their schools are far, hence they are subjected to too much cold. (Mercy, Ingwe-Gomo, 2022).

The state of the climate as described above is not only found in farms in Zvimba East District, but is also found in the other countries such as South Africa, New Zealand, United Kingdom, and Spain as noted by Eriksen (2010). The change of temperatures into extremes as has been highlighted, is something that also affects the productivity of the farms; leading to many loses. The health of both livestock and human beings is under threat by extreme weather patterns, whilst yield of crops being grown on the farms would automatically go down. In as much as the trends are natural, there is need to develop ways to manage them in order to maintain productivity on the farm and through farms as has been noted in the study.

The proliferation of wildfires or veld fires because of climate change has been on the increase. Fire has become a common feature in all the farms, especially during summer. In their interviews, the AGRITEX officer and village head concurred that wildfires have been something that the people on the farms had been fighting against. The participants in the FGDs concurred that wildfires were also a phenomenon that is now common on the farms, threatening livelihoods and lives in the area. Supporting this, Jane a participant from the selected households in Amalinda highlighted that:

*Mumapani umu moto hauperi nguva dzemumwedzi waGunyana kusvika Mbudzi zvinova zvinhu zvinotinetsa. Masango arikungotsva zvisina tsananguro apawo zvichiisa hupenyu hwedu nehwezvipfuwo zvedu panjodzi.* (In the open spaces on the farms, wildfire has become a common feature, especially during the months of September till November; which is mind boggling. The wildfires are erupting always, without knowing who started them, have now put our lives and that of livestock in danger. (Jane, Amalinda, 2022).

Supporting this, the phenomenon of wildfires has not been something peculiar to the Zvimba East farms alone, but has been reported to be widely spread in Zimbabwe and other places. Eriksen and Brown (2011) highlights that wildfires have been something of concern in the world; as climatic changes ravage countries areas such as Spain, Morrocco and United Kingdom; destroying lives and people's livelihoods in affected the areas. This has been something happening in Zvimba East farms as wildfires are destroying livelihood options for many people. Though fire guards are there, these are not fully useful as seen by the losses that have been incurred in the area.

Another trend that was discovered in the study was that of declining biodiversity in the area because of climate change (Kamwi et al, 2015). Most of the participants in the interviews explained that one of the key features that showed that climate change had gripped the area was that of the declining biodiversity. In line with this, community leader 1 from Amalinda explained that:

The type of trees and animals we used to see in this place are no longer there. The flora and fauna of this farm has been heavily depleted. As you can see, the farm is close to Lake Chivero and is part of the National Parks and Wildlife of Zimbabwe; but now some of the animals and what attracted some tourists to visit this place is fast depleting. When we first settled in this place at around the year 2000, we could even see certain types of ants, animals and vegetation which all have been destroyed due to the change in weather patterns and human beings coping strategies in dealing with climate change. (Community leader 1, Amalinda, 2022)

As a result of climate change in the area, biodiversity is now declining greatly; which is now placing both the environment and people in the area at risk as the environment can no longer replenish itself. According to Masoga and Kaya (2011), the availability of biodiversity in an area is one of the key elements that helps to maintain the area in a natural and healthy state; as the environment can keep itself well and healthy through a balanced ecosystem processes. The more an area has good biodiversity, the more stable its food webs and food chains are; hence the more sustainably stable the environment of the area is. In turn, it helps in maintaining a state of equilibrium. Thus, the socio-ecological balance of the activities of people and what transpires in the system is pivotal for the maintenance of the biodiversity in an area but in the farms in Zvimba East, this has been greatly threatened because of climate change that is unfolding in the area.

## 5.6 Chapter Summary

In summary, the chapter presented the contextual background of the study and the nature of climate change being experienced in the selected Post-Fast Track Resettlement Farms in Zvimba East District. The approach adopted in this chapter was based on the understanding that any evaluation of the Post-Fast Track Resettlement Farms in Zvimba East District should begin with an analysis and assessment of the history of the province, district, and particular situation of farm households. Such an examination provided a grounded understanding of households' social and economic circumstances of the case study under study. The researcher took this approach to fully paint a picture of the situation happening in the selected Post-Fast Track Resettlement Farms in Zvimba East District.

The analysis was thus grounded on households' own accounts of their past livelihood experiences and climatic changes happening in the area over time. It traced these into the 2000s as narrated by participants who represented these households in interviews and the survey aspect of the study. Through these, the sections painted a picture of the profile of the area under study to deepen understanding of the issues. The chapter opened by presenting the general contextual background of the study area and further moved into giving the demographic characteristics of the participants that were included in the study. The study further presented the nature, trends and patterns of climatic changes that are happening in selected farms in Zvimba East districts. The chapter presented the findings that are coming out of the study in light of the key literature that was in-line with particular themes presented in the chapter. The following chapter presents how climate change related phenomena have affected both male and female farmers in the selected Post-Fast Track Resettlement Farms in Zvimba East District.

## Chapter 6: The Impacts Of Climate Change On Women Farmers' Lives And Livelihoods In PFTRFs

### 6.1 Introduction

After presenting the case study profile and the nature of climatic change in the selected post Fast-Track Land Reform Resettlement Programme farms, the aim was to demonstrate the diverse climate related phenomena affecting female farmers in the selected farms in Zvimba East District. To build the case of the need for transformative approaches in responding to climate change so that female farmers can become resilient to it, the study documents the impact of climate change on women in the selected Post-Fast Track Resettlement Farms in Zvimba East District. The argument in this chapter is that climate change has had negative impacts on the lives and livelihoods of the women farmers. As Bhatsara (2015) notes, climate change has greatly impacted on the farming communities in Zimbabwe, as most of these are subsistent in nature, and hence do not have adequate capacity to respond sustainably to the impacts of climate change.

In presenting these, the chapter is demarcated into two crucial parts which present both the direct and indirect impact of climate change on lives and livelihoods of women farmers in Zvimba East District. The direct impact of climate change on women farmers in PFTFs are mostly those that impinge on the on-farm production process such as agriculture, ecology, and water resources amongst others and moves on to the off-farm activities. The chapter closes by discussing the indirect impacts of climate change on lives and livelihoods of farmers in the selected Post-Fast Track Resettlement Farms in Zvimba East District. Moreover, the chapter concludes by giving the chapter summary which ties up the findings presented in this chapter.

### 6.2 Direct impacts on on-farm lives and livelihood options in selected PFTs

According to Agrawal (2015), climate change has heavily affected the rain-fed dependent agricultural communities more than those who have managed to find alternatives across the world. As most farmers in Zimbabwe, particularly the resettled farmers who are mostly subsistent oriented, depend more on rain for their agricultural purposes and endeavours, it leaves them vulnerable to climatic related fluctuations. While most farms, which were allocated as A1 model plots to small farm households had irrigation systems prior to allocations, these were either destroyed or looted (Scoones et al., 2010). Alternatively, some farmers were allocated virgin land, which had never been utilised since some of these farms occupied vast expanses of land. Either way, it left the new farmers practicing rain-fed agriculture like the way agriculture was practiced



in communal areas where they originated from. Thus, in the new resettlement areas, farmers continued to practice the agriculture they knew and were familiar with, with limited changes to the agricultural system (see Thebe, 2011).

In a way, mostly due to the agricultural system, women farmers in the post-FTLRRP farms were vulnerable to climate change. Evidence shows that they were affected more directly by changing climatic conditions and had limited options as climatic conditions deteriorated in line with climate change. Climate change's impact on small women farmers have been noted in studies elsewhere in Zimbabwe. In his study of women farmers in Masvingo District, Gukurume (2013) highlighted how climate change affected productivity in the on-farm agricultural activities of women as they lacked adequate sustainable coping means to the impacts of climate change in the area. In the case of the women farmers in the studied farms in Zvimba East District, productivity was also negatively affected by changes in climatic conditions. Farmers experienced the following:

- Reduced crop production.
- Stalled livestock production.
- Ecological challenges such as soil erosion, soil infertility, deforestation
- Depletion of water sources, among others.

However, despite these common impacts related to changing natural phenomena, people were not impacted in the same way, with female farmers bearing the brunt more than men. This is not new as it is well covered in literature. However, what is worth noting is that climate related impacts were not gender blind, with all farmers receiving the same amount of precipitation, and experiencing the same damage such as wilting of crops. In the absence of irrigation, even males could not save their crops from moisture stress, although they could compensate through cultivating large areas, and putting in mitigation measures such as developing some water harvesting measures.

#### 6.2.1 Reduced crop production

Makate et al., (2016) highlighted that agriculture and climate change are internally correlated with each other in various aspects, as climate change is the main cause of biotic and abiotic stresses, which have adverse effects on farming. This is not far from the truth in the selected farms in Zvimba East District, where the production of crops was severely affected by climatic conditions in the years 2012, 2016, 2019 and 2021; plunging many women and their households into poverty.

As was observed across the three farms, most of the women farmers found in these farms practiced mixed farming in the form of crop production and animal husbandry, which has been greatly affected by climate change in the region and country in the recent past. Farmers identified the following observable effects of climatic changes, particularly low precipitation on crop production: low yields, wilting of plants, crop diseases, pest and insects attacking crops and the reduction of soil fertility.

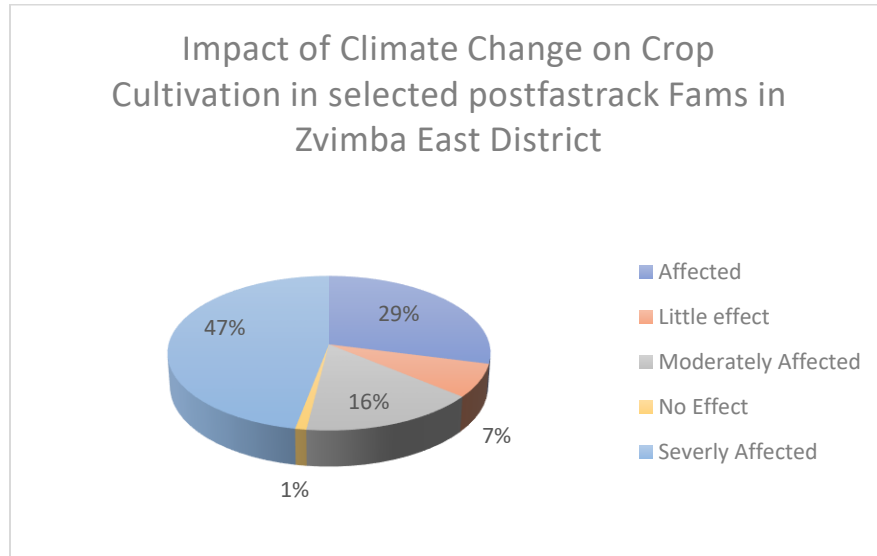


Figure 30: Climate change impacts on crop production

In support of the observation carried out in the field, the survey conducted indicated that 47% of the 337 households highlighted that crop cultivation was severely affected by climate change in Zvimba East District, whilst 29% of these households stated that crop cultivation was affected by climate change in the selected Post-Fast Track Resettlement Farms. This paints a picture that climate change has been the biggest threat to crop cultivation in the area as noted by many participants citing how it has heavily affected crop production in the three farming communities. Supporting these findings, the study by Muzari et al., (2014) on the impacts of climate change on the agricultural sector highlighted that crop cultivation is extremely affected by climate change as it hinders the growth and wellness of plants.

However as was noted above 16% explained that crop cultivation was moderately affected whilst 7% highlighted that crop cultivation was little affected in the selected Post-Fast Track Resettlement Farms in Zvimba East District. The remaining 23% of the households that had other views regarding how climate change has affected crop production mainly did so, coming from a point of

of having alternatives to rain-fed crop production. Some of these women live close to irrigation facilities, especially in Pension farm where the effects and impacts of climate change are rarely felt due to good irrigation facilities. Nevertheless 1 % of the households highlighted that there was no effect on the crops over the last ten years because of climate change.

According to Mashizha et al., (2019) climate change has affected the crop production of many farmers in Zvimba East District, Post-Fast Track Resettlement Farms in Zimbabwe. This has been the case in the three selected farms where climate change has affected crop production heavily as the yields have gone down. As was noted in the study, most women such as Participants such as AGRITEX Officer and Community Leader 1 highlighted that the yield that these used to experience between the year 2000 and 2010 had gone down significantly by more than half. In the FGDs conducted, it was noted that the crop production in the selected farms have gone down greatly, as seen in how a household would harvest between 3-5 tonnes per farming season on minimum and how these households were then celebrating reaching around 2-3 tonnes a season. This has plunged the family in deep food insecurity, which affects the health and wellbeing of the family members that are found in the communities. As a result, women and children are thus heavily affected as they rely mostly on outputs from the field farm in supplementing their diet and having money for other needs of the family.

The wilting of plants in the three selected farms has been noted as another impact of climate change in Post-Fast Track Resettlement Farms. Due to the change in the weather patterns which has seen the temperatures going up with close to 2 Degrees Celsius, climate change severely affected crop production in these farms through various effects such as crop wilting and diseases (Agrawal et al, 2012). In the interviews conducted by the researcher, it was noted that crops had been wilting as a result of high temperatures which has caused high levels of evapotranspiration from the plants. Water loss has been experienced due to the loam-sandy soils that are found in the area. Thus, as a result of this, increase of temperatures; mainly because of the change in farming seasons and the temperatures on the farm, have ensured that production has gone down greatly, with yields being affected severely.

In support of this Muselo from Ingwe-Gomo Farm aged 43 explained that:

We now have problems in that sometimes our crops wilt and other times, they may fail to reach maturity and time of harvest well because of erratic rains. The nature of soils we have

here are loam-sandy in nature, hence they lose water very fast - leading to the wilting of crops which is now leading to low yields. Hence hunger and starvation has been the order of the day in these farms as the yields are going down daily, which affects production.

Climatic changes happening across the world have affected crop production greatly through the spreading of diseases that are climatically induced (Mazwi et al., 2020). Across the three farms, the issues of crop diseases and pests that are hitting Mashonaland West province; particularly affecting Zvimba East District farms were noted in the study. In interviews, most participants such as Kuda, Mavis, Shami and Makhule indicated that because of the very hot summers and very cold winters, pests and insects affect crop life in Zvimba East District. As the area is known to produce crops such as maize, soya beans, sweet potatoes, and other leguminous plants, they have been affected greatly by seasonal outbreaks of diseases caused by pests, fungi and insects. The farmers highlighted that what is mainly affecting them are the outbreaks of the armyworm, bow worms and the stalk borers that have been on the increase in the area; which is something that has been hindering their success in crop production.

Buttressing this argument, the experts such as the AGRITEX Officer noted that:

Climate change has also affected crop production due to the shift in seasons which has brought in many crop pests and diseases. Diseases induced through pests such as the armyworm, stoke borers and bow worms in plants such as maize and soyabeans. However, most of the resettled A1 farmers do not have resources to deal with these pests and diseases. The shift in seasons has seen the need to have money for crop pesticides and insecticides that help in reducing plant damage during the season. (AGRITEX officer Interview, Murombedzi Zvimba, 2022)

In line with this, Chadambuka and Helliker (2022) highlight that most A1 farmers are poor and cannot afford the resources that are needed to fight diseases and pests in plants in Zimbabwe. This has been the case in Zvimba East District farms as most of the women farmers who rely only on government inputs are failing to cope with them as they are not enough to see them through the whole season. This has then affected the yield that they have per season due to the issues of pests and insects that are damaging crops which they are failing to handle. Heavy food insecurities have also crept in across all the three farms under study as crop disease and pest have affected the yield of these farmers in the district under study. Thus, crop production in these farms has become heavily compromised thereby affecting food security through low yields.

With the change in the climate and alterations in crop production methods, the inputs needed for crops have gone high in Zimbabwe. This has affected women farmers in crop production (Kasimba, 2016). The study noted that though the farmers are doing conservation farming, they may still need to weed or require chemicals that kill weed for their crops to come out well. Particularly Ingwe-Gomo Farms; which have clay-loamy soils, are much more prone to weeds which need more labour or chemicals that help farmers in weeding; of which the farmers did not have the resources to meet this demand, thereby compromising plant growth and health. Thus, the farming inputs such as fertilisers, weed control chemicals, seeds and other costs of production have been greatly overpriced in Zimbabwe due to the demand on these resources as more and more people are now venturing into farming, despite climate change. In line with this Spiwe aged 38 explained that:

Crop production has gone a bit down in our farms mainly because of how the inputs have now become overpriced. Can you imagine a 50kg bag of D fertilizer is going for USD 40 whilst top dressing fertilizer is going for 60 dollars. Not only that the seed we now use is going for USD 30 dollars 10 kgs whilst the weed control chemicals that dilute 20 litres is going for USD 18. Where can I get such amounts of money when the country is like this. (Interview with Spiwe, Amalinda Farm, 2022).

Basing on this, it can be noted that the cost of production which was now exorbitant at that time of climate change, had affected the production of crops; mainly in Post-Fast Track Resettlement Farms. Chiweshe (2015) explained that the farmers in PFTRFs are mostly impoverished in nature, hence their production is limited as they do not have funds to get adequate inputs needed for good and sustainable resilient climate change farming. This has been the case in the PFTRFs under study as most of the farmers found in these are living way below the poverty datum line and hence were not be able to adequately finance their farming expeditions. They depended on the government for inputs which were not totally sustaining them when it came to farming in climate change times. Hence crop production has been negatively affected because of climate change in Zimbabwe.

Good crop production has also been affected by issues of erratic rainfall patterns Zimbabwe. This has affected agriculture which is the main economic activity that serves the Zimbabwean economy (Gukurume, 2013). In line with this, some of the participants in the FGDs conducted highlighted that that they did not only need the fertilisers and pesticides as inputs, but as result of the erratic rainfall patterns; they also need to have a deep well or borehole on their farm for good and efficient

production. All these sources of water needed to be installed on one's plot for the irrigation system to function well; which would cost close to USD 2000; which was very expensive for most of them. Hence it was noted that most of the women had the end in sight when it came to building socio-ecological resilience to climate change but the means to get there as farmers was the one that these women mainly did not have.

Though the primary mode of production; which is land, was readily available to the women farmers in Zvimba East District, the capacity to be productive was not fully available to them. According to Moyo and Matondi (2008), the land reform programme thus was highly emotional in nature as the parcelling of land was for settling scores when it was done as it did not look more at capacitation of the farmers that have been given the land to fully be productive. Thus, with climate change now sweeping through, most female farmers were now finding it very hard to step up and become productive in the farms they were given as they did not have credit lines for loans whilst the offer letters that they have were not bankable. It affected and limited them when it came to looking for credit lines from banks.

### 6.2.2 Impact of climate change on livestock production

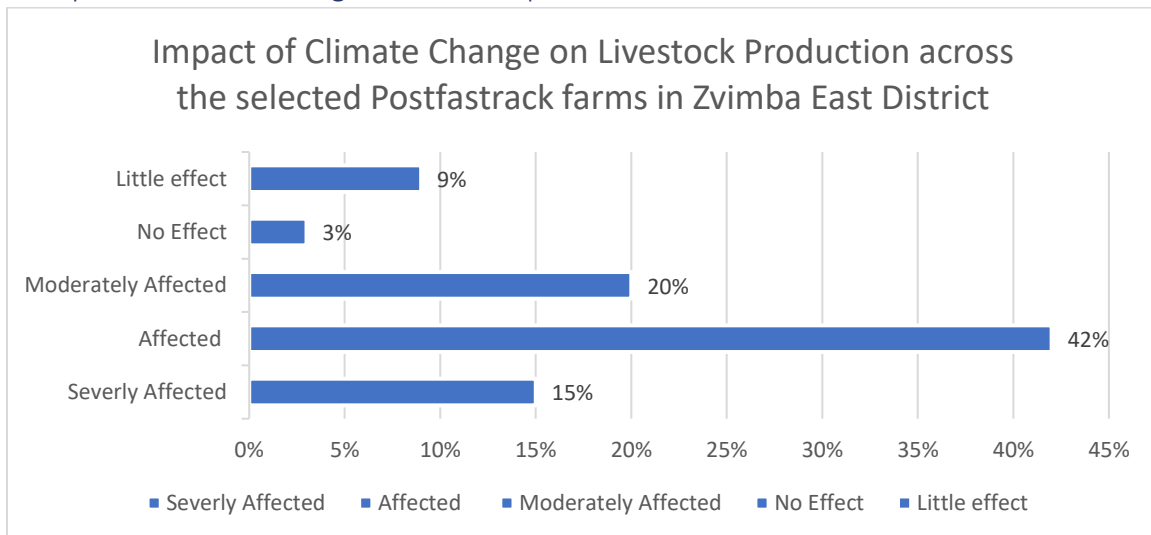


Figure 31: Climate change impacts on livestock production

Climate change has affected livestock production in PTRFs in Zimbabwe. As was unearthed in the study, 42% of the households under study explained that livestock production was affected by climate change whilst 15% of these highlighted that livestock production in Zvimba East PFTRFs was severely affected by climate change. This clearly shows that livestock production has not been

spared by the impacts of climate change that have ravaged the world at large. In support of this, in a study on the impact of climate change on livestock production in Chivi district, Bhatasara and Nyamwanza (2018) explained that it has impacted on livestock production greatly as it has even caused some small farmers to migrate in the area.

Nevertheless, 20% of the participants from the households under study noted that livestock production in the area was moderately affected by climate change whilst 9% explained that climate change had little effect on livestock production. However, 3% highlighted that climate change had no effect in livestock production in the PFTRFs in Zvimba East District. Most of the participants that stated this were the ones that have not delved much into big livestock production of cattle and dairy farming. Since they have been on the farms, they have been practising goat and chicken production. Even though they were doing this, climate change has affected them, but the effect has not been as great as of those that have big livestock. However, in a study done by Holmes (2021) in the United Kingdom, he noted that the farmers in dairy and beef livestock production have had a good resilient strategy to climatic changes through the good support of their government and viability of the economy. Hence the impact of climate change has not been so severe as these have good fall-back plans.

Makonese (2022) notes that the production of livestock in Zimbabwean farms has fallen since the year 2000 because of both the economy and climatic changes that have swept across the country drastically over the years. In line with this, the production of livestock in the selected PFTRFs in Zvimba East District was greatly affected by climate change in past 10 years as was highlighted in the study. In as much as the area is affected, how far it has been affected has not been as severe as most of the resettled farmers in the area who have already diversified into small livestock in the area. As was noted in the study, some of the livestock that were noted include sheep, goats, chickens and ducks. A few farmers have cattle in the area. Thus, this livestock picture observed in the area has made most of the farmers to be safe when it came to climate change; as the small livestock are not much affected by transformation in climatic conditions in the area.

In this study, it was noted that animals such as cattle, sheep and goats were greatly affected by vector bone and non-vector borne diseases. Vector bone diseases are those diseases caused by the vectors these animals carry whilst non vector borne are the diseases that emanate from the environment (Jayne, 2018). The proliferation of ticks in these animals and diseases such as the

lumpy skin were noted to be high because of too much heat due to high temperatures in the areas. In cattle, foot and mouth together with liver fluke were observed to be diseases that were affecting these animals whilst in goats and sheep; arthritis, pox and fluke infection were regarded to be the ones affecting them.

In line with this, one participant explained that:

Due to the high temperatures that may be seen to be emanating in our area, our animals are affected greatly. I remember at one point after the outbreak of foot and mouth and fluke in both cattle and goats, we lost quite a few animals. Most of the people in our plots lost their cattle in the year 2008-2009 then now resorted to now having the Matabele goats which are much more resilient to sicknesses. (Jane, Amalinda Farm, 2022 Fieldwork).

As has been noted in the study, not only are the big animals affected; but also the fowl animals such as turkeys, chickens and ducks which are heavily affected by changes in temperatures. Of the 337 households under study across the three farms, it was noted that almost 300 of these in the last 3 years had experienced livestock diseases such as chicken pox and flu in both winter and summer. The main issues affecting the managing and controlling of these diseases is the issue of getting vaccinations in time to save the livestock from disease caused by climate change (Chiweshe et al., 2015). Thus, it can be noted that climate change has been also affecting livestock production through diseases that are climate change related, affecting livestock production.

In addition to this, the issues of pastures have been another challenge that was raised in the study as it was caused by climate change. Shortage of pastures has seen the proliferation of stunted growth in most livestock that are found in the area (Karuma et al., 2021). This issue was most confirmed across the across the 153 households in Amalinda who explained that their grazing land has been limited as they have small plots. This is now affecting the rearing of livestock such as cattle and goats, with climatic changes intensifying the burden. The pastures are heavily affected because of the high temperatures that have hit the farms, leading to the destruction of green vegetation which is favourable for livestock in the area. It was noted that some of the farmers ended up taking their livestock for grazing on the banks of Lake Chivero; which is very dangerous. In these banks, that was where they found green grass and the hyacinth that the animals ate was also not favourable for them.

In support of this, Eliza from Ingwe-Gomo explained that:



We are left with no option when it comes to grazing land than to take our animals towards the shores of the lake where the green grass and hyacinth are found. Though the vets do not encourage us to do that we do that in order to save our animals. This is dangerous though as we have lost our animals to crocodiles in the lake but seeing them suffer due to hunger pushes us to go and make them graze there. (Eliza, Amalinda Farm, Zvimba East District Fieldwork 2022).

Mugandani et al., (2022) highlighted that as result of the means and ways adopted by resettled farmers to cope with climate change, there have been clashes between the farmers and various facets of law enforcement agencies in Zimbabwe such as EMA amongst others. As was highlighted above, the study discovered that clashes with the Zimbabwe National Parks Rangers and the famers have been reported because of issues of grazing land. In the conducted FGDs, most participants explained that grazing land mostly became a problem around September to November when the sun would be so hot, and they would have exhausted their reserved feed. As a result, these farmers tended to go over the national park boundaries.

In line with this, in a key informant interview with one ranger from the Zimbabwe National Parks; he explained that:

The conflict with the famers normally come when their pastures are exhausted when they drive their animals for grazing on the lake shores. The farmers normally herd their livestock near the riverbanks where there is green vegetation which we always advise against. We always try to protect the farmers and animals from crocodiles, but these are adamant. Though they lose some animals they keep driving their animals to the shores of the Lake which is very dangerous. (Zimparks ranger, Chivero Zvimba, 2022 Fieldwork).

Hence climate change has affected livestock production, leading to losses in these farms. As illustrated above, the conflicts between authorities and the local farmers have been increasing because of the need for pastures. Not only are conflicts happening between farmers and the authorities, but they are also happening between the farmers themselves fighting for grazing land and space for their animals. The competition for grazing land between the farmers has resulted in some resorting to physical violence such as burning each other's houses and even poisoning of animals. In the study several participants such as community elder 1 and village head x explained that burning of houses and poisoning of animals such as mostly goats had now been a common phenomenon, especially when they stray and graze in someone's field.

### 6.2.3 Climate change impacts on water resources

Mutopo (2014) notes that climate change has severely affected water bodies in various communities in sub-Saharan Africa and this has left many livelihoods in stress as they are highly water dependent. As was observed in the study, climate change has greatly affected the water resources that are found in selected farms under study in Zvimba East District. The study noted that for Amalinda Farm and Pension farms, irrigation facilities which were run by the former white farmers and the Harare City Council in particular drawing water from nearby rivers have since dried up; whilst others have shrunk so greatly that they can no longer support irrigation.

In line with this, Tsitsi from Amalinda Farm explained that:

You cannot expect the irrigation equipment of 1960s and 70s to be still working in 2023. Not only has this worn out but some of it has been destroyed during the *jambanja* farm invasions that happened in Zimbabwe during the years that we came here. Due to the infighting some of the infrastructure was destroyed by Peter Hard the white guy and also some of the comrades without knowing that the climatic conditions would change and would need irrigation. (Interview with Tsitsi, Amalinda Farm, 2022).

However, in as much as these facilities which include river channels, reservoirs and irrigation pipes were left, they were worn out and some could no longer pump water as the sources ran dry. As a result, this has left most of the farmers now relying much more on rain fed agricultural practices as the irrigation facilities are no longer there to sustain them for crop cultivation and for provision of water for livestock rearing in the area. Supporting these findings, Moyo and Matondi (2008) explained that climate change has decimated water bodies in most farming communities around Zimbabwe, which has left farmers scrambling for the little available water whilst leaving most of them depending on rain-fed crop production.

In as much as climate change has been responsible for ravaging communities in Zimbabwe, the response to it by government and other players has not been inclusive. This has exposed many small farmers to more of the impact of climate change in their communities (Chiweshe, 2015). Most participants in the interviews and FGDs conducted explained that in as much as these facilities (rivers and Dams) were there when they were first resettled on the farms, they only catered for the owner of the A2 farm; who was Peter Hard, especially in Amalinda Farm. The irrigation facilities were not channelled towards the A1 farmers who owned the small plots that became part of Amalinda farm after its apportioning to war veterans. The exclusion of farmers

from the use of available facilities for farming during the early years of FTLRP have left them more at the mercy of climate change in most farming communities in Zimbabwe (Matondi, 2018).

In line with this Mercy Ingwe-Gomo Farm participant explained that:

The fast-track land reform programme did not cater for the issue of having mechanisation and adequate facilities for production but only addressed issues of getting land. It was only after reaching the farms and now wanting to produce that the A1 farmers were exposed to mechanisation issues because of the change in climate in the area. Even though the government tried the farm mechanisation programme the A2 farmers continued to benefit at the expense of A1 farmers leaving the smallholder women farmers at the mercy of climatic changes happening across the three farms. (Interview with Mercy, Ingwe-Gomo Farm, 2022).

Thus, the small-scale women farmers have been exposed to the ravages of climate change from times immemorial as the cushioning facilities such as irrigation channels were not availed to them in the plots found in Amalinda soon after the land reform programme. Hence it can be noted that though the land reform programme made land available to some women farmers, the cushion to climatic changes was not provided. This left them exposed to various water shortage induced by climate change impacts.

Animals being reared on the farms have been greatly affected by the shortages of water on the farms. The irrigation channels used to provide water for drinking for animals such as sheep goats and cattle, but these have now dried up. Not only were the irrigation channels the only source of water for the animals, but the river found in the farm streaming from Budiro and the Lake were all sources of water for both animals and women farmers found in these communities. Supporting this, Chiweshe and Bhatasara (2019) highlights that, the human wildlife conflicts has been so rife in Zimbabwean farming communities, as farmer and wild animals such as crocodiles have been competing for water resources in the same areas. In interviews conducted by the researcher, most of the participants such as Mercy, Mavis and Kuda highlighted that water mainly became a challenge for animals in the beginning of the dry season; that is during August up until end of November when the rains start. In that period, water for drinking by animals is very scarce, such that women herd all animals towards the Lake. In explaining the situations on Lake Chivero's shores, Jane explained that:

By herding our animals towards the Lake for drinking water we risk a lot in the process of doing that. The Lake is where the water will be but also on the banks of the Lake Chivero it will be so muddy such that our animals may get stuck in the mud for days without being rescued as the mud will be heavy. Another risk is that of the crocodiles that may attack our animals when drinking water on the peripheries of Lake Chivero. (Jane, Ingwe Gomo, Zvimba, Fieldwork 2022).

Water has thus been a major problem on the farm as noted from how the farmers risked everything in a bid to provide water for their animals in the dry seasons (Chiweshe and Bhatasara, 2019). This has led to some of them running losses when they take their animals to the banks of the Lake as some of these get trapped in the mud. As a result of water shortages highlighted above, keeping, and herding of livestock in the area is fast becoming a hazard for both people and animals as their lives are in danger. This is due to climate change induced water shortage that is experienced in the area. As a result of this, some women farmers have resorted to keeping household-bound small livestock such as chickens, ducks and geese so as not to risk their lives in times of water scarcity.

#### 6.2.4 Climate change impacts on ecology

With the climate change affecting agricultural activities on the farm, the ecology of the land has not also been spared as was noted in three farms under study. As a result of the change in climate of Zvimba East District, it has been noted that soil fertility of the area has now being greatly affected. Nhemachena et al., (2020) explain that climate change effects such as flooding, cyclones, heatwaves, and droughts have great impacts on soil structure and texture in communities as it makes most of these to lose their taste. The soils in the PFTRFs under study have fast changed from being loamy to sandy soils, especially in areas where deforestation and overgrazing have been severe. In the study, it was noted that with the climatic changes that have been hitting hard on the farms, when there is much rain fall; the top soil is washed away into the Lake, leaving the soils much drained and without any feeding. As a result, crops that are being cultivated in the area heavily rely on fertilisers as the soils can no longer have the capacity to boost productivity. Hence fields have become too weak for crop production.

Though the fertilisers being used are good for crop production in the area, it was noted that most of the land has become too acidified for wild plants to grow and be part of the ecosystem. In as much as the government of Zimbabwe has introduced conservation farming called '*Pfumvudza*' to try and save the environment through zero-tillage practice, it takes years for the soils to be deacidified and return to their natural state (Mujere, 2022). Acidification of soils in the

resettlement areas has been very high as most farmers in these areas rely on fertilisers for crop cultivation (Mutopo, 2014). Experts interviewed in the study highlighted that some of the flora and fauna of the area has become extinct because of the acidification of the area through the use of fertilisers. As a result of this, the biodiversity of the areas has thus become so low as human activities have affected the ecosystem.

Scoones (2010) highlights that heavy deforestation has been a key characteristic of most PFTRFs as most resettled farmers use firewood as a source of household energy on the farm. This has affected biodiversity in the farms. Mostly, in Ingwe-Gomo and Amalinda farms, this has been noted; leading to the loss in biodiversity because of deforestation that has been happening in the area for more than 21 years now. The study noted that in as much as deforestation has been a cause of climate change in the area, it has also been an impact of climate change as low crop productivity and livestock production has led people to find alternatives in deforestation for fuel and for selling firewood in the nearby locations. This has led to great soil erosion in the area as well as diminishing biodiversity. According to experts from Zimbabwe National Parks and EMA, rapid deforestation in Amalinda Farm and surrounding areas has led to the diminishing biodiversity in terms of local trees such as Musasa and various types of birds and animals that were formerly found in the area in larger numbers such as monkeys, bush bucks, and impalas. As a result, this has greatly affected the ecological standing of the area.

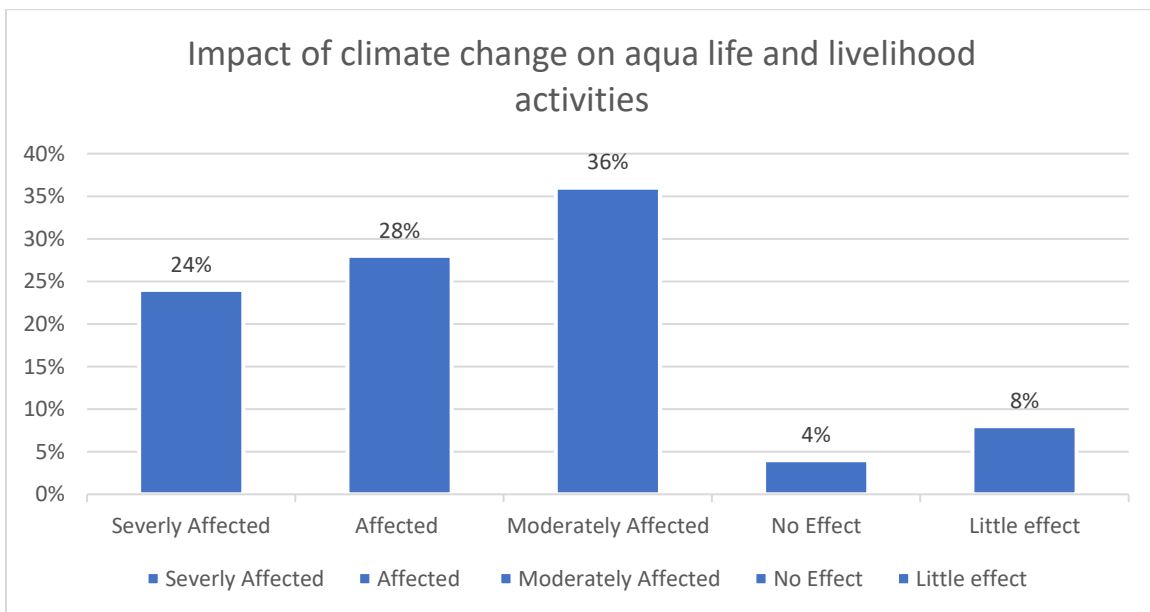


Figure 32: Climate change impacts on aqua life and livelihood options

Climate change has also affected aqua life and livelihood activities in many parts of the world through many ways (IPCC, 2021). The impact of climate change of water bodies has not spared the water bodies found in Zvimba East District, particularly Lake Chivero. In terms of aqua life in Lake Chivero, 24% of the participants explained that the aqua life was severely affected by climate change whilst 28% explained that aqua life was affected by climate change happening in Zvimba East District. This is mainly so because of how the water levels are going down in Lake Chivero due to high temperatures being experienced in the area. The Lake Chivero has the capacity of 250 106 cubic metres, but due to climate change; the capacity has dropped to 150000 cubic metres in the dry season. However, 36% of participants highlighted that climate change has moderately affected Lake Chivero because during the rainy season; the Lake still gets to full capacity, especially between the months of January- May every year. Nevertheless, 8% of the participants highlighted that climate change had little effect on Lake Chivero, whilst 4% explained that this had no effect. This is mainly so because most of the participants highlighted that the aqua life in the Lake is still there, but is mostly threatened by human activities rather than climate change.

Through the observations conducted across three farms; particularly in Pension and Amalinda, it was noted that the washing way of topsoil has also led to the partial siltation of the Lake Chivero which is found in the vicinity of the farms. According to Mhlanga (2015), the siltation of the Lake has greatly affected aqua life found in the Lake, as it has led to the decrease of size of the Lake Chivero due accumulations. The silt accumulating in the Lake has been because of the heavy deforestation and overgrazing of the land happening in the three farms which has seen run off, washing away the top soil and depositing it into the Lake. In the FGDs conducted with some of the women in the community, they noted that the mud mainly develops as result of the land being washed into the Lake from upstream; which leads to both siltation and development of mud in Lake Chivero. As a result of this, aqua biodiversity has thus greatly gone down as the Lake has been silting. Adding on to this, because of the heavy temperatures found in the summer, the water capacity of the Lake goes down heavily, leading to the development of mud on its shores that are trapping animals when they come to drink water. This has affected the livelihood options of women, especially on livestock production as it has led to losses of carcasses.

Species of fish and water plants have also been affected by climate change in Lake Chivero; which is found in the vicinities of Amalinda and Pension farms. It was noted that the size of the fish found

in the Lake has also become smaller because of the nature of the climate due to temperatures and growing water plants found in the Lake. In line with this, Zimparks ranger explained that:

The sizes of the fish have now become much smaller with the breams now reaching size of one's palm only at full growth whilst the cup fish and the tiger fish are now rarely found in Lake Chivero because of both poaching and climate change happening in the area. Some of the water plants have become also extinct due to how the Lake has become silted. The plant now mainly present is the hyacinth which is also affecting the cleanness of water. This is mainly so because about 20% of the Lake has become largely silted. (Zimparks ranger, Chivero, Zvimba, Fieldwork 2022).

Galley formation has been noted in the study as another impact of climate change. Bhatasara (2015) explains that galleys have now become a common site in many areas that have experienced heavy deforestation and overgrazing; as run off on the surface ground has nothing which controls it, leading to formation of pools and eventually large ditches. As the farms are found just on the shores of Lake Chivero, their breadth and width are filled with galley as water running off from the up streams ends up in the farms. The situation has been worsened by brickmaking activities that are done by women in the area, which has led to more development of galleys in these farms. As the land is no longer holding due to exposure of the soils coming in from deforestation and other human activities. Galleys have developed in and around the area. Some of these form in the vicinity of Marimba River and the Mongondo area due to the heavy run-away waters that are found in the area. Supporting this, a study by Muchedzo in Mazowe resettlement in 2019 noted that galleys were mainly forming in the area due to human activities such as brickmaking and deforestation which left the ground open with pits. Hence galley formation has been noted in these farms, and is fast becoming a hazard in for many people; including children together with animals.

In line with this, Community Elder 1 in Amalinda Farm explained that:

Galleys in this area have been emerging greatly due to heavy rainfalls we receive in some years. These have further been worsened by the human activities such as brickmaking and deforestation happening in the area which entrench these galleys. As we are the last settlement before the lack the runoff from the higher regions pass through our settlement and into the pits opened leaving entrenched trails which develop further into galleys. The galleys have become a hazard to both livestock and human beings living in the area as these can fall into these galleys leading to some physical problems. (Community Elder 1, Amalinda Farm, Zvimba Fieldwork 2022).

Desertification is another phenomenon that is greatly evident in PFTRFs because of climate change that is affecting production (Gukurume, 2013). The areas which are parts of mainly Amalinda and Ingwe-Gomo farms are becoming desertified because of the deforestation. As highlighted in the study, due to the cutting down of trees and overgrazing found in the area, the soils have become too loose as most have turned into sandy soils. As a result, the areas that are not cultivated are fast desertifying, as most of these do not have plants growth due to their sandy nature. As a result, desertification has encroached into the ecosystem of Amalinda and Ingwe-Gomo farms. The desertification of parts of Amalinda and Ingwe-Gomo farms have decreased the grazing lands for goats, cattle and sheep found in the area; which has largely affected the small holder women farmers in the area.

### 6.3 Climate change impacts on off-farm activities

In as much as climate change has affected on-farm activities, the phenomenon equally affected the off-farm activities that are done by the farmers in resettlement areas, though it has not been so severe (Mashizha et al, 2019). Women in the three PFTRFs in Zvimba East District are also involved in off farming activities which are mainly non-agricultural in nature. Some of the activities that both men and women are involved in include brickmaking, fishing, basketry, pottery making and weaving amongst others. These are some of the activities that are being carried out by women on the farm, though such off farming endeavours also earn income to sustain their families. In as much as these activities are being carried out by the women, they have been affected by climate change much lesser as compared to the on-farm activities that are mainly climate dependent.

Supporting these sentiments one participant highlighted that:

In as much climate change affects the on-farm activities carried out on the farm, when it comes to the off-farm activities the impacts are much less as has been noted in this farm. Most women tend to use these off-farm methods such as brick making, fishing and handcrafts to cope with climatic changes happening in the area. I feel that these though not totally climate proofed as they depend on other climate dependent inputs are affected by climate change but not severely hence, they are used by these women. (Interview with Angela, Pension Farm, 2022).

In the survey conducted, and in response to questionnaires, it was noted that though climate change had affected the on-farm livelihood options, the impact on off-farm activities has been less; which



has led many women to build their livelihood options on these in order to survive. In as much as the off-farm livelihood options were affected by climate change, these were not severely hit as these are not mainly climate dependent, but are indirectly dependant on the climate in secondary ways which makes them a good cushion for many women. However, the little impact of climate change on these livelihood options is highlighted in the graph below.

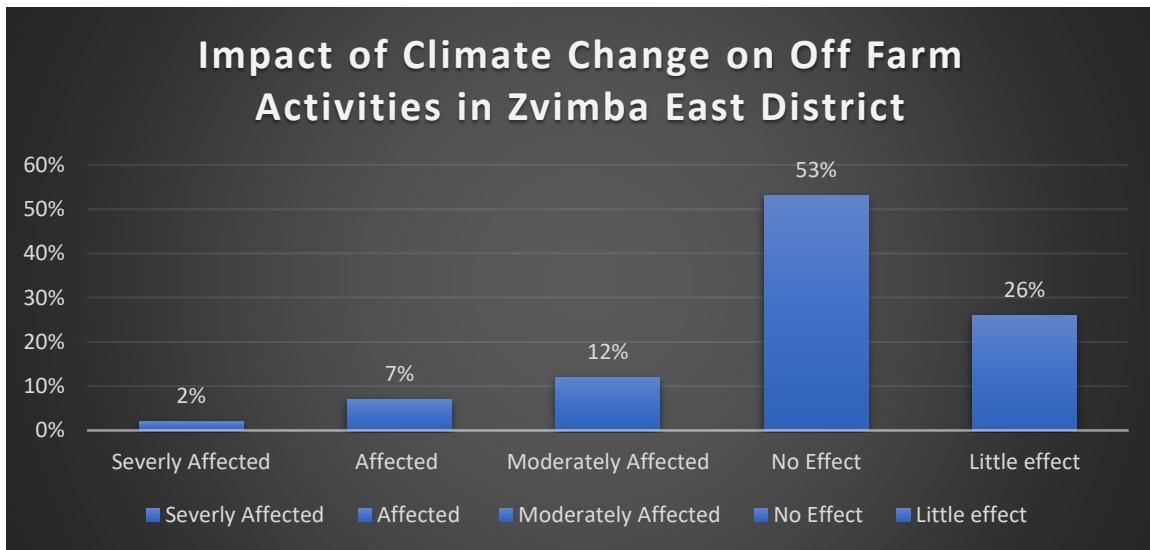


Figure 33: Climate change impacts on off-farm activities

Based on the study, 53% of the participants indicated that climate change had no effect on the off-farm livelihood options being carried out by women whilst 26% of the participants explained that there was little effect of climate change on the off-farm livelihood methods. This is mainly so because the mechanisms are not directly climate-related. Whilst for some activities such as brick making change in the climate’s favour, it due to high temperatures that allow for the fast drying of bricks. Nevertheless 12% of the participants also explained that the off-farm activities were moderately affected by climate change; which is mainly so because these rarely rely on the climate for their survival. However, 7% of the participants posited that the off-farm farming activities were affected by climate change in the farms, whilst 2% of these were severely affected. This has been so mainly because the heart of these activities is the climate and most of these which include weaving, brickmaking and pottery are water dependent.

In as much as some of the off-farm livelihood options were rarely affected by climate change, it was noted that these had bruises from the impacts of climate change. At Amalinda farm, most

women that are involved in brick making heavily lamented on how shortages of water were now a problem for their business. One participant explained that:

The distance we now walk to fetch water for our bricks and pottery is now very long as our wells have dried up. We now fetch water from the Lake which is about 1-2km from the anthills we will be working on. The men have taken over the anthills close to the water sources and leaving us to occupy those that are far from the water points. (Edina, Ingwe Gomo, Zvimba, Fieldwork 2022).

Water is at the heart of all farm lives and livelihood options in resettlement areas in Zimbabwe. The problem of water can be noted to be one key factor affecting brick making by women; which has also been further worsened by the patriarchal domination of men in these areas. Due to this, most women are now finding it very hard to be more productive in brick making as both the direct impacts of climate change which are the water shortages, and the societal impacts of patriarchy are taking a very strong and deeper toll on them; thus limiting their potential. Supporting this, Makunde (2022) highlighted that water is at the centre of all farm livelihood options in the resettlement areas in Zimbabwe as it is the glue that binds the success of both lives and livelihoods. Hence in as much as production of bricks is continuing despite the problems there are facing, the resilience of these women to climate change is fast becoming questionable as the means to reach the end is now severely affected.

In Pension farm where weaving and basketry are also done, climate change has taken a toll on women. This is mainly so because the reeds for production used in weaving and basketry are now fast depleting in the Mangondo area and other parts of the shores of Lake Chivero. This is due to the water levels going down in the mouth of the Lake. Hence some of the weavers and basketeers found in the area are now failing to make their baskets because of climate change; which is heavily limiting their production capacities as the inputs for their business are fast depleting. Not only are the reeds depleting, but also for those that are found in the area, the quality is turning low; which is now affecting many crafts-women. As result, as revealed in the FGDs conducted in the area; some of the women explained that they bought inputs from Mbare Musika; which is now becoming costly for them.

#### **6.4. Indirect impacts of Climate change on the lives and livelihoods of women in the PFTFs**

According to Zvamasiya et al. (2017), climate change affects all facets of lives and livelihoods directly and indirectly. The indirect component mainly touch on the institutions of society such

as the socio-cultural relations, politics and the knowledge and technological aspects. In the social and political spheres of life, climate change has also had a say in the lives of people in the three selected farms in Zvimba East District. This can be seen in how climate change has influenced the socio-political set up of the farms. The direct impacts of climate change which are experienced in the agricultural, ecological, and economic settings of the farm have spilled over into the socio-political spaces of the farms, affecting these indirectly. Some of the socio-political impacts of climate change that have affected women unearthed in the study include child marriages, SGBV, conflict on produce and ownership, poverty diseases, politicisation of inputs, nepotism, and abuse of women.

#### 6.4.1 Social impacts of climate change on women farmers

Climate change has affected women in the three farms under study through how it has reinforced patriarchal dominance in the sharing and access to resources in Zvimba East District. Most women noted that male dominance is now being felt in almost every economic activity that brings more income to the household. Karuma, Bhatsara and Nyamwanza (2021) note that because of climate change, the victimisation of women through patriarchy in PFTRFs has greatly increased through how the phenomenon has impoverished families. Activities such as goat rearing, poultry keeping, and crop cultivation have seen men coming in to dominate mostly the produce that women would have worked hard to earn. The women in the study explained that in as much as projects in agriculture are being done, they are largely anchored by women who are the key in starting up the projects and processing all inputs needed in these projects. However, men always appear when it is the time to reap from the set projects. In line with this Jane from Amalinda Farm explained that:

My husband always drinks and does nothing on the farm mostly. Most of the time he is away following these farm pubs. However, he appears after several days dictating that it's now time to sell a goat or chicken or even the maize in granary. It's hard to dispute him as the father of the house but this is very painful as he will be dictating the pace on what he has not worked for. After the sell he normally gets about 75% of the income and goes drinking. (Jane Amalinda Farm, Zvimba, Fieldwork 2022)

This has been the situation with most women as these are failing to have a voice in terms of fighting and making sure that they are food secure and climate change resilient through the proceeds from the farms. Thus, as their voice are silenced, it now makes it very difficult for these to become resilient to climate change as the foundation to resilience is greatly shaken by the patriarchal nature of the cultures at the farms. Not only is this happening in agricultural processes, but this is also

envisaged in the other spheres such as fishing and brick making which has greatly exposed the women to ravages of climate change. In brick making and fishing which are the alternatives, men dominate these mostly by negotiating the deals with customers and getting the money when selling fish and bricks. Moyo et al., (2023) highlighted that in as much as women have voices in society, climate change in Post-Fasttrack Farms has reduced the volume of women's voices as the patriarchal grip is emerging again through how men want to dominate also household and domestic issues. This therefore has been leaving most women behind thereby affecting how these copes with climate change.

In addition to this, as mostly the Zvimba East District thrives mainly on rain fed irrigation with climate change most women have now been plunged into poverty as crop cultivation and animal rearing have been greatly affected by the climatic changes happening in the area. Most of the women in the study explained that the reason why they have settled on the farms was mainly to be involved in agriculture and fend for their families. With climate change now ravaging the farms these now hard can have even the produce which is enough to meet their daily needs thus plunging them into heavy poverty and food insecurity. In line with this the Village Head X explained that:

Most of the women in this area have become impoverished as from their agricultural activities nothing of significance is coming out. These used to have more than 10 tonnes of maize a season but now they can barely have 2 tonnes. Thus, from this you can sale nothing, what of the children going to school. Hence poverty has crept in the farms as well as deep food insecurity which is now a challenge (Village Head X, Amalinda Farm, Zvimba, Fieldwork, 2022).

As a result, poverty has now become heavily feminized in the farm as women are largely affected by it due to climate change. Not only are these affected but their ability to bounce back is now limited greatly as these cannot afford the means to fight climate change due to meagre returns, they are getting from their agricultural endeavours. Thus, most of the women are now left exposed to the ravages of climate change as well as their families which now ends up affecting not only them but also their children. Supporting this, Makunde et al (2019) highlighted that climate change has most impoverished women and children in resettlement areas in Zimbabwe as these bear the brand of all climatic change impacts. Due to climate change that has affected Zvimba East District,

poverty has now been greatly deepened in families and withing households with women and children being on the deep receiving end in these communities.

The climate change induced poverty which has affected the women has further on exposed women to sexual gender-based violence in the household (Chiweshe and Bhatasara, 2019). Most of the women explained that cases of abuse have been rampant in the farms all emanating from the state of poverty in the family. Cases of husbands beating up their wives for failing to budget available food items in the household have been rampant in the three farms whilst also other men have used abuse of women as venting form the social pressures of providing for the family. In line with this, in some of the FGDs conducted, most women explained that their husbands come back late at night and may complain on why there is no food whilst they have not left anything for the family to feed on. Failure to respond welk would now lead to heavy assaults on their bodies. Thus, form this it can be noted that climate change induced poverty and food insecurity have now bred sexual gender-based violence in these farms in Zvimba East District.

Due to poverty induced climate change child marriages have also become rampant in all the three selected farms in Zvimba East District. Crop failure and livestock production failure has left most families at the mercy of food insecurity and poverty due to climate change. From such negative impacts of climate change, the female children have now been seen as an alibi for most of families to come out of poverty for these families. Considering this the Community Elder 1 outlined that:

Cases of child marriages have been on the rise in this area particularly at the Amalinda farm. In the former compound areas children are being married off at a very young age as early as 12-17 years in these areas. The spike in these marriages have grown of late because of climate change which has threatened food security for many. Now you can see maize, goats, and chickens for determined period being part of lobola (Community Elder 1, Amalinda, Zvimba Fieldwork 2022).

Adding on to this, Alice a participant from Ingwe-Gomo highlighted that:

I was married off in 2012 at the age of 14. My father and mother convinced me to go and get married to this family I am in now as a third wife as they are very good farmers. I had since dropped out of school due to financial constrains as we had nothing significant coming out of the farm in the period 2010-2012 due to drought and even lack of inputs. Hence the only way was to get married to save my family, after all most of my friends were had been married off a year or two before me. (Alice, Ingwe Gomo, Zvimba Fieldwork 2022)

Climate change induced poverty has mainly caused the marrying off children at young age in resettlement areas in Zimbabwe which has been a practice even also ratified by culture in those areas (Bhatasara and Nyamwanza 2018). Due to poverty, the future of many children especially in Amalinda Farm has been sold off to the belly by many families in the area. The need to have food security for the household is now making more families be involved child marriages to be able to survive the scourges of climate change in the area. Thus, the women and children have now been greatly affected as these are used through the marriage avenue to become the climatic change impact proof in the Zvimba East farms in Zimbabwe.

#### 6.4.2 Health related impacts of climate change on women

Climate change has also exposed women to an array of diseases because of the extreme cold weather and hot water weather being experienced in many areas around the world (Bhatsara, 2015). Women in Zvimba East District have also been exposed to various health related impacts of climate change over the past ten years. Too much heat and too much cold has left women exposed to various diseases overtime in these farms such as flus, headaches, and severe back aches. During the time of the COVID 19 pandemic in the year 2021 winter, some even lost their lives because of the heavy flu that hit them during these times. Considering this Masembura a participant from Pension Farm explained that:

For us who leave in the vicinity of Lake Chivero, during the winter we are exposed to very heavy flu. I think our temperatures can go down to as low 9 degrees Celsius as we are very close to the lake. A bit of some ice can be seen on the grass when you wake up very early to assist those coming from the Lake fishing at Night. The flue is so heavy that your chest can become so dense and heavy (Masembura, Pension Farm, Zvimba, Fieldwork 2022).

Not only are the women exposed to mild diseases such as flue as result of climate change, but some of the women have complained more of exposure to malaria. Most participants explained that the area is so much mosquito infested as it is very close to water bodies such as Marimba River and Lake Chivero. Women from the three farms highlighted that their farms are more prone to malaria outbreaks because of wetness and heat they are exposed to due to climate change. In the FGDs conducted, the participants argued that mostly in the summer and rainy season, the rate of cases of malaria mainly goes high in the area due to the breeding conditions that would have been created by the rains in the area together with the water bodies found in the farms.

In support of this, Priscilla from Amalinda Farm explained that:

Living in Gomo farm is a health risk as we are mainly close to Marimba River. This is where most mosquitoes that come in our farm are bred. Most during the summer one has to know that one has to have a malaria medication kit as a few bites from these mosquitoes can cause one to lie down on the floor sick. Thus, this hinders our production mostly as malaria is deadly such that the one attacked by it cannot do anything. We have lost about 4 people between 2019-2022 due to malaria in this farm. (Priscilla, Amalinda Compound, Zvimba, Fieldwork 2022).

Adding on to the above, the women in the farms are also exposed to water borne diseases such as diarrhoea, cholera, typhoid, and bilharzia in sub-Saharan Africa as these are the custodians of household water fetching duties (Kamwi et al., 2015). As the resettlement areas under study are prone to water scarcity due to climate change women end up now fetching water from contaminated sources leading to the outbreak of such water borne diseases. Most women in the study highlighted that during the months of September to end of November water largely becomes an issue leading most of these to fetch water from the Lake and Marimba River and some uncovered wells around the farms which leaves them more at the mercy of the waterborne diseases above. As water is crucial for household survival families have thus been exposed to these ailments of the stomach that mainly stem from scarcity of clean water for daily use in the household. Hence this has been another key climate change impact that has led to the loss of lives in the three farms in the period from 2018 to 2022 when the farms were most severely affected.

The crop and livestock production backdrop as a result climate change has caused malnutrition in children which is another challenge that the communities are facing. Women and children cannot be separated as the problem of children can affect the mother whilst that of the mother affects the children, malnutrition has been a big problem affecting the children directly and women in these farms indirectly. Most of the women explained that the heavy shortages of food due to the low production from both the crop cultivation process and livestock has exposed children to malnutrition. Most of these explained that due to climate change, their eating patterns have now changed as they now have one or two meals per day only due to food shortages in their households in the selected farms. Thus, this is causing malnutrition in some of the children found in these farms due to lack of adequate food for these children.

Dube (2018) highlights that the heat waves that have been hitting hard the farms have also caused heat stress not only in the plants and animals only but also in human beings and women have not been spared by these. Amalinda Farm has been experiencing heatwaves during the months of

September- December since 2015 up until now. It was observed that the farms have been experiencing heat waves which will be as hot as between 35 degrees celcius-40 degrees Celsius between the cited months which have caused heat stress on both plants and animals with human beings not being spared. With these heat waves women have been exposed to heat stresses which have manifested themselves in very acute headaches, dizziness and fainting occurring on the farms. As these women bear the burden of much work such as fetching water and many household chores, they are exposed more to heat which now leaves them more eat stressed than their male counterparts thus affecting their health. Supporting this most of the women in the FGDs conducted explained that on the hottest days they have experienced some dizziness and headaches in their bodies such that some would even sleep to recover from that. Hence this shows that climate change has affected women in their bodies greatly as shown through these eat stresses highlighted above.

#### 6.4.4 Politically related impacts of climate change on women

Climate change impacts have politically marginalized women in these farms. This so because it has exposed women to the machinations of political discrimination, prejudices, and stigma when it comes to the issues of trying to adapt and become resilient to it (Chazovachii et al., 2012). In as much as women are on the core of production that happens in the farms, the irony of the matter is that when it comes to political decisions and issues such as distribution of inputs for government programmes these are placed on the peripheries if not the end of the line for the benefits. This was noted in the study when most women interviewed gave reference to ‘pfumvudza’<sup>5</sup> that even though these benefited but they only did benefit out of the leftovers by the male centred leadership. Though the village head for one of the farms is a female, she is overpowered by men when it comes to getting inputs as women are discriminated against and mostly saved last. Considering this Chiedza explained that:

In as much as access to *Pfumvudza* inputs by the government we have it the problems is that not all of us as women benefit. Some of us as women are greatly left out through the hook and crook men who deem themselves powerful over us. In the recent share of inputs, I couldn’t even get the fertiliser as poor reasons were given that my ID number was not well copied on the list. These petty reasons are always given against women such that they end up not benefiting. (Interview with Chiedza, Amalinda Farm, Zvimba, 2022).

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<sup>5</sup> Pfumvudza is a form of conservation farming adopted by the government of Zimbabwe for use by communal and resettled small scale farmers.



As a result, as these are left out of the cushioning given by government against climate change, the impacts of climate change end up affecting women more as they are left exposed without any covering. The way in which women are exposed is through how men are dominating the distribution of inputs as highlighted above which end up violating the rights of women. Most notably the windows are mostly affected by these as they are defenceless when distribution is done. However even though the situation is like this another way that women are left out is through how the women are left out when registering for inputs as the name of the men is the one that is registered as the head of the household. As a result, most men end up also taking the inputs such as fertilisers and seed and selling it as it is in their name. Thus, women are left exposed to the climate change impacts of food insecurity and poverty because of this.

The politicization of inputs is also another factor that has been affecting women in the selected farms in Zvimba East District. The researcher observed and noted that women have been grouped based on political affiliation in the area when it comes to getting inputs particularly of Pfumvudza and government food aid of maize. Those belonging to ZANU PF are the ones that mainly received food aid and inputs of 'Pfumvudza' mostly whilst those that are deemed sell outs or part of the opposition that is CCC or MDCA are left out. Most of the women (Chiedza, Priscilla and Kuda) in the study highlighted that if the leadership do not want you to receive any inputs from the consignment being distributed the agenda of one being a sell-out is built from the many months before distribution such that on the distribution one is left out. Thus, most women who would not been in the right standing with the political authorities mostly of ZANU-PF when distribution of maize, maize seeds and fertilizers come, these are left out leading to them being heavily affected by the ravages of climate change.

Chikonzo (2021) notes that nepotism in both input distribution and government food distribution is also another key factor that has been affecting women and exposing these to climate change. The study discovered that most of the post-fast track farms are no go areas for NGOs such that government facilities only reach these farms. As a result of this officials from the ruling part are the ones that would oversee distribution together with the headman for the area. As such only people that are in line with what the local leaders want are the ones that are given whatever would have come for the farming communities in the areas. Not only are these given the leadership of the area sometimes takes twice or thrice as much that is given to the individuals on the farm whilst not

considerate for those that have not received anything on the farms. In support of this Jason a participant from Pension Farm explained that:

The leadership in this farm is the one that is very nepotistic in nature. They first share for themselves and their families without even considering others. Mostly the women who are widows and some who are orphaned left on their fathers' plots find it hard to get whatever climate change cushioning that is made available by the government. (Jason, Pension Farm Zvimba, Fieldwork 2022).

Corruption was also noted to be one of the factors that have affected women and left them exposed to climate change impacts (Chingarande et al, 2020). In the distribution of food aid and farming inputs corruption has been seen to be at the centre of the distributions. Some of the participants interviewed explained that other people living in the farming communities know before hand when the truck with food aid and farming inputs come. Thus, these pay the distributors who are some of the community leaders some money usually between 10-20 dollars for these not to be left out in the distribution. However, women who are mostly poor such as the widows and orphaned young women left in charge of the plots mainly risk not getting any supplies as these do not afford monies for the bribes which are needed for one to get their portions. Thus, failure to get pay the distributors has left many women on the whims of climate change impacts as they cannot afford to get the cushioning against it.

## 6.5 Chapter Summary

In summary the chapter built the case of the need for transformative approaches in responding to climate change so that women farmers can become resilient to it through documenting the impacts of climate change in the selected Post-Fast Track Resettlement Farms in Zvimba East District. The researcher argued that climate change has negatively impacted on the lives and livelihoods of farmers most notably the women in the selected Post-Fast Track Resettlement Farms. As what Bhatasara (2015) notes climate change has impacted the farming communities in Zimbabwe greatly as most of these are subsistent in nature hence do not have adequate capacity to respond sustainably to the impacts of climate change. Despite the women farmers running away from other societal challenges of shortage of land and limited access to resources, these now see themselves confronted with new challenges in the form of climate change in the new place they have gone to. With these challenges in perspective, the question remains of how they are responding to these climatic challenges in their resettled new homes.

In presenting these, the chapter was demarcated into two crucial parts which present both the direct and indirect impacts of climate change on lives and livelihoods of farmers in Zvimba East District. The direct impacts of climate change on farmers in Zvimba East District discovered are mostly those that are the impact directly on the on-farm production process such as agriculture, ecology, and water resources amongst others. The chapter goes on to discuss the impacts of climate change on off farm activities done by the farmers in Zvimba East district. The chapter closed by discussing the indirect impacts of climate change on lives and livelihoods of farmers in the selected Post-Fast Track Resettlement Farms in Zvimba East District. The next chapter presents the means and ways that are used by women farmers to respond to climate change in Post-Fast Track Resettlement Farms.

## Chapter 7: Women's Responses To Climate Change And Their Level Of Socio-Ecological Resilience In PFTRFs

### 7.1 Introduction

The previous chapter presented the impacts of climate change have affected most women farmers negatively in Zimbabwe. As climate change has been affecting both male and female farmers greatly in Zvimba East district with women farmers and children bearing its brand as was unearthed in the study, these have been bound to respond. Folke et al (2010) notes that the impacts of climate change have been both negative and positive in nature. The effect of climate change warrants a response or an innovation by women farmers to cope with climate change. Subsequently, communities such as the one under study have employed several ways to respond and cope with climate change in their area. As was noted by Chiweshe and Bhatasara (2019), the climatic region in which the farmers are located shape the various responses to climate change the farmers utilizes which are mostly shaped by the climatic changes being experienced in the area. In as much as the climatic changes affecting environments and specific regions in various agro-ecological regions may be the same, the response of the people to the climatic change impacts varies from place to place depending on the existing climatic change rationality found in area. Most of the climate change responses by different communities have been hinged on livelihood diversification which is the means of survival for them.

Against this background, this chapter argues that the farmers have responded through several ways to the different impacts that these farmers have been facing in their environments. The chapter further buttresses this argument by citing that not only are the responses shaped by the climatic changes in the area only but the climatic change responses are also rooted and shaped by the socio-economic and political positioning of the farmers which have a bearing on how these responds to climate change in particular contexts and environments. Consequently, this chapter discusses the various response to climate changes occurring in selected Post-Fast Track Resettlement Farms in Zvimba East District in Zimbabwe. The chapter discusses the various means that have been adopted by the farmers in this study area mostly highlighting these from a social, economic, political, and ecological standpoint. The responses to climate change are the basis upon which the level of socio-ecological resilience of the communities under study will be measure.

## 7.2 Non-Farm responses to climate change in PFTFs

In responding to climatic changes happening in the area such as droughts and flooding and other livestock health issues, the women farmers across the three farms selected in the area in this study have employed several livelihood diversification strategies to cushion themselves against the negative impacts of climate change that they are facing. The responses that these have employed are can be classified as agricultural as well as non-agricultural responses.

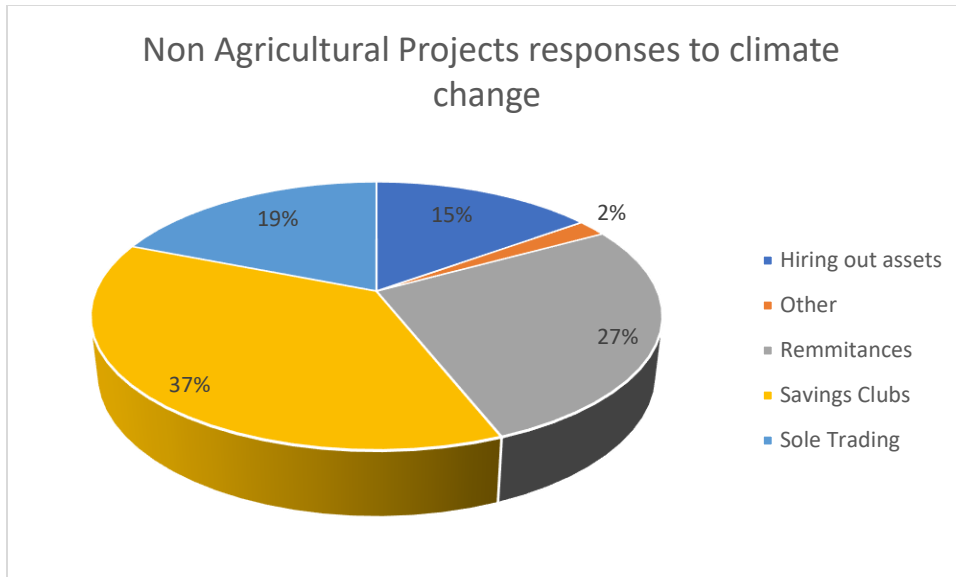


Figure 34: Non Agricultural activities done in response to climate change.

The women farmers have now responded to floods, changing temperatures and droughts across the farms through several non-farm livelihood options to help them stay afloat amidst the stated climate change impacts. As highlighted in the pie chart above generated from survey data, 37% of the women farmers are now into savings clubs, whilst 27% rely on remittances in responding to climatic changes in the area. Adding on to this 19% of the households explained that women are now into sole trading as they have formed tuckshops whilst 15% highlighted that are now into paid piece work such as farm labour, housekeeping work, and security work. However, 2% of the households in the study explained that they are now into other non-agricultural initiatives in responding to climate change. The use these various methods

In line with this in both most interviews and FGDs conducted, it emerged that households are now into different non-agricultural livelihood means to help them weather the storms of climate change happening in the area. Since the year 2000 in the area, it was noted that climate change has caused

a change in the way the farm is perceived in by most farmers especially women. Sheila aged 49 explained that:

We conceptualised the farm as only something for agriculture but now we have seen that the farm is an economy on itself. Climate change has opened our eyes such that we have seen that outside the weather patterns occurring in the area we can live and survive. We have started our *mikando* for groceries and we are doing so well. Such that if its dry in the fields and weather wise our granaries cannot be dry as we have food. (Interview with Sheila, Amalinda Farm, 2022).

The impacts of climate change such as hunger and starvation which have emanated from the failed harvests across the three farms have led women in the communities now to move away from agriculture and look for other alternatives to cushion themselves from climate change impacts. As the women have discovered this, the search for alternatives have landed them in non-agricultural activities as actions that help to buttress the agricultural means and ways that these have been using to survive over the years.

#### 7.2.1 Women's savings clubs

The failed harvest due to droughts and floods have greatly limited the income of women across the farms in Zvimba East District. This has forced most of the women farmers (77%) of these across the three farms to be innovative outside the farms and form other fallback plans to save themselves and their families from hunger. Johnson (2018) notes that *mikando* (savings schemes) have been one of the keyways that women farmers living on the farm have used to survive the scourges of climate change occurring in their places.<sup>6</sup> In light of this, this has been something that has been noted on the selected farms that the savings clubs for women have become something that these can fall back on when climate related disasters such as hunger and starvation have stormed their farms as this help them with income generation that can be used to boost survival for families on the farms

In addition to these savings club, the women have also gone an extra mile to also do a financial savings club. Across the farms it was noted that 73% of the women at Amalinda Farm, 68% of the women farmers at Ingwe-Gomo Farm and 78% of the women farmers at the Pension farm are now involved in financial savings club to help them to be resilient to climate change. In the interviews

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<sup>6</sup> Mikando are women's saving schemes where women contribute certain amounts of money every month and the money contributed per month is given to one member of the group after another every month in a rotational manner.

conducted in Pension farm, it was noted that most of the women have their groups where they pool their money some on a weekly and others monthly and the money is shared at the end of the year. In support of this, it Pelisiwe aged 51 explained that:

If we had to sit and wait for the farm and farming processes to give us food, then we would die. The monies we get from farming process with climate change now taking a tow on us cannot help us cope with the expenses we need to pay. School fees, food, uniforms all need to be catered for. Thank God for the difficulties we may face in the fields, we now pull our monies together. Weekly we pay \$10 dollars each or monthly we pay \$40 dollars each. There are many of these schemes, but one may choose the one comfortable with her. (Interview with Pelisiwe, Pension Farm, 2022).

Sheila; aged 43, highlighted that:

The reduction of the yield in the farm has opened our eyes that we may see that we can do a lot as women though living on a farm. I have been part of the saving clubs for 3 years now. I have managed to by my solar system, to but my kitchen unit and pay school fees yearly for my children despite having an irresponsible husband who is does not look at us as a family. (Interview with Sheila, Amalinda Farm, 2022).

Hence, climate change has shifted the mind-set of women on the selected farms into survival mode through some initiatives that they have conducted. The female farmers through their innovations and initiatives have become male husbands in female bodies as they have now even taken up the responsibilities of men. Climate change has thus opened the eyes of many women so they can realize their potential and know the influence and power that these have in their societies. In line with this, Notaro (2021) explains that in as much as climate change has caused societies to lament over the problems it has caused, in other societies it has opened the eyes of the blind in that society in terms of surviving and becoming resilient.

Key identification that has been made in this study is how households in the Post-Fast Track Resettlement Farms have been using the various social networks and social capital as basis for their response to climate change. As climate change has heavily affected the agricultural sector of which is the basis of livelihood for the various farms under study. In responding to these Post-Fast Track Resettlement Farms have started their own savings clubs to generate income. The savings club or *mikando* is mostly done by the women in the area. In an interview with one participant, she explained that:

When we saw that our produce is now no longer adequate to sustain the household in terms of income, we started having our own savings club. Most women have these on these farms where they pool resources such as money, groceries and kitchenware and share later as per their club specifications. Some of the money rotations are done weekly and monthly starting with as little as USD\$ 5 per week and going to as high as \$70 per month. Whilst the grocery and kitchenware are done quarterly and annually. (Interview with Jane, Amalinda Farm, 2022).

The savings club have been noted to be handy in lean seasons as these have managed to provide income and food to households in these times and many others. In the FGDs conducted it was noted that extra income was coming from the savings clubs in the area that are helping households to cope with climate change. Others explained that the income from the savings club has been used in various household initiatives such as paying school fees for children and going as far as also buying in puts that are being used from farming in the area. Gukurume (2013) highlighted that the village savings clubs have proved to be handy in lean seasons and even good seasons as these offer households' viable income alternative that can be used to cover many other expenses that are crucial for households. Hence this was also noted in the study.

#### 7.2.2 Remittances

Another form of social network and capitals that was noted to be helpful in building resilience to climate change through helping to cope with hunger and starvation emanating from droughts across the farms has been the remittances. Of the 337 households understudy across the three farms, 277 of these households highlighted that remittances they receive from friends and relatives have been one of the mechanisms that have been used by to survive the scourge of climate change in times of lean seasons and drought in the area. As was noted in FGDs conducted most of the participants highlighted that they received money from their friends and relatives as far as South Africa, Botswana and even United Kingdom. The amounts of money that these received range from USD50-300 a month depending on the stability of income of the sender. These monies have gone a long way in helping these people to build resilience to climate change in Post-Fasttrack Farms in Zvimba East District as they are used for food, paying school fees, and getting inputs amongst other issues. In line with this one participant explained that:

Most of the households in this community have either a relative or a son in diaspora. These normally help us whenever they can through sending money and supplies to use. Normally people receive between 50-300 USD a month which has gone a long way in helping us to be food secure in times of drought in this area. (Primrose, Pension Farm, 2022),



Jones et al., (2012) explains that remittances have become a cushioning and a building block for resilience for most women farmers and their families in times of climatic changes such as droughts and floods in Zimbabwe. This has been noted across three farms as most participants explained that the monies, they receive has been helping them in acquiring small livestock and buying food in these farms as noted in the FGDs conducted. Others explained that it's not only money from abroad but also money that comes from their children that are found in Zimbabwe but working in Harare and other surrounding towns. Remittances of food, clothing and money were noted to be the ones that have been helping these families to develop and build their resilience to drought induced poverty emanating from climate change. Some explained that they managed to build houses and granaries through the money being sent by their friends and relatives which have helped them to store food to cushion themselves in times of droughts and floods. Thus, remittances have been key in building climate change resilience in Post-Fast Track Resettlement Farms as was noted in the study across three areas.

### 7.2.3 Sole trading

Women have also practised perching of the farm as also a non-agricultural economy due to how the droughts have been plunging most families into poverty forcing most of these to diversify and innovate also whilst being on the farm. When normally the mainstream function is not producing the intended results the alternative becomes a solution. In line with this, most women farmers have also tended to look at their stay on the farm with this view of looking at what other possible alternatives are there for them on the farm to survive the scourge of climate change affecting them. Musendo et al., (2022) notes that though the primary focus of many farmers on the farm is to draw the power of the farm from it as an agricultural economy, one of the subtle powers of the farm economy is also its no agricultural side that many have realized in this time of climate change. As was highlighted in the FGDs conducted many women have now resorted to doing various other non-farming business on their plots to help them survive the scourge of climate change. Sphiwe aged 38 explained that:

I have now opened a tuckshop at my home and many people now know it. Despite having climate change there is need for one to eat all the time. After noticing this gap, I have opened this tuckshop and I am hoping that it will grow and become something big. In my shop I have all basic commodities and sometimes I repack them to quantities that my fellow neighbours and community can afford to buy. I can repackage cooking oil into

100mls,300mls and 500 mls and repackage sugar into 300g, 500g and 1kgs to make it affordable. (Interview with Sphiwe, Ingwe, 2022).

In line with this, Muse also explained that:

As for me when I did my tobacco 3 years back, I bought my grinding meal, and I established a bar too. Most people come here to grind their maize and to also buy their beer. I have also indicated that during soccer messages as many people do not have televisions, they come and pay \$1 to watch matches here since I have solar. When the rains are now not so good, I am no longer crying for them too much as I have a solid fall-back plan. (Interview with Muse, Amalinda, 2022).

In the face of lean seasons which have affected their income, women have looked on to bring alternative and innovative solutions to the scourge of climate change in the area thereby helping them to become resilient. The realization that the farm can also be a non-agricultural economy for most of the women prompted by climate change has brought joy and stability financially for these women and their families. Despite being farmers most of the women have now risen also to become entrepreneurs which has now greatly helped them in taking care of the family and making sure there is food security in their homes. Chagutah (2010) explains that the ability for women farmers to see opportunities in crises has greatly helped them to ward off some of the scourges of climate change in many places in the African continent. As a result, the solutions that are created by a people for themselves and through themselves in the face of climate change help them in developing sustainable resilience to the scourges of climate change.

#### **7.2.4 Engaging in paid work.**

Adding on to this, due to hunger and starvation that has been brought by droughts and floods in the area about 67% of the women have now engaged in paid work to cope with climate change across the three farms. Paid work has also changed its nature because of climate change in the Post-Fasttrack Farms. Most women farmers (67%) noted that with heat waves and droughts, the yields were going down, these now opted for paid work to supplement their income. In as much as most men were going to work in most of these farms, the females mainly were the housewives that would be employed in the household and family. As climate change now ravaging these farms, the phenomenon has changed as also mainly catalysed by the economic meltdown that the country is experiencing, women now have taken to look for wage work to supplement the income of their husbands and the families (Chiweshe and Bhatasara, 2019). In the interviews conducted it was

noted that most women are now into jobs such as those of security guards, house maids, general farm workers and general hands in several small and medium enterprises in areas such as Budiriro, Kuwadzana, Mufakose and Harare CBD to mention but a few.

Buttressing this in an FGD conducted one of the participants clearly highlighted that:

From around 2000-2010 we only knew that our husbands were the ones who would go to work and bring in the necessary money for farming in puts and all we needed. However, with the coming of climate change and its ravaging impacts that we realized around 2005 going forth we have changed how we do things, as women we now go to work. Some of us are now security guards and others general hands in various businesses around nearby locations. (FGD conducted at Amalinda Farm, 2022).

The women have taken up such jobs to ward off hunger and starvation that is being experienced in their families as due to droughts that have been incessant on the farms. In as much as the piece jobs do not give them much as was noted in the FGDs with most of these averaging between 50-150 USD a month, the women have resorted to these to find their way-out climate change induced hunger and starvation. The need to put something on the table for the children to eat in times of crisis has pushed the women farmers into these jobs across the three farms.

Scoones et al., (2010) explains that even though some of the women have been allocated farms, the change of the climate noticeable through incessant droughts and heatwaves in the farms has now pushed some of these to move on and look for wage work in neighbouring A2 farms such as the Chando Farm and Zvarevashe farms nearby. Though some of the women farmers in the area are plot owners, due to heavy food insecurities some of these have gone to pledge their labour to other farms to get something to feed the family. In line with this, Jane explained that:

It is very hard to be a woman who owns a plot but with nothing to start up farming endeavours with. I might be a plot owner but when it comes to hunger and starvation that we have experienced in the past years, I have had to humble myself and go on to look for *maricho* (piece jobs in neighbouring farms). This has been something that has helped us in these times of climate change as our yields have been going down. (Interview with Jane, Amalinda Farm, 2022).

The women have taken upon these piece jobs to help their families find something to eat during the times of crisis. As most of the work is food for work with a little income, the motivation for these has been to provide for their children. As was noted in the study, mostly the widows and

those women with husbands that are drunkards have been the ones that have taken up such employment as these have no alternatives in times of climate change in Zimbabwe.

#### 7.2.4 Breaking up of gendered norms and values and control of farming

As a coping strategy to climatic shocks in the area, most of the farmers in Zvimba East District have resorted to the already existing social systems found in the farms. Gender as system in the farms has been a classification of how the people in these farms have been living on the farms. Thus, several livelihood options have been highly gendered in nature as was noted in the study as there is a demarcation between men and women and the tasks that these should do when it comes to livelihood options. In line with this, Adger (2006) explains that livelihood options have mostly been gendered in farming communities as this is used as a posture of division of labour.

Crop cultivation in the farms is mostly done by women farmers in the farms have been studied. Most participants explained that crop cultivation was for women as they are the ones that would be readily available on the household daily. The men were deemed to be suppliers of the inputs that are deemed necessary for the farm. In the Amalinda farm most participants highlighted that the crops that are grown include maize, soya beans and tobacco are mostly manned by women. Supporting this ideas Mutopo et al., (2020) highlighted that women are deemed to be more friendly to the environment, hence are custodians of activities on the farm.

However, in as much as women were the ones who are involved much in crop cultivation, the control of the produce was not in their hands but in the hands of patriarchy which now has changed. The study noted that the livelihood options control has now gone beyond gender as now women are now in control of produce and farming production at the farm because of climate change. In as much as women still have their hands on the production of food, men have now been removed as controllers of produce but are now involved and become part of the production process. This is mainly so because due to the economic meltdown in Zimbabwe most men have lost their jobs and now resort to staying home which has made these also lose control of produce as they now have also to work on the field as their controlling power which is the economic input has been cut. Even though men have now moved out of the locations and now stay in the farms with their women and children and are now part of the production process in terms of crop cultivation, tis has shown how the control and power have shifted towards women.

In line with this, the village head X explained that:

Crop cultivation was mostly done by women whilst men were at work in the locations controlling outputs and income. Now there is nowhere you can find good rewarding jobs due to our economy. As a result, men have now joined the women in the fields contributing their labour also to maximise outputs. This is so because failure to do that will plunge the family into poverty as everyone's hand is needed for maximum production. Women are now in charge of production and management of funds in the farms as the men now have lost their controlling power. (Interview with Village Head X, Amalinda, 2022).

Supporting this Georgina explained that:

My husband used to take all the money from our produce but now this has changed since he lost his job. He now works with us in the fields and even asks for money for me to go and drink which is good. Climate change has humbled our men and give us control of the fields, produce and outputs as mostly the men are still suffering from the stress of economic meltdown which has affected them mentally with stress and depression. (Interview with Georgina, Pension 2022).

Thus, it can be noted that the macho ideology of men being the head of the house and provider for the family has been broken. The immunity of men in crop cultivation has been broken as these are now hands on the field thereby leading to increased yield for most men (Adjani et al., 2013). Thus crop cultivation has now been seen as one of the main factors used in adapting to climate change by most households that are found in the different farms.

In the market gardens of Pension farm, it was noted that in as much as most women are still being employed well by the city council, these were not interested in farming as they had their lives and salaries coming well on time. With the economic meltdown it was noted that some of the female farmers in the area changed their position on farming and started helping their children and young girls to the extent that some have their own gardens (Chakwaira, 2010). In line with this one Mercy explained that “our mothers did not want to join us when we first developed gardens as things were okay, but now there is no option than to join the winning team.” Hence because of this it can be noted that also the so-called female spaces are now also in charge of the market gardening space which has now become a building block in building resilience to climate change.

The selling of produce in these farms especially that comes from the farm was highly patriarchal in nature as was noted by Scoones (2015) and Gukurume (2018) in their respective studies of Post-Fast Track Resettlement Farms in Zimbabwe. Though men were not in direct production of crops on the farm these wanted to oversee the money that has come out from the sale of the produce.

Some even went further to be the ones who would sell the produce for their women. However, these have changed now as was noted in the study as most women have now developed means and ways to go round the challenges that they are facing in the sale of produce. In the FGDs conducted women participants explained that we are now in charge of the sales of produce nowadays as we only give our men only portions but keep the larger chunks for family development.

Others explained that they no longer even give the man any single cent if they are not part of the production process. The aspect of having 50/50 sharing on the farm has now invaded farms giving women significant charge and control of produce in the households in Post-Fasttrack Farms. Through this development has been noted in most households as many of these are now able to buy properties. In the FGDs conducted some participants explained that they have been able to buy solar panels and even build small houses through the money they have realized from the profits gained from their field produce. Others highlighted that they have been able to take their children to school through the produce from the field.

Women farmers in the area have also gone beyond gendered means of resilience to climate change in the farms understudy. In the in-depth interviews conducted and the various FGDs conducted it has been noted that women have now grown beyond gender lenses in adapting to climate change in the selected Post-Fast Track Resettlement Farms. In one interview Jane aged 47 explained that:

Times have now changed worse with the climate change our societies and ways of living have also changed. When we first settled here in around 2000, we used to depend on our husband for almost everything but now we have now far outgrown that. We are now even the breadwinners in the families as most husbands have lost their jobs whilst also climate change has been ravaging. We have found alternatives in brick making and even fishing, the jobs that our husbands used to do alone we are now doing these with them to help the family. (Interview with Jane, Amalinda Farm, 2022).

In line with this, another participant named Esther aged 52 highlighted that:

As a result of how climate change has affected food security of households, it is now no longer possible for us to demarcate our roles based on gender. The focus of both males and females is now on the need to eradicate hunger so you see our roles are now similar in the economic spheres on the farm. As women we now run businesses, do brick making and fishing together with also other masculine jobs. The change in perception has mainly been because of hunger and starvation. (Interview with Esther, Amalinda Farm, 2022).

Consequently, this clearly shows how the gendered adaptation to climate change has changed over time in Post-Fast Track Resettlement Farms. The state of being male or female economically has been left hanging in these societies as sleeves have been rolled to fight issues of hunger and starvation in the society (Folke, 2006). In the study it was noted that even the gendered roles of young boys and girls are now being fast eroded in these farms. Cases cited include those of divisions of labour that if one is manning the tuck-shop whether the boy or the girls the other is doing house chores at the family homestead. Such acts of gender blindness and balance have been necessitated more through the issues of how climate change has brought about hunger and starvation at the family unit. Thus, climate change has brought about positive disruptions in the gendered notions of climate change adaptation and resilience in the farms under study. The power issues in terms of control of produce has shifted because of climate change and the economic meltdown in Zimbabwe and the selected Post-Fast Track Resettlement Farms. In line with this the women have now gained controlled of the farm economy and produced as has been noted in the study. This has come through the demise of men and as result of the loss of employment for most men on the farms.

### **7.3 On-Farm Responses to climate change in the selected PFTFs**

As most women stay on the farms, these have adopted the on-farm responses to climatic changes they are experiencing on the farm. According to FAO (2022) on-farm activities consist of farming and agricultural production, including casual and seasonal labour which are viewed through a value chain lens, on-farm work occurs at the “beginning” of the value chain. In line with this, as the farm is the primary unit of production of women, these have now adopted the various response to climate change whilst on the farm to ward off hunger, starvation and diseases that have come from droughts, heatwaves, floods, and other climatic change impacts being experienced in the area.

#### **7.3.1 Diversified Crop Cultivation**

As droughts and heatwaves are raving the farms, greatly which has affected agricultural production and productivity across the three farms, the households in the area have developed several crop cultivation responses to adapt and become resilient to climate change. Some of the strategies have been introduced by government and NGOs, while others are initiatives from the farmers themselves. Some of these practices have been practiced in Zimbabwe, particularly in semi-arid regions. Drier regions in Zimbabwe are prone to drought, and crop failure is common. As such, farmers mostly produce crops that are drought tolerant, and over the years the government has

introduced drought-tolerant varieties, which are available on shop shelves, although sometimes they are freely provided to farmers by government and other non-state organisations. However, in as much as these have been introduced to farmers across the settlement divide introduced by government, in Zvimba district the farmers had still been using the varieties that they were still using such as maize and beans which were recommended for this region despite the change in the climate conditions in the area over the years. Thus, because of this climate change has thus hit the farming communities under study greatly as these have not fully diversified in their farming techniques and mechanisms though these are beginning to adopt the changes.

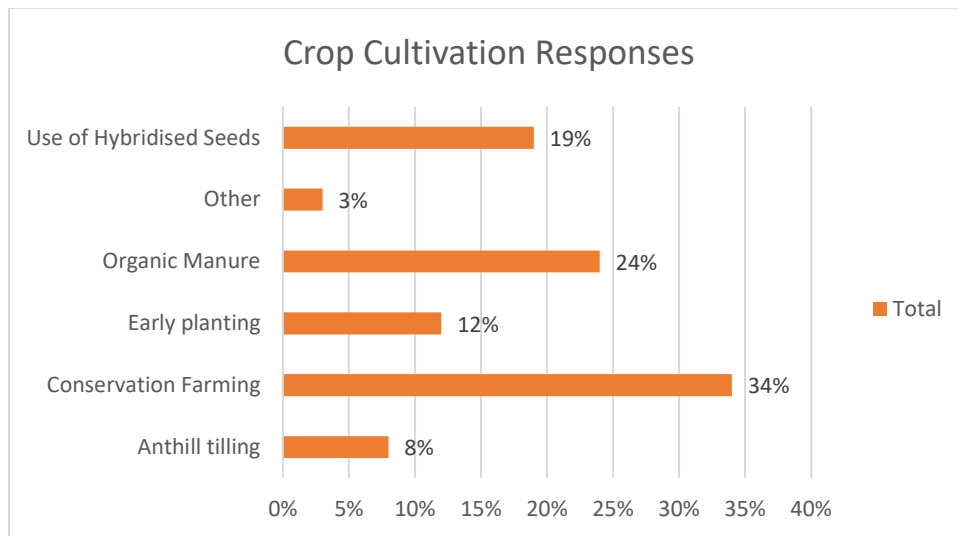


Figure 35: Crop Cultivation responses

As noted in graph above most of the farmers (34%) are now into conservation farming (*Pfumvudza*) introduced by government whilst 24% have now resorted to using organic manure for farming. Adding on to this, 19% of the households have now resorted to using hybridized seeds whilst 12% of the farmers now resort to the use of early planting to beat climate change. However, 8% of the farmers are now into anthill tilling to boost soil fertility whilst 3% stated that they use other measures to adapt to climate change. Through these various ways it can be noted that the farmers have used the various adaptation measures to cope with climate change and become resilient to it though the notion of sustainability and socio-ecological resilience of these methods remain.



#### 7.3.1.1 Early Planting

Supporting what was unearthed in the survey, the study noted that one of the keyways that the households across the selected farms are employing is early planting in the farms as 102 households out of the 337 households are practicing it. Most of the farmers in Ingwe-Gomo Farm and Amalinda Farm highlighted that early planting is now what they are now doing as it saves them time and labour. In support of this, the AGRITEX officer explained that:

Most people in these farming communities are now practicing early planting in the area. This where they plant their seeds particularly before the rains come such that when they come they find the seed already underground. This is done between end of September-mid October as rains are anticipated around early November to end of November for the first rains. (Interview with AGRITEX Officer, Murombedzi Zvimba, 2022).

This process has been deemed very helpful in making sure that the farmers have a guaranteed harvest as they use the early rains in planting which minimises their processing times the crops. Early planting is seen to be bringing results to the community as it is helping the community to realize harvests from their farming expeditions carried out on the farm amidst the climatic changes that are happening on the farms (Mavesere and Dzawanda, 2023). This has helped to build production as it has helped the households to become food secure as increased yield and productivity has been noted in the study.

#### 7.3.1.2 Conservation Farming

Conservation farming has also been adopted as another innovation that the women have adopted because of climate change as 180 households out of the 337 households are practicing it. In as much as this was there in Zimbabwe in other parts, the presence of this phenomenon in Zvimba East District was not very much widespread. This was popularized in the area through the government programme of Pfumvudza which the women have adopted and has been very helpful. In the study it has been noted that the adoption of conservation farming, that is Pfumvudza has been bearing fruits as it has helped the women dodge the scourges of climate change in their agricultural endeavours. This climate change proof method of farming has necessitated some good returns for the women farmers in the area which has seen these helping households to become food secure.

In an interview with the AGRITEX Officer in the area he highlighted that:

The introduction of the climate smart conservation farming called Pfumvudza has seen yields boosting in the area despite it experiencing climate change. As the process involves use of hybrid seeds and minimum tillage of soil whilst conserving water, yields are guaranteed to be there for the farmers. In the past 3 years that we have adopted pfumvudza it has been noted that the minimum a household can have in terms of maize was about 1.5 tons a year which is not bad. (Interview with the AGRITEX Officer, Murombezi, Zvimba, 2022).

The adoption of conservation farming (Pfumvudza) has not only proved handy in being climate change proof only but also has helped in ecological resilience of the area under study (Mavesere and Dzawana, 2023). This is mainly so because this method uses zero tillage or minimum tillage which helps in preserving the soils and reducing soil erosion in the area. Through this the siltation of the rivers and lakes which contributes also to climate change is greatly reduced thereby helping in boosting sustainable resilience to climate change in the area. Thus, the conservation farming adopted by women farmers in the areas has been very pivotal in the reduction of the impacts of climate change on the household level and community level.

The zero-tillage mechanism of crop cultivation which has been adopted also across the three farms as a mechanism that is advocated by the government of Zimbabwe has been yielding positive results that have been seen in how their food security has increased since the adoption of the programme. Mavesere and Dzawanda (2023) explains that Pfumvudza which has been spread well around Zimbabwe has greatly led to increased food security over the 3 years it has been in existence. Supporting this Martha aged 43 explained that:

The programme of *Pfumvudza* in which one must dig holes that are 5cm deep and are spaced 75cm across holes by 60cm between holes which is spread over an area of 100m by 100m. This programme has brought great yield to us as from such a small space you are guaranteed to get at least a tonne or more of maize. Though the process is labour intensive it has good returns. (Interview with Martha, Pension Farm, 2022).

James explained that:

*Pfumvudza* has made us food secure. What I like most about the programme is that after doing your holes and are inspected by the AGRITEX officer, you are guaranteed to receive inputs for your area. If you follow instructions your yield is guaranteed as the issues of lack for adequate rainfall are covered by also the preparation one has. With the minimum rainfall we are receiving in this area we are getting a proper yield. (Interview with Jane, Ingwe-Gomo Farm, 2022).

In line with this, it can be noted that the zero-tillage conservation agricultural programme called *Pfumvudza*, has helped many families to become food secure. In as much as the process is good and yielding results for many, the labour needed to do the adequate *pfumvudza* cultivation has led many also to be bored with the programme and sometimes fall of the programme. Some of the participants highlighted that the *pfumvudza* programme is for those that are still able bodied and whose bodies still can handle the pressure of crop cultivation of such intensity in this area. Contradicting what Chiweshe and Bhatasara (2019) explained that *pfumvudza* was for all people on the farms and rural communities, the study realised that there is need for good bodily health and strength to participate in this programme. Thus, the programme is not all inclusive as the elderly and those with various health conditions ion communities are left out in it as these cannot do the holes as per the desired depth and cover ground needed by the extension officers.

The dependence of rain-fed agriculture has made also the *Pfumvudza* programme fail to fulfil its mandate fully in the farms. Though this programme has brought reliance to climate change for most farmers in the area, when there is not enough rainfall in the area as what happened in 2021 season, the crops wilted greatly and harvest plunged greatly plunging families into hunger and starvation. Thus, the study discovered that though *Pfumvudza* is saving the environment, there is need for this agricultural initiative to be buttresses by good mechanization such as good irrigation facilities for it to yield and give much benefit to more people and communities in Zvimba East District.

#### 7.3.1.3 Hybridised seeds

In responding to climate change, some of the farmers have now resorted to the use of hybridised seeds to beat up the changes in the environment (Tirivangasi and Nyahunda, 2019). In interviews conducted on the farm most of the farmers explained that they now used seeds that have faster maturity times for these to beat the fast-changing weather conditions in crop cultivation. Some of the seeds that these now use include *NTS 576*, *SEED CO SC517* and *SEEDCO katsoko* maize seed which are fast maturing maize seeds. These normally take between 90-120 days to reach fully maturity which is a good space of time for production. The maturity level of these seeds of between 3-4 and half months is crucial as it is the timing when the rains will be still raining in the farms thereby helping realise a good harvest in the area.

The use of such fast-maturing crops has seen the improved food security of the area. This is mainly so because these fast-maturing seeds help mainly in reducing the time of production thereby helping farmer to be on time with the rains that are being received on the farm. As a result, most farmers have been able to receive good harvests due to their ability to grow these fast-maturing seeds as was noted in the study.

#### 7.3.1.4 Organic soil fertility measures

As a result of the soil erosion happening in the area which has seen most of the soils becoming sandier, farmers have resorted to various ways to restore soil fertility and texture of soils across the three farms. In Amalinda and parts of Ingwe-Gomo farms, farmers have resorted to anthill tilling and spreading the soil in their fields to help improve the soil texture and fertility in the area. In line with this, Jesse aged 54 explained that:

As you can see, we are the last farms before the lake and land in this area is tilted towards the Lake. This means that soil erosion happens much faster in this part of the farm leading us to have very weak soils. So, we have decided to till the anti-hills and spread them in our fields to help our fields hold on to water and feeding during the farming season. And this has proved helpful. (Interview with Jesse, Ingwe-Gomo Farm, 2022).

Others in the farms explained that they have resorted to contour ridging farming along the anthills. In the FGDs conducted most of the participants explained that they discovered that the anthills are very healthy and have good feeding in them. Some of the participants further explained that one does well her contour farming on two anthills one can produce close to half a tonne to a tonne of maize on these. This a formidable yield which can be achieved at household level to those that are committed to contour ploughing. However as was noted by Tirivangasi and Nyahunda (2019) contour cultivation is good in areas that are hilly and mountainous but also can lead to the degradation of the mountains and hills which is something not ecologically friendly. Thus, though anthill agriculture is being done in the areas under study, it was noted that these are not environmentally friendly as it leads to the destruction of anthills and loss of biodiversity in the area through destruction habitats for termites and flying termites in the area.

Nevertheless, in Pension farm and parts of Ingwe-Gomo farm that has a good number of Harare City Council cattle resort to the use of cow dung or cattle manure for improving soil fertility. In the interviews conducted most of the farmers explained that they collect manure from the kraals at Ingwe and Pension farm they use to put in their vegetable gardens to make more fertile. Not

only do they use manure in the vegetable gardens only but also these manure in maize and beans cultivation on their farms. In line with this Jane explained that:

We normally use cattle manure in our gardens to improve soil fertility. I spread 100 kgs of cattle dung in my 3m by 50m vegetable gardens after every 6 months to boost fertility so that my vegetables are good. When I use this my vegetables become dark green in colour with leaves such as wide as my two palms. (Interview with Jane, Amalinda Farm, 2022)

Supporting this, Mercy highlighted that:

In terms of maize cultivation and bean productions, we use cattle manure that is much finer than the one used in vegetable production. We normally put one cup per hole of *Pfumvudza* to boost the fertility of the soil. Through this we are guaranteed of good harvest in terms of maize and beans that normally can produce close to 6-7 tonnes per hectare. (Interview with, Mercy, Ingwe-Gomo Farm, 2022)

From these sentiments, the use of organic manure as has been noted above is one of critical ways that the farmers have used to adapt to the impact of climate change in the area. This mechanism has helped to improve the soil fertility and texture in the area which has led to increased yield and health of crops in the area. The use of organic manure has led also to improved biodiversity as this is very much low in acidity as compared to the use of artificial fertilizers (Chazovachii et al., 2012). Hence it has led to the greater improvement of biodiversity particularly in the soil thereby conserving the environment greatly in the areas. As compared to Amalinda Farm that relies more on artificial fertilizers, the soil texture of Pension and Gomo farms is much stronger than that of Amalinda which has helped the prior farms in terms of having much productivity.

### 7.3.2 Diversified animal husbandry responses

In responding to the climatic changes that are happening in their communities, women have also resorted to changing their animal husbandry activities through diversification efforts. The diversification of animal husbandry in the selected farms in Zvimba East District has taken different forms and shapes which are going to be discussed in the is section showing how women have mapped their survival of climatic conditions in these areas.

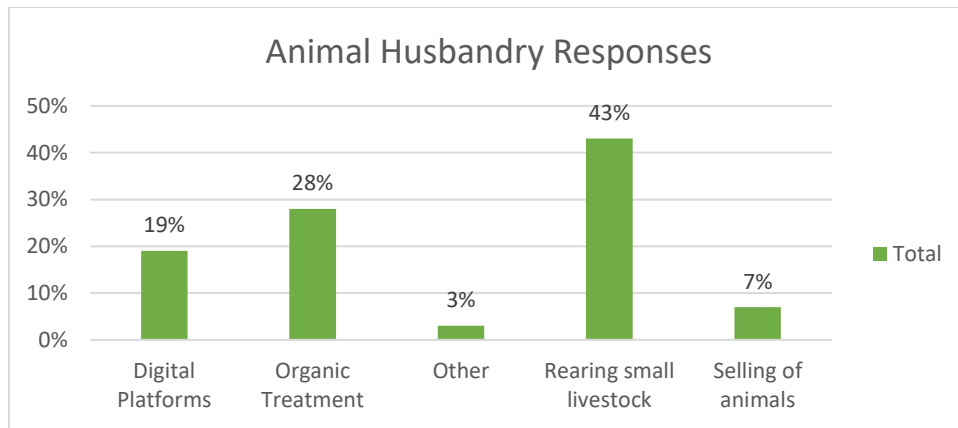


Figure 36: Animal husbandry responses to climate change

In terms of animal husbandry, the households across the three farms have used different ways to adapt to climate change in animal husbandry. Supporting this, Gukurume (2014) highlighted that animals have become a fall-back plan for most farmers in resettlement areas in Zimbabwe such that their rearing and welfare has been prioritized. As highlighted above, most of the households (43%) of the households have diversified to rearing small livestock whilst 28% of these now use organic treatment to heal climate change induced diseases in animals. Adding on to this 19% of the households now use digital platforms to get information to deal with animals and rearing tips whilst 7% have relied on selling animals when they hear of an outbreak coming or when they have the need for money. Nevertheless 3% of the participants explained that they use other means of rearing their animals in these times of climate change.

#### 7.3.2.1 Rearing of small livestock

Women have now ventured into animal husbandry as another livelihood options that these are now involved in. Of the 337 households under study, it was noted that 317 households had diversified into small livestock women with the remainder particularly having big and small livestock on their plots. In terms of herding of the livestock such as cattle, goats and sheep which has been one of the key roles of men on the farm has been shifted its role. The herding of cattle has now shifted as now the women are now also involved in the herding of cattle, goats, and sheep in the area. In line with this, Spiwe a participant from Ingwe-Gomo Farms noted that:

Now, I herd my cattle alone. My husband used to do it but now as he is now old, I now herd the cattle alone. In terms of goats and sheep I also take care of these. I now have vast experience with regards to goat, cattle and sheep rearing on this farm. Some other things if

you leave them to men you will die of hunger when the men are not available it's better for you as a woman to step in. (Interview with Spiwe, Pension Farm, 2022).

Another participant Esther from Amalinda Farm explained that:

I am now greatly involved in rearing my animals especially goats and sheep. I now taken them for dipping and am now very knowledgeable in terms of how to treat these if they fall sick. I took it upon myself that after the death of my husband I had to rise and be the man though I am a woman and I have stood up to the test. (Interview with Esther, Amalinda Farm, 2022)

Adding on to this, though household livestock upkeep was mainly for women men have now also ventured into poultry keeping as a way of coping with climate change. In the interviews conducted it was noted that small livestock such as ducks, chickens and geese that were normally on the upkeep of women have now also been taken up by men. Petros explained that:

In the 21<sup>st</sup> century there is now no division of labour as now roles are now uniform. As you can see, I assist my woman in these chores such as feeding the chickens and turkeys as I will be available at home. This helps as it keeps me busy and helps us as a family in generating income for our daily needs. (Interview with Petros, IngweGomo Farm, 2022)

In terms of responding to climate change, the farmers in the selected farms have also resorted to selling livestock for sustenance in climate change times. The selling of livestock was politicized so much at family level as assets such as livestock were believed to be the father's only (Scoones et al, 2011). As a result, most women and children wallowed in poverty as these did not have access to these assets for selling. However, this has been changed in the Post-Fast Track Resettlement Farms as the selling of livestock is now need based and anyone who leads the family can sell. Many women who were involved in the study explained that livestock now can be sold even by them if there is a basis for them to sell them.

In line with this Jane explained that:

At one moment when my child was severely sick, I had to sell a goat to take her to the hospital. When my husband came, he commended me for the good decision I had taken to save our daughter. Most men here in Amalinda re now like that as they now agree that women make decisions in crisis times. (Interview with Jane, Amalinda Farm, 2022).

Supporting this another participant Anna highlighted that:

As women chickens were believed to be our only livestock but this has now changed in the family set up. We now believe in co-ownership of assets with our husband and now plan together on what actions need to be taken. As a result, we are thus mostly successful as we fight together. (Anna, IngweGomo Farm, 2022).

Thus, because of this can be noted that, the patriarchal hold on assets has now been broken in most Post-Fast Track Resettlement Farms. This is clearly so because the decision-making power is now being shared between the men and the women thereby making these successful in responding to climate change as households in these farming communities. The breaking up of this patriarchal hold has been a crucial component in the development of women and their independence when it comes to being strong and resilient to climate change in Zimbabwe.

#### 7.3.2.2 Use of organic herbs

Buttressing this, in the in-depth interviews conducted it was noted that the use of organic herbs to treat livestock is another mechanism that has been used by women farmers in the selected Post-Fast Track Resettlement Farms to respond to the impact of climate change. The study discovered that in responding to climate change the natural resources in the area were key to solve some of the negative impacts of climate change on both human being and livestock. Supporting this, Masoga and Kaya (2011) explains that climate change responses in communities have been hinged also on their interaction with the environment such that solutions to some of the impacts are found in the vicinities of their communities. As was noted in the study to treat chickens and ducks of their diseases a key plant called *gavakava* is used by the people in the area.

In treating livestock diseases, the people in the area have opted that the environment is the one that can solve these diseases. Most participants (68%) explained that as the climate is changing, this has caused several diseases in animals such as sheep goats and cattle and poultry that are being kept across the three farms whilst 32% of these explained that these diseases are just erupting due to time. It was noted mostly because of high temperatures most animals are exposed to heat stress which is affecting their growth confirming what Mubaya and Ndebele-Murisa (2017) also unearthed in his study. Most participants explained that the deal with this by providing the animals with much water which has been added salt to help the animal rehydrate faster. Thus, in line with this it can be noted that most farmer use the locally available resources in responding to climate change in the area.



In dealing with cattle and goats, most women farmers explained that they do not have much money to buy veterinary vaccines to deal with diseases in our livestock. As result these have now opted to use locally available methods to take care of their animals. One of the key interventions used is mainly the use of natural herbs such as mahogany pods, *mutamba*<sup>7</sup> leaves and *mutova*<sup>8</sup> barks for treating various ailments such as abrasion, diarrhoea and other diseases that are affecting their livestock. Thus, the use of the ethno-veterinary medicines has been noted as one of key coping mechanisms that these farmers have adopted to cope with the impacts of climate change in their area.

### 7.3.3 Water innovations

As climate change has also affected the availability of underground water for agriculture, the women farmers in the selected Post-Fasttrack Farms have responded through deepening wells in the plots to have water for agriculture and home use. Of the 337 households across the three farms 157 of these have wells on their plots with the remaining having no water sources near them. In the studies carried out it was noted that most of the wells that were found in the area ranged from 8m-10 meters in the years 2000-2005 (Mutopo and Chiweshe, 2017). However, since then the communities have been depending these and now, they have gone as deep as between 12 meters to 20 meters on average. This has been so because with the changing temperatures, ground water table was fast moving downwards and as a result the response that the women famers took was to further deepen the wells for these to have water for domestic use and for commercial purposes such as farming and brick making to mention but a few.

Irrigation of crops was also adopted by women farmers because of climate change affecting the area (Chiweshe, 2023). As has been highlighted the rain fed agricultural activities in the area were greatly affected by climate change taking place in the area. As a response to this, irrigation schemes have been developed in the area to help these farmers to realize better yields particularly in Pension Farm and parts of Ingwe-Gomo Farm. As was noted in Pension farm and Gomo farms, the women farmers in these areas have been largely dependent on sewerage disposal through the makeshift river channels that they also channel into their farms. These have been very useful as it has managed to boost their crop yield through the years.

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<sup>7</sup> Mutamba (*Guazuma ulmifolia* Lam) is a tree that produces hard dry fruits that are known for their sweet taste. The fruits from the tree are sometimes used to prepare tee

<sup>8</sup> Mutova is a small evergreen tree that has a mushroom shape. Its leaves are used for the treatment of various diseases

In support of this Stacy; aged 33, explained that:

Though the climate is changing, we thank God so much because we have our irrigation systems here in Pension farm. We can produce our crops all year round using this sewerage water that further goes into Lake Chivero. As you can see, we have gardens with green mealies way before the season starts and we provide nearby towns with green vegetables and tomatoes. Though climate change in this area, we are lowly due to the cover we have of free irrigation water. (Interview with Stacy, Pension Farm, 2022).

In as much as irrigation is the way to go for the conditions in which many women are facing across the farming communities, the study noted that most of the women do not afford these farming innovations. Most of the women are married by men who are not going to work these cannot afford setting up irrigation mechanism same with the women who are widows and those that are divorced still do not afford to make have the irrigation on their plots which has affected production and their resilience to climate change in times of the droughts and lean seasons being experienced in the area.

#### 7.4 Off-Farm Climate change responses in the selected PFTRFs

In responding to climate change impacts happening in the area such as hunger, starvation and poverty emanating from droughts, heatwaves, cold waves, and other climate change manifestations women have now resorted to off farm responses to circumvent climate change impacts. According to Fisheries and FAO (2022) the off-farm income encompasses all non-agricultural -related activities that occur beyond the farm which are climate dependent. In this study the off-farm livelihood options are the defined as all activities that are done on the farm but without an agricultural bearing on them in a bid to become resilient to climate change. Hence women have adopted such means to be able fight the effects of climate change such as hunger, starvation and poverty that was now creeping in because of climate change.

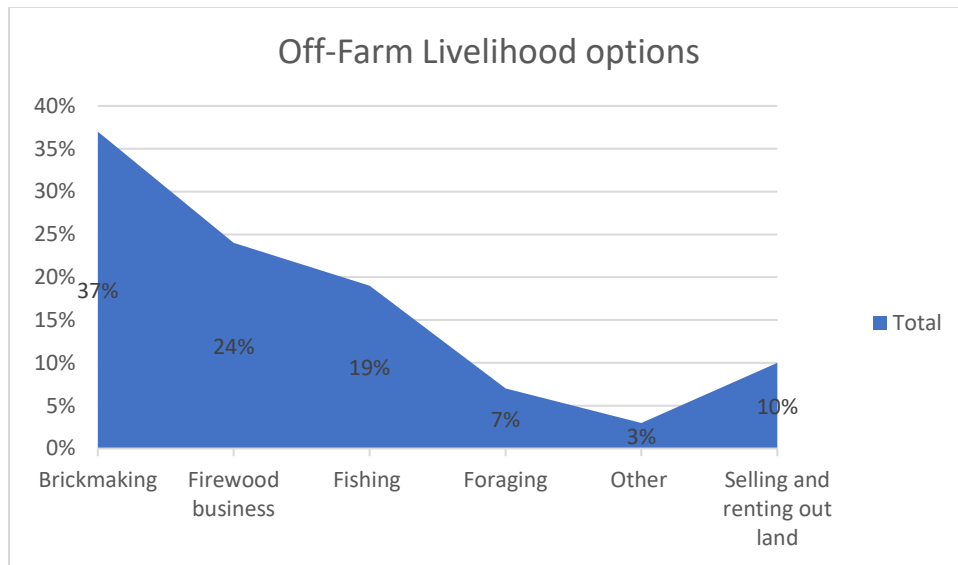


Figure 37: Women's Off-farm livelihood options in response to climate change

The women farmers across the three farms have adopted off-farm (ecologically based) livelihood options to respond to the effects of climate change such as droughts, heatwaves, and floods in their areas. As shown in the graph above, 37% of the households rely mostly on brick making whilst 24% of the households are into firewood business for coping with climate change. Adding on to this 19% of the households have relied on fishing whilst 10% of the households also sell and rent out land for survival amidst climatic changes happening in the area. Nevertheless 7% of the households are now also into foraging for fruits, tubers, and animals to cope with climatic changes whilst 3% of the households highlighted, they use other means such as grass cutting amongst other methods.

In line with this, in the interviews conducted most of the participants highlighted that their harmony with the environment was now saving them in times of droughts and floods in the farms in Zvimba East District. In an interview with the village head X, she explained that:

The farms in Zvimba East are endowed with various natural resources such as the water and wild forests which are the sources livelihood for many people living in the area. Most families thrive on the products that come from our environment though now the environment has been burdened more as people are now abusing it. (Interview with Village Head X, Amalinda Farm, 2022).

Hence, for most women farmers across the three farms, the ecology of the area has been the saviour for most of their families as it has emerged as the basis for survival. In substantiating this, this

section discusses in-depth the means and ways that have been adopted by farmers in the selected Post-Fasttrack Farms in Zvimba East District to cope with climate change in the ravaging the area.

#### 7.4.1 Brickmaking

Brick making has been turned to as one of the means and ways that the farmers in the area have used to cope with the lean seasons and drought as it is a source of income. The survey unearthed that about 80% of the households particularly in Amalinda farm whilst 20% of the highlighted that they have other livelihood options. Karuma et al., (2021) explained that brick making in Post-Fasttrack Farms has been discovered to be one of the key livelihood options during the off season and worse of in these times of climate change. As was discovered in the study brick main is most done in the period between April-October during the off season in the area. Most participants highlighted that brickmaking is mainly done to supplement their finances of the family to help in the paying of school fees, getting food, and getting money for the milling of their mealie meal. Brick making was noted to be done mainly in Amalinda Farm and parts of Ingwe-Gomo Farm where the anthills are most found. In the previous times it was mostly done by men but now also women and children are now in it is now being done by women also as means of supplementing income.

Anna a participant highlighted that:

I discovered that I needed to be involved in brickmaking as my husband after he sold his bricks would squander the money alone. Having seen this, I now joined hands with my sister in-law and discovered our anthill and started making bricks. Our biggest oven of bricks had 10000 bricks and we sold these for 350 USD as we charge 35 USD per 1000. This went a long way in helping us pay fees for our children and get groceries for our families. (Interview with Anna, Amalinda Farm, 2022).

In line with this it can be noted that the usually male dominant spaces are now being broken down and now being infiltrated by women due to the need to cope with climate change. In as much as there has been feminization of men, women on the farms have also become masculinized in nature. This is mainly so because these have gained the muscles financially and socially to challenge the largely male dominated spaces thereby helping most of these to cope with climate change. Supporting this argument Stacy explained that:

Acquisition of anthills in the area is highly competitive in nature and a bit political as men always want to dominate the natural environment that is for everyone. However, as women

we have formed teams that can challenge men and stand toe to toe if these try to violate our rights of also benefitting from the anthills in brickmaking. These usually wanted to dominate anthills near the waters but now we have marked our spaces also near the waters such that we are not duped by these men. (Interview with Stacy, Pension Farm, 2022).

From these sentiments it can be noted that systems of patriarchy that had been controlling the farming communities are now being challenged. Though patriarchy remains in brickmaking its grip has been weakened as women are now involved in these previously male dominated spaces (Mutopo and Chiweshe, 2017). The challenge of women of these authorities in the area discovered in the study clearly points out to the new era of post-patriarchy that is now being noted in the post-fast track farms in terms of controlling of resources. Hence climate change responses have also brought changes to the ecological governance of the area.

Nevertheless, though brickmaking can be noted to be one of the means and ways that farmers are using to cope with drought impacts in the area, the negative consequences of this act cannot be ignored. As was observed in the study in the transect walks, the brickmaking process was now affecting the environment greatly by living deep holes in the environment that would degenerate into gulleys. Marco a participant explained that *we are now losing of our livestock in these deep holes cum gulleys*. Hence as result in a such as the need to become climate change resilient is there, this is now being done at the expense of the environment in the Post-Fastrack Farms of Amalinda and Ingwe-Gomo.

#### 7.4.2 Fishing

Fishing was also noted to be one of the means that have been adopted by the communities in Ingwe-Gomo, Pension Farms and Amalinda Farm to cope with the lean seasons or droughts encountered across the farms by women. The study noted that mostly the males in these areas were the ones that are involved in fishing for survival, but women are now involved in fishing too. Of the households that were involved in the study 33% of these had women that are now involved in farming. As was observed most women from Pension farm practice simple fishing using fishing rods and simple nets in the Mangondo area which is the beginning of the Lake Chivero. These practice their fishing mostly after the rains have started when the water levels in the Mangondo area would have gone up. Unlike the women at Amalinda Farm and Ingwe Gomo farm, this practice fishing all the time using sophisticated nets that can catch up to 50kgs-200kgs of breams at one go in the Lake Chivero.

In support of this, most participants (Anna, Petros, Jesse and Esther) explained that fishing was one of the most lucrative livelihoods options in the area which is helping them to survive the scourges of droughts and floods in the area (Fisheries and FAO, 2022). These explained that fishing is very key in their revival to climate change as it gives them quick money and good returns which can help them, and their families survive. Others even highlighted that they bought ploughs, built houses, and paid school fees because of fishing from Lake Chivero. Supporting this, one participant explained that:

I was born and bred here at Amalinda Farm. I didn't do great in school but what I know is that I can fish very well. I can tell the area where the fish is by just checking the flow of water. This has been our livelihood, imagine getting between 60-120 USD per 50 kg of fish that you have. Sometimes if the ancestors are happy with us, we can come out of the Lake with 3-4 bags which is good money. (Interview with Feli, Amalinda Farm, 2022).

Adding on to this, Anna explained that:

Fishing is in our DNA, and we believe the Lake was created for us the natives of this area. In as much as there are seasons when catching fish such as summer which has many fish and winter which has very few fish, we have mastered these times and know the techniques to use to get much catch. Yes, Zim Parks as always, an issue with us as it calls us poachers, but we are just local people seeking a survival. (Interview with Anna, Amalinda, 2022).

From these sentiments it can be noted that the Lake Chivero has been a source of livelihood for women in the area. The Lake has sentimental value to these as it is also attached with religiosity with it being a blessing from the ancestors believed to cushion them from hardships such as poverty and climate change in the area. Hence fishing though it is a livelihood option for the people of the area, it is spiritualized as the catch is regarded as something that is coming from the great ancestor of the area who is Chivero.

As noted from the sentiments above, it was noted that also fishing though it is a livelihood option, the scale as to which it is done is depleting the environment as it can lead to the extinction of some of the types of fish in the Lake Chivero. However, this perspective is deemed highly political as the local people believe that it is their right to fish in the Lake Chivero without restrictions in the area. This is causing tensions between the local people and the area stewards such as EMA and Zimbabwe National Parks Rangers. Most participants view and feel that they have a right to the Lake as they are the local people, but authorities view these as poacher as these do not have

requisite papers needed to fish for commercial purposes which is the basis of conflict for these entities.

In line with this, Zim Parks ranger explained that:

We are always at loggerheads with the local people when it comes to fishing. Most of these prefer using nets but these do not have fisheries license such that we end up in conflict with them having now need to use minimal force to scare them. Others even now enter the Lake during the night using canoes which is very dangerous. (Interview with Zimparks Ranger, Chivero, 2022).

Though these are scared using rifles and rubber bullets they keep on getting into the Lake Chivero as they believe it's their basis of survival and ancestral right to catch fish in the Lake. As a result of this some even drown in the Lake and others may get bitten by crocodiles, but these keep getting into the Lake. The interpretation of any mishap that happen in the Lake is that the gods of the waters particularly Chivero will be angry with the one who has entered hence mishaps happen. Hence fishing is one of the key activities that have been noted to be used as the livelihood option in times of climate change.

The women of the area have become daring also to go for fishing in The Lake. Through the number of women as compared to men who go for fishing in the Lake is still small, in roads into fishing as livelihood options has been made. Supporting this, Mai Kevi explained that:

We cannot leave children to suffer due to hunger when we have the Lake here with us. What men can do we can also do as we have the same hands is what I told myself. Now I am into fishing using nets and can have a good catch as good as that of men and feed my family. (Interview with Mai Kevi, Pension Farm, 2022).

This clearly shows how the odd are changing in terms of the need to cope with climate change as male dominated spaces are being invaded by women as they seek to survive the scourge of climate change. However, some participants explained that though women are now involved in fishing in the Lake, these do not have the full experience of going to the deep end of Lake near the Spillway and most of them do their fishing during the day. Hence also amongst women on the farm also fishing has emerged as one of the mainly means of survival for most of the families in times of climate change.

Surviving the Lake Chivero environment was also noted to be one of the big issues that has made many women shun fishing as they say that it violated their femininity. Supporting this Musendo et

al., (2022) explained that mostly women prefer a livelihood option that says within the scope of their femininity and womanhood. This has not been so with the Lake as fishing in Lake Chivero has also several socio-cultural as well as legal binding rules. Some of the binding cultural phenomena that have been noted in the area include that must not enter the Lake during their menstrual cycle time, when breast feeding or after having sexual intercourse with men as it brings bad luck and bad omen to her team. For men one should not carry cigarettes but snuff, one should not enter the Lake after having sex with someone not their partner and should not use new clothes. These are socio-cultural codes that are used to navigate the Lake and the ancestors in it.

#### 7.4.3 Disengagement from agriculture

The women across the three farms have also disengaged from agriculture in a bid to cope with climatic changes happening in the area. Due to droughts and lean seasons that have hit the areas for long across the three farms some of the women have resorted to hiring out agricultural land, equipment and selling inputs and even land in a bid to cope with the climatic changes happening in the area. These have been taken aboard as the means and ways that are being used in by women to generate income that can be used to meet the day-to-day expenses such as food, school fees, clothes to mention but a few.

##### 7.4.3.1 Selling and renting out agricultural land

The value of land and ownership is something that has become so contested in the area and a gap that is exploited to cope with the ravages of climate change such as lean seasons, droughts, and floods across the three farms faced by women (Chiweshe and Bhatasara, 2019). As most of the primary landowners who were the fathers in the farms have died, the issue of the posterity of land and being help in high honour has become fluid in nature. Most of the land across the three farms has now been left in the hands of mothers or the firstborn sons that are now the custodians of the land. Due to climate change these now have resorted to selling of the land to earn a living in the times of climate change. In line with this; Musasa, a committee member in one of the farms explained that:

*Cases of plots being sold have been held with families demarcating these plots to other people. Some with close to 5 Ha have sold even 2 ha of these plots and being left with 3 ha only. These may lie to their village head citing that the person who has come is a relative who is part and parcel of the family and has the right to land. Normally when sold a hectare can go for 2500-5000 dollars. (Interview with Musasa, Ingwe-Gomo, 2022).*



Some of the wives and children of the deceased have opted to sell the plots to others by mutual consent with other family members and migrate to the urban areas. Selling of plots by mutual consent is done at family level but the buyers may be introduced in the area as relatives of the deceased again. Sometimes issues of corruption also emerge as the village leadership is given some money to ratify a sale of the plots by children of the deceased in the areas. This has been the cases mostly found out at Amalinda Farm and parts of Ingwe-Gomo Farm when it comes to land ownership in the area. Mutopo (2014) highlighted that with the founding generation of land reform programme passing on, the generation that has inherited this land from their fathers has not held land with now respect seeing most of these selling off the plots because of hunger and poverty. As a result, the area is now filled by some new people who were not the face of the FLTRP of 2000 or the children of those that were there at first.

Points of conflict now emerges in that in the offer letters of the plots and 99-year leases of the farms, they are clearly stated that the plots cannot be sold to someone else as it is state land, but the acts of selling are being done. The village head X explained that:

The acts of selling plots are not binding by law as all the land here is state land. The state owns the land through the Chief who is the custodian of the land of the state. Any act of selling of land in these farms is a violation of the law. I do not know how others do it but in some instances, we have banished about 3 families from this area due to this issue of selling land and their issues are still in the courts (Interview with, Village Head X, Amalinda Farm, 2022).

Though the selling of the land is not supported by law as noted in the Land Commission Act Chapter 20:29, but across the selected farms particularly in Amalinda this is happening. As noted above what pushes mostly the people in the area to sell land is the issue of poverty that is mainly coming because of droughts and lean seasons which have limited their capacities to produce on the farm. Thus, most of the families that end up selling state land which is violation of the law would have failed to produce on the farm such that what will be thinking on behalf of them is not their brains but the poverty that these would be facing.

However, others in the selected farms have resorted also to sub-letting and sub-leasing of the land they got from FLTRP as means to survive the scourge of climate change induced poverty in the area. Those with A2 farms Amalinda Farm and those A1 farms across the three farming areas have

resorted to renting out parts of their land to help them earn a living in the area. As was noted by Spiwe aged 34:

I saw that selling my plot my children would hate me for that. So, I devised a way that I would rent out 2 ha and I am left with one for subsistence farming. Per season I get about 200 USD from renting these 2 Ha which is something that is very helpful to me and my family as we are getting money for food and payment of fees (Interview with Spiwe, Amalinda Farm, 2022).

Tito; aged 36, explained that:

People here in Zvimba East normally rent out their land to those that are staying in close by locations areas such as CABS, Budiro, Glen View, Westgate, Mufakose, Westlea etc. The rentals are usually between 70-120 dollars per season only a ha depending on how one has negotiated with the clients. Renting out land is seen as one of the keyways that are used to raise extra income for the family in times of climate change. (Interview with Tito, Ingwe-Gomo Farm, 2022).

The renting out of land though not permissible by law in Zimbabwe is happening in Zvimba East District farms. Most people from close locations are now interested in farming hence seeking out small pieces of land to do projects and conduct farming to diversify their income. As now the people in the area do not have much capital to embark on climate smart agriculture in the area, most of these have resorted to renting out land to get quick money to provide food for their families. Thus, climate change has pushed these men and women into trying to resort to quick fixes when it comes to trying and solve and adapt to the impact of climate change in the area.

With the changing climate in the area, it has called also for the change in farming equipment or tools that are needed on the farm (Chadambuka and Heliker, 2022). Though this change is very much needed in the various farms that have been under study it has been noted that these farms still use tools that are still way behind as compared to modern farms. As was noted in the study, though the government has rolled out farm mechanization programs mostly government ministers and top wig ZANU PF party members benefit more from such initiatives. For the ordinary A1 farmers in Zvimba East District nothing gets to them. The women farmers still use hoes and ox drawn ploughs for farming in the 21<sup>st</sup> century. The tractors that are on the farm are owned by one A2 farmer who charge exorbitant prices such as US60 per hectare for him to cultivate the land. As a result, the farmers have been greatly left out in terms of infrastructure which has affected their farming endeavours on the farms.

The researcher observed that the water infrastructure in parts of Ingwe-Gomo and Amalinda farm is very poor. Particularly in Amalinda Farm, the whole community has one borehole that services the whole community. The other source of water is that which is found in the former compound where community taps were installed by the former white farmer Peter Hard. These farms have no adequate water sources that can help production in the times of climate change which has seen these being affected poverty and hunger as they cannot adequately respond to climate change. Both men and women are seen to have been heavily affected by climate change as they do not have resources to have boreholes drilled on their plots. Due to this, some of the farmers in Gomo area have resorted to riverine farming as they grow their crops along the riverbed of Marimba River which is a disaster in the environment.

In as much as Ingwe-Gomo and Pension farm have some irrigation canals near them, the canals are mostly for the City of Harare paddocks that they have improvised to flow to their gardens. Though these canals flow to their gardens, the flow is limited too as the sources of water which are sewerage dams are also affected by very high temperatures such that they can go low in terms of capacity and cannot flow to the gardens for the farmers. Not only is the problem but also the canals are now old such that they may lose water along the way which is something affecting the farmers. Thus, for these farmers both males and females to become much more resilient to climate change there is need for systems that can help them to become more resilient through having good water infrastructure.

#### 7.4.3.2 Hiring out agricultural assets

Women who lead households with various agricultural assets have started building their resilience to climate change using these in Post-Fastrack Farms. In Amalinda Farm, most (69%) of the participants in the survey explained that hiring out of agricultural assets has proved handy to most farmers that are found in the area. Assets that are mostly hired out include cattle, cattle ploughs and even hoes that are used in agricultural practices. The hiring of these assets is meant to cushion the households hiring out these assets in climate change times thereby helping these to build their resilience to climate change. In line with this in an interview Shelila from Amalinda Farm, she explained that:

Cattle and ploughs are mostly hired out during the farming seasons. These are hired out to plough and till the land in the area. They are also hired out for use in weeding the fields. The amounts that are normally charged for a half a hectare are \$30 for the portion whilst

the for a hectare \$40-60 dollars is charged. These ways have been used by those with assets to make sure that they have extra income to deal with ravages of climate change in their household. (Interview with Sheila, Amalinda Farm, 2022).

Muzari et al., (2012) highlighted that assets have proven to be very handy in climate change management for Post-Fasttrack Farms as these are fall back plans for these communities. Assets such as ploughs, cattle, and even tractors have been hired out to the farmers thereby generating income for the households that would be hiring out the assets. As some of the women are sceptical now about rainfed agriculture every season hence they opt for hiring out their agricultural assets to others who will be funding In Amalinda Farm and Pension farm the farmers with tractors have also used these for income generation through hiring them out. Petros a farmer explained that:

Through hiring out my tractor for the season, I have been able to pay school fees for my two children who are at a boarding school. Normally my tractor can service the whole Amalinda Plots and part of Ingwe-Gomo which combined can be close to 500 ha of land. Imagine charging only 30 USD a hectare how much would I have gained. So, this is the money that can help me in lean seasons that we may experience in this area. (Interview with Petros, Ingwe-Gomo Farm, 2022).

The women farmers have been so innovative to use what they must cope with the climatic changes that are happening in the area. The hiring out of agricultural assets has proved to be a key building block for resilience to the farming households with assets that can be hired out across the three farms. Bhatasara and Nyamwanza (2018) explained that hiring out of agricultural assets has proved to be a sustainable fall-back plan for farmers in most resettled areas though these have been largely dependent on the climatic patterns that are being experienced in the area. The hiring out of agricultural assets is not done daily but is done during the season when farmers will be out in full scale for farming when this process is hindered through climate change then it is very difficult for assets to be hired out.

#### 7.4.4 Collection of fruits and vegetables (Foraging)

The women inhabitants of the three farms in Zvimba East District have also turned to foraging as a survival antique against droughts and leans seasons that have been experienced across the three farms. As was noted in the study, there are times when the Lake water levels go down such that also the fish will be hard to catch normally between May-August. Not only will this be the case but also some of the reserves would have also been finished around the period of June-December as was noted in the study, it is during such times that foraging for wild fruits and vegetables in the

area becomes handy in Zvimba East district for most of the families living below the poverty datum line as it helps to cushion the families against hunger and starvation. In line with this Sheila aged 56 highlighted that:

There were times this area has been hit by serious droughts for example in the year 2002, 2012 and 2015. We used now to rely on wild fruits known as *matamba* and *chakata* for survival. The *chakata* pears we would dry them and crush them for the nut inside that we would further crush for oil. (Interview with Sheila Amalinda Farm, 2022).

In support of this, one participant explained that:

Not only did we forage in droughts only, but even right now with the change of weather patterns and lack of adequate rains we still do look for natural products to keep us going. Relish is hard to come by in this farm most around June-December, instead of buying vegetables as we would not have money, we can look for blackjack (*mutisine*), river weed (Kasunika) and wild okra which becomes our relish. (Interview with Spiwe, Amalinda Farm, 2022).

Due to this, the farmers in Zvimba East also rely on the environment in terms of provision of food during times of climate change induced drought crisis in the area. As was noted Mashizha et al., (2020) the relationship between the environment and the people inhabiting it is mutual in nature as the environment depends on people for its sustainability whilst the people depend on the environment for their sustenance. This has been the case across the three farms as they depend on foraging on the natural environment for their survival in the crisis times.

During the rainy season, it was noted that the farmers also tend on to look for the other types of natural features of the environment such as mushroom for relish. Most participants in the study explained that the area in which three farms are located is strategic as in each season, there is a natural fruit or vegetable that can be found in the area whilst also mushroom grown during the rainy season. This helps them in diversifying their diet and helping them to be strong. In line with this Jane highlighted that:

The type of mushroom that is seen in this include *nhedzi*<sup>9</sup>, *nhemayakanda*<sup>10</sup>, and *tsvuketsvuke* all named<sup>11</sup> based on its colour. Normally we get these for relish, and some

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<sup>9</sup> Nhedzi a whitish and brown coloured mushroom

<sup>10</sup> Nhemayakanda a cream-brownish mushroom

<sup>11</sup> Tsvukestuvke a red in colour type mushroom

have now gone to get these for income as they sell the mushroom in surrounding areas of Budiro and Glen View. (Interview with Jane, Amalinda Farm, 2022).

So the mushroom has gone from being something that can be consumed by farm households only but has become something key for income generation. The women and their families are using the mushroom as a basis for their income generation by selling these to surrounding areas. As a result, the environment is now being used as basis for saving the families from poverty and hunger through not only provisioning for food only but also being part of the income generation circle of people in the selected Post-Fast Track Resettlement Farms in Zvimba East District.

In terms of foraging, not only were the communities foraging for vegetables and fruits, but animals were also foraged for through hunting. In the FGDs conducted it was noted that most men and boys in the areas during the Spring would go for hunting around the hills of Gomo and Mangondo areas across these three farms. In as much as the big animals such as bucks are now hard to find due to how the environment has been depleted, small animals such as hares, rock rabbits and warthogs are still found in the area. Thus, hunting groups exist in the area where the men pull up their dogs for a group hunt. In line with this Malvin explains that:

Group hunting is one of the activities that we engage in to get meat when things are low in the Lake and the farm. Though sometimes EMA and National Parks are against that, we as a community we feel the environment is ours and we go for hunting. We hunt for meat mostly and sometimes we sell the game meat to other farmers in the area. (Interview with Malvin, Pension Farm, 2022).

In as much as hunting was done for leisure, with climate change it has now emerged as a livelihood option across the three farms in Zvimba East District. Through hunting the farmers can now get meat which diversifies their diet and income that can help them navigate the challenges that climate change has posed on most of them on the farm. However, it has been noted that because of hunting there has been a depletion of wild animals in the area whilst some are even no longer found in the area. IPCC (2014) highlights the entitlement of all people living in the vicinity of game parks to hunting has led to the depletion of animals whilst some are even also becoming extinct in some areas. This has been the case with farm in the Zvimba East District as most of the people take their entitlement far to the extent of abusing the environment and the animals that are found in the areas in their vicinity which is something not good.

Foraging has also gone to the extent of foraging for medicines in the area to be able to cope with climate change. Climate change has taken a toll on the health of both livestock, plants, and the people in the area. Most of the participants in the FGDs conducted highlighted that diseases such as hypertension, diarrhoea, typhoid, heat stress and headaches were now emerging in the area because of the change in climate and temperatures found in the areas. Due to this, the people across the three farms have now tended to depend on their environment for their healing and wellbeing in terms of health. In an interview with a traditional healer in the area highlighted that:

As the people on the farm, we are one with environment. Our ancestors gave us the environment as an inheritance. We should take care of the environment whilst it should take care of us. With the changing weather many people on the farms are falling sick. However, we thank God and our ancestors that we have the medicines for some of the ailments here. With the elderly people in this community, we are now even training our young people to get medicines and know them especially those found on this farm. (Interview with Traditional Healer, Amalinda Farm, 2022).

In line with this, it can be noted that the farms have become pharmaceutical in nature as these are now sources of medicines for the communities. An interesting discovery that was noted in the study was that unlike in prior times when people shunned traditional medicines, the populations on the farm are very much knowledgeable of the different medicinal plants that help them fight various diseases and ailments. In the FGDs conducted it was noted that some of the basic medicinal plants foraged for in the area include *gavakava*<sup>12</sup> which treats constipation and diarrhoea, *mutsamvi*<sup>13</sup> which treats bilharzia, *chifumuro*<sup>14</sup> which deals with stomach upsets and *mupfura* which deals with sore eyes amongst other climate related illnesses in the area. Buttressing this argument Makhubele et al., (2016) explained that through IKS it can be noted that the individuals in the community are one with the nature around them as they use it to sustain themselves. Thus, it can be noted the change of climate has also made more people on the farm to be aware of medicinal herbs found on the farm to help fight climate related sicknesses that are being noted on the farms.

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<sup>12</sup> Gavakava is an indigenous herb used to treat infections and other ailments

<sup>13</sup> Mutsamvi is an indigenous fig tree that has medicinal properties

<sup>14</sup> Chifumuro is an indigenous herb used for treatment of various sicknesses

#### 7.4.5 Handcrafts (Basketry weaving pottery)

Handcrafts have been seen to be one of the ways that have been used to adapt and respond to climate change in these three Post-Fasttrack Farms in Zvimba East District. The hand crafts have been seen to be alternatives in income generation which help to give women leverage in terms of income for buying basic goods and necessities in times of lean seasons, flooding, and droughts across the three farms (Karuma et al.,2021). In the selected Post-Fasttrack Farms, it was noted that both women are now into weaving basketry and pottery as a livelihood in which they sell these into nearby towns such as Budiriro whilst others go as far as Mbare to sell their wares. As was noted in the FGDs that were conducted in the study, Ingwe-Gomo farm women are into weaving and basketry in these areas. The women are mostly into weaving of small mats and basketry of vases and other baskets which are used to earn remuneration. The men have taken this up also as they are now into weaving of chairs and big mats for resale. Substantiating this Jane explained that:

Weaving and basketry has now become our life. We normally use the reeds from the shores of Marimba River and Mangondo area. When it is very dry sometimes, we buy our reeds from Mbare Musika that we use for weaving and basketry. Normally we charge 3-7usd per basket depending on the size and 7usd-10usd per mat depending on size. (Interview with Jane, Ingwe-Gomo, 2022).

Survival has become the mode in which the farmers in the selected PFTRFs women farmers have put themselves in such that the gendered dynamics of society and work are being broken. Formally weaving and basketry were for women but now the areas such as these men are now venturing into them. In an interview with Makamure from Amalinda Farm indicated that:

With how dry the weather and climate has been the issue is no longer about being a man or a woman but is now the ability to survive the scourges of whatever one will be facing. I am now into weaving and basketry as our economy is so dry and tough, so have decided to use the available resources to help my family to survive the scourges of climate change. When it is off seasons weaving and basketry helps us to get on along financially as it brings some extra income to our household. (Interview with Makamure, Amalinda, Fieldwork 2022).

Nevertheless, in as much as weaving and basketry has been found to be a solution to the ravages of climate change, the trade is not spared as sometimes there is shortage of reeds in the area due erratic rains being received in the area. The trade of weaving and basketry is also rain dependent such that climate change has affected how it is being run in communities such as the selected Post-



Fast Track Resettlement Farms. Mazwi et al., (2020) explains that rainfed and dependent livelihood options have been greatly ravaged by climatic changes that are happening in Zimbabwe leading to the decrease in per capita production in these sectors. This has been the case in weaving and basketry as the weavers and basketweavers must seek alternatives of buying reeds from Mbare as highlighted in the FGDs conducted and most of the interviews done.

#### 7.4.6 Firewood business

Massive deforestation has been noted across the three farms under study which has been justified by the inhabitants of the farm as their solution out of poverty, hunger and starvation through the firewood selling business. During the off seasons, most of the households that are found in the area engage in selling firewood to nearby locations such as Budiro, Mufakose, CABS consortium and Glen View to mention but a few. Musendo et al., (2022) explains that mostly resettled farmers in Zimbabwe have been living off their environment in most farms as these thrive on exploiting their environment through firewood selling, sand mining and other on farm practices that are deemed as alternatives for climate change in their area. This has been the case with the Post-Fast Track Farms in Zvimba East District in Zimbabwe.

Through the transect walks and observations carried out, it was noted that most of the area trees that were found in the area has been heavily cut. Stumps were found to be in the area, with most of the areas soil becoming sand and some being washed down into Marimba River for Ingwe Gomo farm and some of the soil into Chivero River for Amalinda Farm. This has been because of how trees have been heavily cut down in the area as the households in the area seek to earn a living through these acts of poorly adapting to climate change in the Post-Fast Track Resettlement Farms. In line with this one participant explained that:

As you can see, people in these farms are heavily dependent on rain-fed crop cultivation but due to climate change, deforestation has crept in. Most of the trees on this farm (Amalinda) have been cut down. Despite the efforts to conserve the environment by Harare Municipality, EMA and Zimparks the practice is ongoing. A bundle of firewood costs about 3-5 USD and people see this as enough to see them through the day. (Interview with James, Amalinda Farm, 2022).

Firewood business has been seen as a quick alternative to the scourges of climate change as it brings quick returns to the households in Post-Fast Track Resettlement Farms. In the FGDs conducted, most participants from various households explained that firewood business is one of

the keyways that these have been using to get quick income to cover some daily necessities in times of crisis. Some of the participants explained that the money is mainly used to cover weekly extra lessons money for their children, buying food stuffs and setting medicinal supplies for their families. In as much as firewood business is not deemed as the core provision of income, its role is the supplementation of the family income daily or for shortages in the family though for some households it has become the core business. Scoones et al., (2010) highlights that massive deforestation has been on going in post Fast Track Resettlement Farms as selling of firewood is now deemed as one of the income streams in households.

Supporting this one participant explained that:

Normally we sell firewood to supplement our income for the households on this farm. Our monthly income from other ventures is not adequate so we sell firewood to be able to buy relish, food, meet day to day costs for the households and other pressing needs. However, as some households are female headed and some males have lost their jobs, firewood selling has been seen as primary source of income as this sell firewood daily to raise funds for school fees and other pressing needs for the family. (Interview with Spiwe, Amalinda Farm, 2022).

The selling of firewood has been noted as one of the streams that help households cope with the ravages of climate change in the selected Post-Fasttrack Farms as it adds to the streams of income for the households (Karuma et al., 2021). In as much as this adds to the streams of income for the households there are some risks that these household members must take to get the income. Constant altercations between EMA, Zim parks and the Harare Municipality have been noted as one of the risks that these farmers must negotiate which has led many of the farmers to walk for long distances as early as 300am to by-pass the roadblocks by these bylaw enforcing agents. In line with this Jesse, Amalinda participant explained that:

We walk for about 8-15km to reach a selling point of our firewood. Normally we go through the Marimba River banks which is very muddy to avoid being caught by law enforcement agents. We go through the Ingwe-Gomo fence and skip into Budiro. In Budiro we walk around carrying our loads till we find customers for the firewood. In farms such as Amalinda where trees are now few, people cross Lake Chivero by boats to go to Black Farm to go and fetch firewood which is risky as sometimes canoes may capsize with loads or if chased by Zim parks speed boats you may lose control of the canoe. (Interview with Jesse, Amalinda Farm, 2022).

#### 7.4.7 Socio-cultural initiatives and responses to climate change

Socio-cultural context of the farming communities in different nations has been used also as weapon both to fight and defend women's households against climate change in the global south around the world. As climate change affects societies holistically with all social, economic, political, technological, and environmental facets of communities under threat, societies have also used these to fight the climatic change impacts. Different socio-cultural initiatives have been used to adapt to climate change and build resilience to climate change in Post-Fast Track Resettlement Farms that have been selected for this study. In adapting to climate change in Post-Fast Track Farms and building resilience in the area, most of the farmers have also used socio-cultural initiatives to build their resilience to climate change.

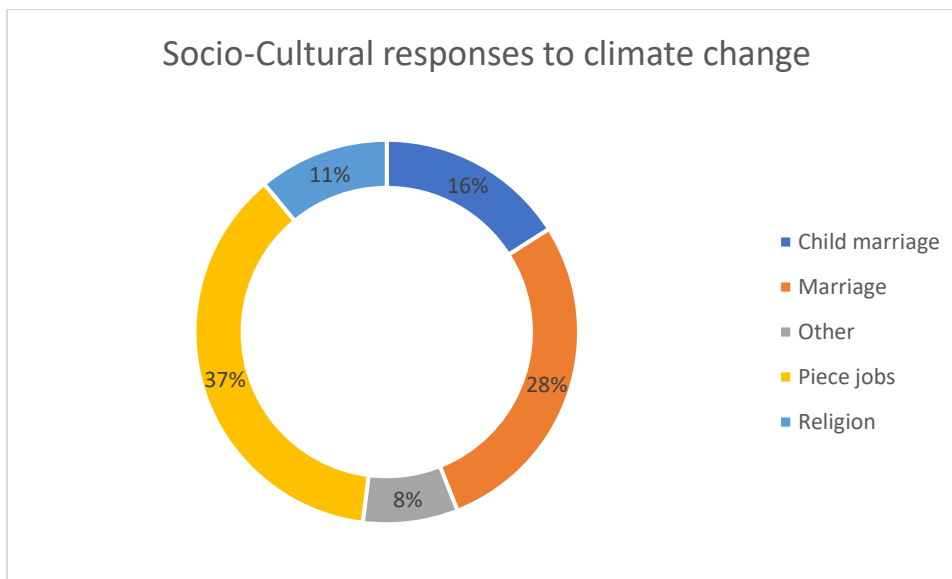


Figure 7.5: Women's socio-cultural responses to climate change

The households across the three farms under study have also been using various socio-cultural innovations to cope with the ravages of climate change in the area. Thebe (2011) explains that as climate change is affecting all forms of life in Zimbabwe holistic in nature as all sectors of life in societies are now tailor making their initiatives to respond to the demands of climatic changes in their communities. As shown in the doughnut chart above, the response to it has now become most households (37%) rely on piece jobs to cope with climate change impacts whilst 28% have resorted to marriage as a coping means to climate change. 16% of the households were noted to be also using child marriages as a coping mechanism whilst 11% have now resorted to the use of religion

as a coping mechanism. However, 8% of the participants explained that households now rely on other means such as savings clubs amongst other means.

#### 7.4.7.1 Religion as a form of livelihood

Religion is also another firm livelihood that has been used to build resilience to climate change in the Post-Fastrack Farms in Zvimba East District. In the farms under study one of the most prevalent and dominant religion is Christianity with African Indigenous churches being the key churches that are more widespread in these farming churches. Both African Traditional Religion and Christianity have been used to cope with the climate change manifestations such as the lean seasons, droughts, and floods (Thebe, 2018) that have been occurring across the three farms. Most of the participants explained that the Christians most do the all-night prayers for rain at their churches and their shrines if they are the apostolic sects. However, the A.T.R mostly do the rain making ceremonies that are done by the Lake Chivero particularly on the guva raChivero island (Grave of Chivero Island). In explaining this the village head X explained that:

In times of natural disasters such as droughts and lean seasons we normally plead with our ancestors to give us rain and save us from hunger and starvation. What we do is a ritual for rain making which we do in crisis times at the guva raChivero Island on the Lake. As we believe Chivero is the one that controls the climate and bumper harvests for us. When we do these rains normally come and droughts recedes (Village Head X Interview, Amalinda, 2022).

Nevertheless, besides leading in rituals for rains, it has also been noted that religion on its own has become a livelihood for some of the women farmers in the study. In the interviews carried out, it was noted that forming churches was now a livelihood option for most of the people in the Post-Fastrack Farms in Zvimba East District. In line with this Madzimai Genario participant explained that:

I am a prophetess of an apostolic church. This is where my bread and butter and school fees for my children come from. The people I help bring food, pay fees, and bring clothes for me and my family. Even the livestock you see here they come from the people I help who would be appreciating my God given gift (Madzimai Genario, Ingwe-Gomo Farm, 2022).

Not only is this being done in apostolic churches only, but this is now also being done in traditional religions. Some of the traditional healers highlighted that they received gifts from their clients as appreciation for their work. The basis of their survival and coping mechanisms to climate change

is hinged on the people that these people will be serving who bring various gifts as appreciation to the work that would have been done by the healer. In line with this another traditional healer that was interviewed explained that:

Yes, climatic changes are there in this area but as the healer of the area I hardly experience them as my clients provide for me and my family. As I am given to the ancestors for the community and people, my family is given to them so that they take care of them which is something they are doing so well. I do not charge for my services, but people bring livestock, clothes and food for myself and family as appreciation (Interview with Traditional Healer, Amalinda Farm, 2022).

Nevertheless, not only has religion been used as transactional in coping with climatic changes but religion has been used as a pacifier of climatic shocks and stresses in PFTRFs which has helped communities in coping with climatic changes in the area. The religious leaders have been critical in bringing hope to the people about rain and good harvests which has helped households to keep on conducting farming in the area with the hope of good rain and bumper harvests as promised by the religious leaders of the area. Scoones and Chaumba (2014) explained that though we are living in a postmodern society, theological explanations of the events such as climate change have been critical in keeping composure in communities when faced with threats of it thereby helping in developing resilience to climate change in the mind. Madzimai Mety a religious leader explained that:

One of our key roles is to help society to trust in God and for it to know that God holds the destinies of nations and even rain. Through our words and prayers for community society has hope for rains and good bumper harvests which helps them to prepare their fields in eager anticipation of rain. Sometimes we pray and do rituals for rain which coincides with the coming of rains which further boosts their reliance on religion and God for rain (Interview with Madzimai Mety, Amalinda Farm 2022).

Hence as religion builds a deeper belief and anticipation for positivity about the climate, it can be noted that it is big pillar that helps greatly in building resilience to climate change. Resilience to climate change starts in the mind and translates to the behaviours of people. Thus, as what was noted in the study, religion has been key in helping and preparing people to act and behave in manner that enables them to bounce back after climate change stresses and shocks in the area which is very key and handy in communities.

#### 7.4.7.2 Marriage as livelihood option (Polygamy and Child marriages, Divorce)

The other mechanism that has been adopted by households across the three farms in Zvimba East is the use of marriage as a mechanism to cope with climatic changes happening in the area. Different forms of marriages have been observed to be taking place in Amalinda, Ingwe-Gomo and Pension farms not borne out of love but borne out of the need to survive the different scourges of climate change being faced in the farms. Child marriages were observed as one of the means and ways that have been adopted by the different families that are found across these different farms in Zvimba East District in Zimbabwe. In an interview with the village head X, she explained that:

Most parents are now marrying off their young children to families of wealthy and food secure households in the farms. Women train their girl children to shine in front of boys from wealthy families. Some even approach the food secure families with their children to marry them. Children as young as 14-17 years old are married off in exchange for food and other goodies in times of drought mostly amongst the people from Malawi and apostolic sects (Interview with, Village head X, Amalinda Farm, 2022).

The drive to push the children into marriages is not coming from love but from the need to survive. McLeod et al., (2019) explained that the impacts of climate change is now pushing for the growth of child marriages in many farming towns across the world particularly in the developing countries. This has been the case across the three farms understudy where mostly children between 14-17 are married off to older men found in the area as was observed in the study. Some of the children explained that sometimes there is no other option to have as they would have dropped out of school and marriage is seen as the best possible way out of poverty for them and their families. Some participants explained that the OVCs children are also pushed into marriage through by the difficult conditions they face and mostly females sacrifice themselves to take care of their young siblings in times of droughts in the area.

Another form of marriages that was noted in the study was that of polygamy. Mostly the children that would have been married off when young are plunged into polygamous marriages. These come in as the second, third or fourth wives to mention but a few. Amidst the apostolic sects such as Johanne Masowe and Marange found in the area, the children are married off and can become 6<sup>th</sup> or 7<sup>th</sup> wives in the set up. The main issues would be to be called out by the name of the family and to be part and parcel of the unions of polygamy for the sack of their families. In an interview with Stacy a participant explained that:

Sometimes you would want to be married but you have no option. Seeing your family suffer is difficult whilst marriage is a way out. Mostly if you are married into a good family like where I am which can provide for you and your family its fine. I am happily married and have co-sisters who are my sister-wives in this union, and we are happy as our families are well taken care of (Interview with Stacy, Pension Farm, 2022).

Marriage thus has been seen as one the ways that has been used to help families survive the scourges of lean seasons and droughts. In as much as these were already existing in most communities it has been noted that the frequency has been increased due to the climatic changes that are happening in communities particularly the farming communities such as Post-Fasttrack Farms. As Dube et al., (2018) notes there have been an increase in polygamous marriages in postattack farms as these have been normalized due to the climatic change impacts such as droughts which are pushing women into unions of convenience for their survival and particularly that of their families.

#### 7.5 Level of socio-ecological resilience of the livelihood options taken

Based on the means and ways that women have taken upon themselves to help them cope with climate change in PFTFs, the level of socio-ecological resilience of these innovations is thus assessed in this section. As social-ecological resilience is the capacity to adapt or transform in the face of change in social-ecological systems, particularly unexpected change, in ways that continue to support human well- being (Dube et al., 2020), the adopted means and ways that women have taken aboard to cope with climate change have to be measured to see how environmentally friendly these means and ways are. The measuring of these means and ways that have been done based on the mini survey conducted particularly based on the ratings of the key informants that have been included in this study who understand mainly the implications of different livelihoods on socio-ecological resilience.

##### 7.5.1 On Farm livelihood resilience level

The on-farm livelihood resilience was measured based on the analysis of all on farm livelihood options that women have been using to cope with climate change across the three farms. The resilience levels were measured based on the ability of the community to bounce back and become climate proofed against impacts of climate change with little damage on the environment and the way of living of the people in the community.

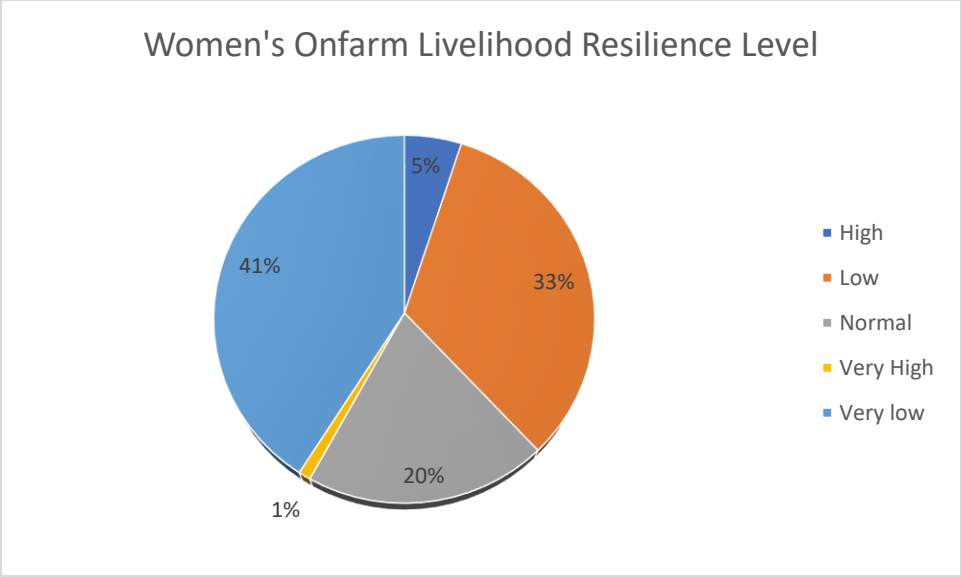


Figure 38: Women's on-farm livelihoods resilience level

In terms of the on-farm livelihood options that have been adopted by women, it was noted that most of the means and ways adopted are not environmentally friendly and ecologically sustainable. As highlighted in the pie chart above, about 74% of the participants highlighted that the women's on-farm livelihoods are low or very low implying that these are not socio-ecologically resilient enough to help them cope with climate change whilst 26% of the participants highlighted that the livelihood options are normal or high when it comes to being socio-ecologically resilient. This thus highlights that most of the means and ways that have been adopted by the women such as early planting, conservation farming and deepening of the soils are not that sustainable.

Adding on to this, in as much as 'Pfumvudza' has been largely successful in most parts of Zimbabwe the level of continuity of the project is low as it is labour intensive (Mujere, 2022). Most of the women explained that the means and ways that have been used to do 'Pfumvudza' as it is labour intensive which end up affecting their wellbeing as if one can do that in one season, they cannot do it another. Adding on to this, the issues of anthill farming end up creating gully on the anthills they by ending affecting the environment which needs also to be looked a redesigned for it to be sustainable.

In as much as deepening the wells is being done it was noted that this has also been affecting the black of women. This is mainly so because the deeper the wells the more likely the women are to strain their back muscles in fetching water as the bear and bore the burden of fetching water in the



communities. Nevertheless, as has been highlighted above, it was noted that in as much as women are now also into rearing small animals which is a bit sustainable the issues of having viable markets for these has been.

#### 7.5.2 Women's Off farm livelihood resilience level

The women's off-farm livelihood resilience was measured based on the analysis of all on farm livelihood options that women have been using to cope with climate change across the three farms. The resilience levels are measured based on the ability of the community to bounce back and become climate proofed against impacts of climate change with little damage on the environment and the way of living of the people in the community.

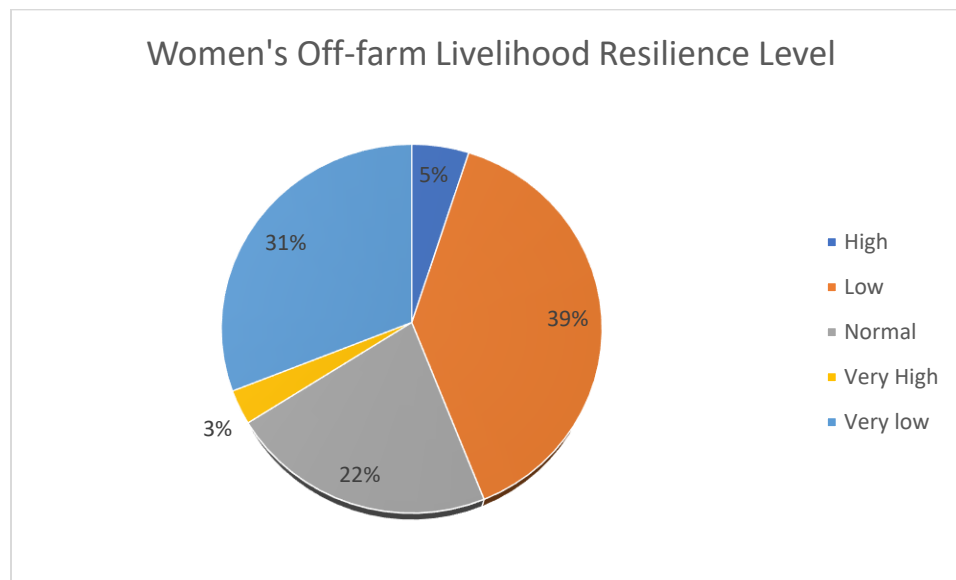


Figure 39: Women's Off-farm livelihood resilience level

The socio-ecological resilience of women off farm livelihood options in the selected Post-Fastrack Farms remains highly unsustainable. Based on the survey, 70% of the participants highlighted that the women's off-farm livelihood resilience levels were either low or very low whilst 22% explained that the level of resilience was normal whilst 8% of these explained that it was high to very high. Hence as was noted in the study, most of the off-farm livelihood methods used to survive the scourges of climate change in the Post-Fast Track Resettlement Farms in the selected farms are not very much environmentally friendly in Zimbabwe. Most of these means and ways instead of preserving the environment they are damaging the environment which is a deep call of concern for the authorities (Folke, 2006).

Brick making that the women are into is damaging the environment greatly as it is demolishing geographical features of the farms such as anthills, trees and grass found in the farms. The process of brick making which is usually done during the off season and mostly in times of lean seasons and droughts has led to massive deforestation across the three farms particularly in Amalinda Farm in Zimbabwe. According to Bhatasara and Nyamwanza (2018), as most women farmers are not sustainably equipped to become resilient to climate change most of these have resorted to maladaptation practices which are further worsening environmental state in Post-Fast Track Resettlement Farms. Not only is deforestation happening but also heavy gullies are being formed on anthills which are detrimental to the environment whilst also in the process of roasting the bricks after they have been made heavy carbon dioxide gases are emitted into the atmosphere which is another call of concern for the authorities and communities. Thus, instead of reducing climate change the communities are leading to climatic changes in the area through their human activities.

Although, fishing is a livelihood options adopted by women, how it is done is highly unsustainable hence making it not socio-ecologically resilient. Through the human activities of poaching of fish which also some women are now involved in the ecological resilience of the livelihoods adopted becomes questionable. As was noted in the study, there has been increased loss of biodiversity in the aquaculture across the three farms through the poaching activities that are going on. EMA officers and ZNP officers concurred that the different kinds of fish that used to exist in the Lake and amount of these that were found in the Lake has increased overtime greatly because of poaching that has been happening in the area. Due to these activities, there has also been increased human wildlife conflicts between these and crocodiles found in the Lake (Mhlanga, et al, 2014). As was unearthed in the study cases of women being bitten by crocodiles have been also reported in the area. Thus, from these it can be noted that the socio-ecological reliance of these livelihoods is very questionable as the sustainability of the livelihoods of women in these farms in Zimbabwe as these livelihoods of women are not something to guarantee the future on.

### 7.5.3 Non-Farm livelihood options resilience level

The on-farm livelihood resilience was measured based on the analysis of all on farm livelihood options that women have been using to cope with climate change across the three farms. The resilience levels are measured based on the ability of the community to bounce back and become

climate proofed against impacts of climate change with little damage on the environment and the way of living of the people in the community.

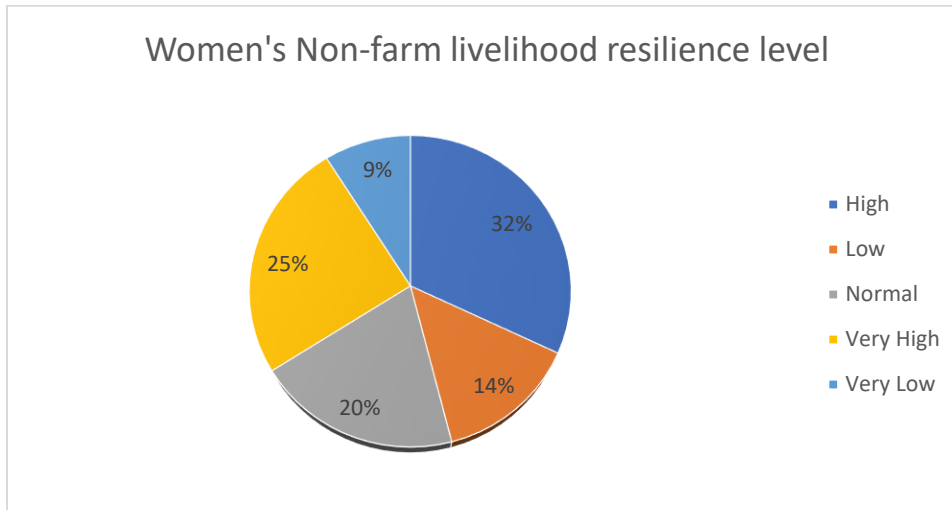


Figure 40: Women's non-farm livelihood resilience level

In terms of the level of socio ecological resilience of women livelihood options, the non-farm livelihood options are noted to be high in developing resilience to climate change as these are socio-ecologically friendly (Zamasiya, Nyikahdzoi and Mukamuri, 2017). As highlighted above, in as the non-farm livelihood options are mostly high-very high (57%) in terms of socio-ecological resilience to climate change whilst 20% of the participants explained that these are normal whilst only 23% of the participants rated them to be low-very low in terms of level of socio-ecological resilience. Hence based on this it can be noted that most of the non-farm livelihood options it was noted that these are viable options to for women to survive with the scourges of climate change in the Post-Fast Track Resettlement Farms. This is manly so because most of the methods that the women are using are ecologically friendly and very sustainable when it comes to reducing the impacts of climate change on women and environmentally friendliness of the livelihood options used. Sole trading, hiring of assets and religion have been seen to be socioecological resilient and helpful for many women in Post-Fast Track Resettlement Farms in Zimbabwe.

However, in as much as this is happening and socio-ecological resilience to climate change in Zimbabwe, it has been noted that the issues of child marriages which are also being done across the farms as a copying mechanism to climate change are not that much viable for women in the farms. This is mainly so because the destinies of children are being marred through these marriages

which are being used as means to respond to the scourges of climate change in Post-Fast Track Resettlement Farms in Zimbabwe.

#### 7.6 Chapter summary

In conclusion, the women farmers have responded through several ways to the different impacts of climate change they are facing. As was noted by Chiweshe (2018), the climatic region in which the farmers are located shape the various responses to climate change the farmers utilizes which are mostly shaped by the climatic changes being experienced in the area. Consequently, the chapter further buttresses this by arguing that not only are the responses shaped by the climate only, but the socio-economic and political positioning of the women farmers has a bearing on how these responds to climate change in particular contexts and environments. In as much as the climatic changes affecting environments and specific regions in various agro-ecological regions may be the same, the response of the people to the climatic change impacts varies from place to place depending on the existing climatic change rationality found in area.

Based on this, I argue that the effect of climate change has warranted several innovative responses from women farmers to cope with climate change. However, in as much as the women have responded innovatively to climate change to build their socio-ecological resilience, the level of the sustainability of the responses remains questionable as demonstrated above. Most of the on-farm and off farm mechanism are highly unsustainable and maladaptive in nature as these are exacerbating the proliferation of climate change. With also the gendered systems being in control though these are being challenged, socio-ecological resilience remains farm from the women hence the need for transformative approaches for realisation of this goal.

## Chapter 8: Discussion, Conclusion And Model Setting

### 8.1 Introduction

The chapter sought to discuss and bring to the fore conclusions on the study of how gender influences the socio-ecological resilience to climate change of women farmers in the selected PFTRFs which will help in developing viable transformative approaches that can be used in these farms. In analysing these issues, the thesis used the mixed methods approach; particularly the use of qualitative and quantitative methods which were mostly descriptive in nature. In trying to understand the phenomenon under study the thesis began by analysing the contextual background of the settlements in Zimbabwe, the natural regions in Zimbabwe and the state of climate change in Zimbabwe which were all presented to give a background to the issues under study. Furthermore, I then narrowed on the profile of the case study in Zvimba East District and the three farms under study; giving their socio-economic, political, and technological state with also the state of the climate in the area. The changing trends of climatic conditions in the area were also fully presented in this specific background that was presented in this study, impact of climate change on women's lives and livelihoods, responses of women to these impacts and the level of socio-ecological resilience of these responses are discussed in the chapter. Based on this the foundation upon which the question on how socio-ecologically resilient the women's livelihoods is adopted in the selected Post-Fast Track Resettlement Farms in Zimbabwe was set.

From the discussion of these findings, the chapter then moves to the conclusions of the study. The conclusions of the study are based on responding to every objective of the study that has been set for the study by succinctly summing up the key findings into conclusions reached. The key conclusions summarise the key argumentation which is gender as a bearing on the socio-ecological resilience of women's livelihoods and lives to climate change in PFTRFs across Zimbabwe. From this, the need to develop transformative approaches to deal with issues of climate change that are gender sensitive are raised. After this the chapter then presents the policy recommendations that were unearthed in this study, thereby helping to add value through policy suggestions for different institutions in and around the world. The chapter then concludes by giving the suggestions for the further studies which were unpacked from the study. These are listed such that they can help other scholars to further investigate issues that are emerging from the study.

## 8.2 Discussion of Findings

The discussion of the study is hinged on the nature, trends and patterns of climate change experienced in resettlement farms in Zvimba East District which will cascade down into the impact of climate change on women's lives and livelihoods in the selected PFTRFs in Zimbabwe. After discussing this, the responses of women farmers to the climatic changes that are occurring in the area were also interrogated and finally an analysis of the level of socio-ecological resilience of the livelihoods of women in the selected PFTFs in Zimbabwe was presented. Based on this, this section now discusses the findings presented in chapter 4-7, thereby building a case on the issues of socio-ecological resilience to climate change and how transformative approaches can be developed in these areas. This will help the communities to develop sustainable means and ways to cope with climate change in the Post-Fast Track Resettlement farms. The chapter therefore discusses the findings of the study, bringing out the key ideas and how these can lead to the development of transformative approaches that can be utilised in Post-Fast Track Resettlement Farms in Zimbabwe. The section is split into three segments which are hinged on the set question of this research which include:

- ✚ What is the nature, trends and patterns of climate change experienced in resettlement farms in Zvimba East District?
- ✚ How have these climate change-related phenomena affected women farmers in Zvimba East District?
- ✚ What livelihood options are available/adopted by women in coping with climate change in Zvimba East District?
- ✚ How socio-ecologically resilient do the women adopt the livelihood options in post-FTLRRP resettlement farms to cope with climate change in Zvimba East District?

### 8.2.1 Changing nature, trends and patterns of climate change in Zimbabwe

As was noted by IPCC (2021) report, the nature, trends, and patterns of climate change across the world are changing and by 2080; in most areas' temperatures would have moved up by at least 3 degrees Celsius with more frequencies of droughts, cyclones, floods, heatwaves, and cold spells across the world. This has been the case in Zimbabwe as climate is changing. From the year 2000 up to now, noticeable changes can be noted across the country. Based on this, this section discusses the noticeable changes in the climate across the selected farms in Zvimba East District as a

foundational bedrock upon which the impacts on women's lives and livelihoods together with their responses to these and how socio-ecologically resilient are they are built.

#### 8.2.1.1 Erratic rainfall

The climate in the selected Post-Fast Track Resettlement Farms had been changing greatly, which has affected the production in the areas. One of the key changes has been on the nature of rainfall received in the area which has become much more erratic. The rainfall has become more erratic as the area is now affected by several droughts since the settling of people on the farms in Zvimba East District. The area has been affected by nearly five droughts since people settled on the farms in the years that include 2002, 2005, 2010, 2013, 2016, 2019 which has greatly affected people's food security. In line with this, Donald (2009) explains that in times of droughts, the rain-fed agriculturalists are mostly affected as these do not have enough alternatives that help them move away from the scourges of droughts. This can be seen in how the areas under study have had their crops hit by droughts during these periods and animals experiencing water shortages which has affected their resilience to climate change in these Post-Fast Track Resettlement Farms in Zimbabwe. Erratic rainfalls experienced across the three farms have caused women's productivity on the farms to go down, plunging most of these women into poverty.

Erratic rains have also affected the availability of water on the farms. As water is the basis of production for many farmers including women, the area of production has gone down on the farm. Not only has production gone down, but also the burden of doing household chores for women has increased greatly as these now have to walk long distances to fetch water for the household. Chiweshe (2013) notes that water is the key commodity that keeps household functioning well in resettlement areas and its shortages impacts more on women and children more than any other members. Due to erratic rainfall in the area, the water table has gone down, and most wells have dried up in most areas across the three farms. Lake Chivero has also gone down by nearly 1/5 of its size due to the erratic rainfalls which is a significant drop in its capacity. This has affected households that rely on it for water; particularly women who now must bear the brunt of water shortages in the areas.

#### 8.2.1.2 Increased temperatures

Increasing temperatures in summer have been noted across the three farms under study. It was noted that the average temperatures for the area had increased by 1-1.5 Degrees Celsius in the area

since the year 2000. This increase in temperature has led to heatwaves and the El Nino effect in the areas which has affected the lives and livelihoods of people. In line with this, Adger et al., (2015) explain that the summers in sub-Saharan Africa have become much hotter than they were before the year 2000, showing how climate change is real in this part of the world. In support of this, the rate of evaporation of the water from the Lake has increased; which has led to reduction in water levels in Lake Chivero during summer because of the long dry spells being experienced in the area. Plants in the area have also been affected by these temperature changes as has been noted in the study. Some plants wilt due to the high rate of evapotranspiration in the area, thereby affecting crop production. Not only are the plants being affected but animals have also been affected as more and more diseases emanating from the heatwaves are being experienced in the area. Hence the increased temperatures have become a common feature of the Post-Fast Track Resettlement Farms in Zimbabwe which is now affecting the lives and livelihoods of women that are found in them.

The increased temperatures lead to the increased sinking of the water table in the area, causing most wells to dry up. The wells in the three post PFTRFs have been typically about 8-10m deep when they started staying on the farms, but these wells have continued to be deepened every summer as they run dry, owing to increased temperatures experienced across the farms. On average, the wells are now between 13-20 metres deep because of how the water table keeps moving and there is continued deepening of the wells in the area. Adger et al., (2014) also notes that water is at the heart of women's resilience to climate change in rural and resettlement areas in most developing countries, hence its scarcity affects how people in these areas move on with life in times of climate change crisis. Consequently, the lives and livelihoods of women continue to be affected as climate change worsens in the area, thereby negatively impacting their socio-ecological resilience to climate change.

#### 8.2.1.3 Decreased temperatures in winter

With climate change happening across the three farms, decreases in winter temperatures have been noted across them. An abnormal cold spell has been experienced across the three farms since the turn of the millennium. The average temperatures of the farms in Zvimba East District in winter has been ranging between 6-9 Degrees Celsius whilst previously, the temperatures ranged between 10-12 degrees Celsius in winter. These temperature changes have signalled the change in the climatic conditions of the area which in turn greatly affects the lives and the livelihoods of people



in the area. Samasen (2010) explains that the very cold winters experienced in most parts of sub-Saharan Africa are signalling how climate change is now the new normal for these communities; which is something they must live with on a day-to-day basis. Hence based on this, it can be noted that the drop in temperatures in the area is a climate change signal that is affecting all in the communities under study.

Furthermore, the decreased temperatures are much more felt in these farms greatly as people in these farms live near major water bodies such as Lake Chivero, Marimba River and Mangondo areas. Living in the vicinity of such water bodies has exposed the resettled farmers more to the scourges of the cold spells that are experienced in these areas more than any other communities that live further away from the water bodies. Frost bites in human beings and frost attacks on plants have become a common thing on these farms and have affected production for women in these farms. School going children are exposed to flus and other forms of diseases that affect people such as pneumonia which emanates from cold spells. Through such impacts, it can be noted that the cold spells that are being experienced across the three farms have been affecting women more and more thereby limiting their production capacity and their resilience to climate change.

#### 8.2.1.4 Shift in the seasons and agro-ecological characterisation of the farms

Like what is happening in Zimbabwe at the national level, there has been a shift in the farming seasons across the three farms under study. The farming seasons have shifted since the year 2000 in these farms as was unearthed in the study. The farming seasons in this area used to start from end of September and stretch to April the next year. However, with the coming of climate change in the area particularly because of erratic rainfall in the area, the farming season has become lean as it now starts around mid-November and ends around mid-March. This is the time during which normal rainfall is expected in the area. Supporting this, Bhatasara and Nyamwanza (2018) highlight that in as much as Zimbabwe relies on agriculture for sustenance, heavy dependence on rain-fed agriculture should be dropped as seasons are fast becoming too lean. This has also been the case in the farms, thereby affecting productivity and the lives of the resettled farmers. The seasons have thus become too lean for meaningful production to be done by the women farmers using rain-fed agricultural methods.

Due to the shift in seasons, the agro-ecological classification of the areas particularly in Zvimba East has also changed. Zvimba East District used to be in region 1 in Zimbabwe, but has since

dropped to region 2A. This has been so because of the reduction in rainfall received in the area. Rainfall levels have dropped from between 900-1100mm a year to between 750mm-850mm a year as per the Meteorological Offices (2021) report. The change in the agro-ecological classification of the area which has seen it being downgraded a bit clearly shows how the area is fast also dropping to become classified as an arid or semi-arid area in Zimbabwe due to the climatic changes happening in the area. These climatic changes in the area are reducing the agricultural potency of the areas, thereby affecting the socio-ecological resilience of the area in Zimbabwe. Thus, the change in the agro-ecological classification because of the changes in seasons and weather patterns also shows how the climate has been changing across Zvimba Districts in Zimbabwe.

#### 8.2.2 Climate change impacts on women farmers

The section discusses how climate change has impacted negatively on women in the post fast track resettlement farms in Zimbabwe. In the discussion, the section explains how climate change has affected women directly and indirectly on the Post-Fast Track Resettlement Farms. The direct impacts are linked to production that happens on the farm through the on farm and off farm activities that women are doing which are hinged on the ecology of the farm. The direct impacts of climate change on women's lives also directly affect the economic standpoint of women which now affects their socio-ecological resilience to climate change in these farms. The indirect impacts of climate change are hinged on what affects the welfare of the women socio-politically and health of the women which are all emanating or are hinged on climate change as revealed in the study.

##### 8.2.2.1 Direct impacts of climate change on women's lives and livelihoods

Women are the custodians of agricultural production in many countries in Africa, which is also the case in the Post-Fast Track Resettlement Farms in Zimbabwe. Since these are the custodians of most subsistence agricultural productivity in most agricultural farms in Zimbabwe, the scourges of climate change heavily impact on their production activities which are mostly on farm and off farm activities. According to Gukurume (2014), in as much as both women and men are affected by climate change in farming communities, it is mostly the women that bear the brunt of the scourge of climate change as these are mostly hands on in agricultural production in most farms in Zimbabwe. In consideration of this, this section discusses the impact of climate change on both women's on farm and off farm production activities which are the direct impacts of climate change on women's production.

#### 8.2.2.1.1 Impact of climate change on women's on-farm production

Reduced crop production has been one of the severe impacts of climate change on women in the Post-Fast Track Resettlement Farms in Zimbabwe. Due to climatic changes such as erratic rainfall and droughts that have affected the Post-Fast Track Resettlement Farms under study, it can be noted that women's food security has been heavily threatened as their production capacities have been reduced due to the state of the climate in the area. In support of this, Briggs et al., (2020) explains that due to climatic changes happening in most countries in sub-Saharan Africa, women have been exposed to heavy food insecurities as crop production has gone down. Hence, it is now very difficult for women to engage in crop production using late maturity seeds as the rains have become highly erratic. Crop production has been reduced which has plunged women and their households into dire poverty particularly in the PFTRFs.

With the reduction of crop cultivation, women have been more exposed because their backup plan; which is livestock production, has also been affected. Livestock production has been stalled across the three farms as the pastures in these farms are fast depleting, which has affected the growth of animals such as cattle and goats across the three farms. Not only are these affected by shortage of pasture, but the temperature changes in the areas have affected livestock production because too much heat causes diseases and too much cold has also been causing diseases on the livestock. Thus, through this, the livelihood option of livestock production livelihood option for women has been heavily limited. For women, this has led most of them into poverty and heavy food insecurities across the farms. The products that come from livestock that help in dietary supplementation end up becoming scarce thereby affecting their health and wellbeing and that of the household. Thus, stalling of growth of livestock has impacted heavily on women's economic earnings and dietary supplementation thereby limiting their socio-ecological resilience to climate change.

Climate change has affected the ecology of the areas under study, and this has negatively impacted on women. Most women across the three farms are mainly engaged in ecologically based livelihoods and they are heavily affected by climate changes in the area. For example, flooding which happens sometimes across the three farms leads to the washing away of top soil through soil erosion and gully formation across three farms as was observed in the study. This minimises

production for women in farming as the land is fast becoming poorer and poorer for farming as most of the nutrients would have been washed away into the nearby waterbodies such as Lake Chivero. Not only is this happening, but also even those women who are into fishing are affected. There has been heavy biodiversity loss in the Lake as the first population is fast being depleted due to how the water levels are going up and down in the Lake; which is also affecting fish production. Hence based on this, it can be noted that climate change has been affecting livelihoods of many women farmers in Post-Fast Track Resettlement Farms.

Furthermore, the climatic changes have also affected the production of women on the farms due to the depletion of water sources. Water is the backbone of all agricultural processes on the farm but with climatic changes that are being experienced in the area, the resource is fast becoming scarce on these farms. Competition for water between human beings and animals has increased owing to the scarcity of this resource. Water have plunged many women and their households into disarray as they have been exposed to waterborne diseases. Like Budiriro and Glen View suburbs which were hit by cholera, women in Amalinda, Ingwe-Gomo and Pension farms are left exposed to water borne diseases due to acute water shortage. For livestock, the scarcity of water has led these to be herded in the vicinity of Lake Chivero; which has caused human and wildlife conflict as some of the children are attacked by crocodiles together with the animals they will be herding. This causes more problems for women farmers, which leads the researcher to question the sustainability and socioecological resilience of these to climate change.

Desertification is another phenomenon that is greatly evident in Post-Fast Track Resettlement Farms because of climate change that is affecting production (Gukurume, 2013). The areas which are parts of mainly Amalinda and Gomo farms are becoming desertified due the deforestation of the areas. Due to the cutting down of trees and overgrazing in the area, the soils have become too loose as most these have turned into sandy soils. As a result, the areas that are not cultivated are fast becoming desertified as most of these do not have plants growing on them leading to them becoming very sandy in nature. As a result, desertification is fast encroaching into the ecosystem of Amalinda and Gomo Farms as the areas are becoming too sandy in nature. The desertification of parts of the Amalinda Farm and Gomo Farms has decreased the grazing lands for goats, cattle and sheep found in the area which has largely affected the small holder women farmers in the area.

#### 8.2.2.1.2 Impacts of climate change on women's off-farm production

In as much as climate change affects the on-farm activities, equally the phenomenon also as affected the off-farm activities that are done by the women farmers in resettlement areas though the impact has not been as severe as witnessed in on-farm activities (Mashizha et al., 2019). The study noted that the women in the three Post Fast Track Resettlement Farms in Zvimba East District are also involved in off farming activities which are mainly non-agricultural in nature. Some of the activities that both men and women are involved in include brickmaking, fishing, basketry, pottery making and weaving amongst others. These off-farming activities are being carried out by women on the farm for them to earn income and sustain their families. In as much as these activities are being carried out by these women, they have been affected by climate change in a lesser way as compared to the on-farm activities that are mainly climate dependant.

Climatic changes happening in the area have pushed women to move to the use of their ecology for surviving the scourges of climate change. Most of the women are into the firewood business and brick making which is damaging the environment in the area. Through such activities ecological challenges such as soil erosion, soil infertility, deforestation and loss in biodiversity have emerged in the farms which has affected the sustainability of the environment usage for future generations. Through such acts it can be noted that most women are now heavily depriving future generations of good environments and safe environments as the act they are engaged in are deepening climatic changes than lessening them in the area. As a result of this, Chambati (2005) explained that some of the livelihood options that resettled farmers embark on, on the farms are because of lack of alternatives to climate change. These end up entrenching the climate change in these farms as they damage the environment. Through such activities also Lake Chivero has further been silted as can be observed in summer due to the runoff that is flowing into the Lake without anything to stop it due to human activities happening on the farm.

From this it can be noted that water is the heart of all farm lives and livelihood options in resettlement areas in Zimbabwe. The problem of water is one key factor affecting brick making by women which has also been further worsened by the patriarchal domination of men in these areas. Due to this most women are now finding it very hard to be more productive in brick making. This is because both, the direct impacts of climate change which are the water shortages, and the societal

impacts of patriarchy are taking a toll on them which has limited their potential. Supporting this Makunde (2022), highlighted that water is at the centre of all farm livelihood options in the resettlement areas in Zimbabwe as it is the glue that binds the success of both lives and livelihoods on the farm. Hence in as much as production of bricks is continuing despite the problems there are facing, resilience of these women to climate change is fast now becoming questionable as the means to reach the end is now severely affected in these farming areas.

In Pension farm where weaving and basketry is also done, climate change has taken a toll on women. This is mainly so because the reeds for production used in weaving and basketry are now fast depleting in the Mangondo area and parts of the shores of Lake Chivero due to the water levels going down at the mouth of the Lake. Some of the weavers and basketeers found in the area are failing to make their baskets because the inputs for their business are fast depleting. Not only are the reeds depleting, but also the quality of the reeds found in the area is now questionable; something which is now affecting many women basketeers and weavers in the area. As result in the FGDs conducted showed that some of the women explained that they now must buy our inputs from Mbare Musika which is now becoming costly for them.

#### 8.2.2.2 Indirect impacts on women's lives and livelihoods

According to Zamasiya et al., (2017) climate change affects all facets of lives and livelihoods directly and indirectly with the indirect component mainly touching on the institutions of society such as the socio-cultural relations, politics and the knowledge and technological aspects of society. In the social and political spheres of life, climate change has also had a say in the lives of people in the three selected farms in Zvimba East District. This can be seen in how climate change has influenced the socio-political set up of the farms in Zvimba East District in an indirect manner in these communities. The direct impacts of climate change which are experienced in the agricultural, ecological, and economic settings of the farm have spilled over into the socio-political spaces of the farms affecting these indirectly. Some of the socio-political impacts of climate change that have affected women unearthed in the study include child marriages, SGBV, conflict on produce and ownership, poverty diseases, politicization of inputs, nepotism, and abuse of women.

##### 8.2.2.2.1 Socio-cultural Impacts

Climate change has affected women greatly in the three farms under study through the reinforcement of patriarchal dominance in sharing and accessing resources in Zvimba East District.

Male dominance is now being felt in almost every economic activity that brings more income to the household. Karuma et al., (2021) note that because of climate change, the victimisation of women through patriarchy in PFTRFs has greatly increased and this has impoverished families. Activities such as goat rearing, poultry keeping, and crop cultivation have seen men coming in to dominate mostly the produce that women would have worked hard to earn. Hence in as much as projects in agriculture are being done, these are largely anchored on women who are key in starting the projects and processing all that is needed in these projects but however men always appear when it is the time to reap from the set projects.

Across the three farms, most women were failing to have a voice in terms of fighting and making sure that they are food secure and climate change resilient through the proceeds from the farms. Due to their voice being silenced, it made it very difficult for them to become resilient to climate change as the foundation to resilience is greatly shaken by the patriarchal nature of the cultures at the farms. Not only is this happening in agricultural processes, but this is also envisaged in the other spheres such as fishing and brick making which has greatly exposed the women to ravages of climate change. In brick making and fishing which are the alternatives, men dominate mostly by negotiating the deals with customers and getting the money when selling fish and bricks. Moyo et al., (2023) highlighted that although women have voices in society, climate change in Post Fast Track Resettlement Farms has reduced the volume of women's voices as the patriarchal grip is emerging again through how men want to dominate also household and domestic issues. This therefore has been leaving most women behind thereby affecting how these people cope with climate change.

In addition to this, since the Zvimba East District thrives mainly on rain fed irrigation, With climate change, most women have now been plunged into poverty as crop cultivation and animal rearing have been greatly affected by the climatic changes happening in the area. Most of the women in the study explained that the reason why they have settled on the farms was mainly to be involved in agriculture and fend for their families. With climate change now ravaging the farms, it is now hard to even the produce food which is enough to meet their daily needs thus plunging them into heavy poverty and food insecurity. Due to this, poverty has now become heavily feminised in the farm as women are largely affected by it due to climate change. Not only are these affected but their ability to bounce back is now limited greatly as these cannot afford the means to fight climate

change due to meagre returns, they are getting from their agricultural endeavours. Thus, most of the women are now left exposed to the ravages of climate change as well as their families which now ends up affecting not only them but also their children. Supporting this, Makunde et al., (2019) highlighted that climate change has most impoverished women and children in resettlement areas in Zimbabwe as these bear the brand of all climatic change impacts. Due to climate change, poverty has now been greatly deepened in families and withing households with women and children being on the deep receiving end in these communities.

The climate change induced poverty which has affected the women has further on exposed women to sexual gender-based violence in the household (Chiweshe and Bhatasara, 2019). Most of the women explained that cases of abuse have been rampant in the farms all emanating from the state of poverty in the family. Cases of husbands beating up their wives for failing to budget available food items in the household have been rampant in the three farms whilst also other men have used abuse of women as venting form the social pressures of providing for the family. In line with this, in some of the FGDs conducted, most women explained that their husbands come back late at night and may complain on why there is no food whilst they have not left anything for the family to feed on. Failure to respond well would now lead to heavy assaults on their bodies. Thus, from this it can be noted that climate change induced poverty and food insecurity have now bred sexual gender-based violence in these farms in Zvimba East District.

#### 8.2.2.2.2 Health related impacts on women

Climate change has also exposed women to an array of diseases because of the extreme cold weather and hot water weather being experienced in many areas around the world (Bhatsara, 2015). Women in Zvimba East District have also been exposed to various health related impacts of climate change over the past ten years. Due to changing temperatures, the women have been left exposed to various diseases overtime in these farms. Due to heavy inters that have hit hard the area, it was noted that most women have been exposed to heavy flu which have been very difficult to deal with. During the time of the COVID 19 pandemic in the year 2021 winter, some even lost their lives because of the heavy flu that hit them during these times.

Not only are the women exposed to heavy as result of climate change, but some of the women have complained more of exposure to malaria. Most participants explained that the area is so much mosquito infested as it is very close to water bodies such as Marimba River and Lake Chivero.



Women from the three farms highlighted that their farms are more prone to malaria outbreaks because of wetness and heat they are exposed to due to climate change. In the FGDs conducted, the participants argued that mostly in the summer and rainy season, the rate of cases of malaria mainly goes high in the area due to the breeding conditions that would have been created by the rains in the area together with the water bodies found in the farms.

Adding on to the above, the women in the farms are also exposed to water borne diseases such as diarrhoea, cholera, typhoid, and bilharzia in sub-Saharan Africa as these are the custodians of household water fetching duties (Kamwi et al., 2015). As the resettlement areas under study are prone to water scarcity due to climate change women end up now fetching water from contaminated sources leading to the outbreak so such water borne diseases. Most women in the study highlighted that during the months of September to end of November water largely becomes an issue leading most of these to fetch water from the Lake and Marimba River and some uncovered wells around the farms which leaves them exposed to waterborne diseases above. As water is crucial for household survival, families have thus been exposed to these ailments of the stomach that mainly stem from scarcity of clean water for daily use in the household. Hence this has been another key climate change effect that has led to the loss of lives in the three farms, especially during in the period between 2018-2022 when the farms were most severely affected.

The crop and livestock production backdrop as a result climate change has caused malnutrition in children which is another challenge that the communities are facing. Malnutrition has been a big problem affecting the children directly and women in these farms indirectly. Most of the women explained that the heavy shortages of food due to the low production from both the crop cultivation process and livestock has exposed children to malnutrition. Most of these explained that due to climate change, their eating patterns have now changed as they now have one or two meals per day only due to food shortages in their households in the selected farms. Thus, this is causing malnutrition is some of the children found in these farms due to lack of adequate food for these children.

Dube (2018) highlights that the heat waves that have been hitting hard the farms have also caused heat stress not only in the plants and animals only but also in human beings and women have not been spared by these. Amalinda Farm has been experiencing heatwaves during the months of September- December since 2015 up until now. The farms have been experiencing heat waves

which will be as hot as between 35 degrees celcius-40 degrees Celsius between the cited months which have caused heat stress on both plants and animals with human beings not being spared. With these heat waves women have been exposed to heat stresses which have manifested themselves in very acute headaches, dizziness and fainting occurring on the farms. As these women bear the burden of much work such as fetching water and many household chores, they are exposed more to heat which now leaves them more eat stressed than their male counterparts thus affecting their health. Supporting this most of the women in the FGDs conducted explained that on the hottest days they have experienced some dizziness and headaches in their bodies such that some would even sleep to recover from that. Hence this shows that climate change has affected women in their bodies greatly as shown through these eat stresses highlighted above.

#### 8.2.2.2.3 Politicisation of aid nepotism and corruption

Climate change has caused many women farmers in the Post-Fast Track Resettlement Farms to become politically marginalised. Climate change has exposed women to the machinations of political discrimination, prejudices, and stigma when it comes to the issues of trying to adapt and become resilient to it (Chazovachii et al., 2012). In as much as women are on the core of production that happens in the farms, the irony of the matter is that when it comes to political decisions and issues such as distribution of inputs for government programmes these are placed on the peripheries if not the end of the line for the benefits. In reference to '*pfumvudza*' most women explained that even though they benefited, they only did benefit out of the leftovers by the male centred leadership. Though the village head for one of the farms is a female, she is overpowered by men when it comes to getting inputs as women are discriminated against and mostly saved last.

The politicisation of inputs is also another factor that has been affecting women in the selected farms in Zvimba East District. Women have been grouped based on political affiliation in the area when it comes to getting inputs particularly of '*Pfumvudza*' and government food aid of maize. Those belonging to ZANU PF are the ones that mainly received food aid and inputs of '*Pfumvudza*' whilst those that are deemed to be sell outs or part of the opposition that is CCC or MDCA are left out. Most of the women explained that if the leadership does not want them to receive any inputs from the consignment being distributed, the agenda of one being a sell-out is built from the many months before distribution such that on the distribution one is left out. Thus, most women who had not been in the right standing with the political authorities mostly of ZANU-PF when distribution

of maize, maize seeds and fertilisers come, these are left out leading to them being heavily affected by the ravages of climate change.

Chikonzo (2021) notes that nepotism in both input distribution and government food distribution is also another key factor that has been affecting women and exposing these to climate change. Most of the Post-Fast Track Resettlement Farms are no go areas for NGOs such that government facilities only reach these farms. As a result of this officials from the ruling part are the ones that would oversee distribution together with the headman for the area. As such only people that are in line with what the local leaders want are the ones that are given whatever would have come for the farming communities in the areas. Not only are these given the leadership of the area sometimes takes twice or thrice as much that is given to the individuals on the farm whilst not considerate for those that have not received anything on the farms.

Corruption is one of the factors that have affected women and left them exposed to climate change impacts (Chingarande et al., 2020). In the distribution of food aid and farming inputs corruption has been seen to be at the centre of the distributions. Some of the participants interviewed explained that other people within the farming communities know before hand when the truck with food aid and farming inputs come. Thus, these pay the distributors who are some of the community leaders some money usually between USD 10-20 for these not to be left out in the distribution. However, women who are mostly poor such as the widows and orphaned young women left in charge of the plots mainly risk not getting any supplies as these do not afford monies for the bribes which are needed for one to get their portions. Thus, failure to get pay the distributors has left many women on the whims of climate change impacts as they cannot afford to get the cushioning against it.

#### 8.2.3 Women farmers' response to climate change in PFTRFs

In as much as climate change has brought more negative than positive impacts on most societies in the world, it has forced societies to become innovative to adapt and become more resilient to the phenomenon in the world (Matondi, 2019). This has been the case with most of the women farmers in selected farms in Zvimba East District as they have learnt that climate change is here to stay with them in their communities and what they need to do is to live with it without making it worse. The most popular strategies were those that protect households from the effects associated

with agricultural failure. Some of these livelihood strategies have a long pedigree in societies located in dry regions.

#### 8.2.3.1 Women farmers' climate proofing on-farm

As most women stay on the farms, these have adopted the on-farm responses to climatic changes they are experiencing on the farm. According to FAO (2022) on-farm activities consist of farming and agricultural production, including casual and seasonal labour which are viewed through a value chain lens, on-farm work occurs at the “beginning” of the value chain. In line with this, as the farm is the primary unit of production of women, they have now adopted the various response to climate change whilst on the farm to ward off hunger, starvation and diseases that have come from droughts, heatwaves, floods, and other climatic change impacts being experienced in the area.

##### 8.2.3.1.1 Diversified crop production mechanisms

As droughts and heatwaves are ravaging the farms, greatly which has affected agricultural production and productivity across the three farms, the households in the area have developed several crop cultivation responses to adapt and become resilient to climate change. Some of the strategies have been introduced by government and NGOs, while others are initiatives from the farmers themselves. Some of these practices have been practiced in Zimbabwe, particularly in semi-arid regions. In line with this, the study noted that one of the key ways that the households across the selected farms are employing is early planting in the farms as 102 households out of the 337 are practicing it. Most of the farmers in Ingwe-Gomo Farm and Amalinda Farm highlighted that early planting is now what they are now doing as it saves them time and labour. This process has been deemed very helpful in making sure that the farmers have a guaranteed harvest as they use the early rains in planting which minimises their processing times the crops. Early planting is seen to be bringing results to the community as it is helping the community to realize harvests from their farming expeditions carried out on the farm amidst the climatic changes that are happening on the farms (Mavesere and Dzawanda, 2023). This has helped to build production as it has helped the households to become food secure as increased yield and productivity has been noted in the study.

Adding on to this, the conservation farming has also been adopted as another innovation that the women have adopted because of climate change across the three farms. In as much as this was there in Zimbabwe in other parts, the presence of this phenomenon in Zvimba East District was not very much widespread. This was popularised in the area through the government programme

of *Pfumvudza* which the women have adopted and has been very helpful. In the study it has been noted that the adoption of conservation farming, that is *Pfumvudza* has been bearing fruits as it has helped the women dodge the scourges of climate change in their agricultural endeavours. This climate change proof method of farming has necessitated some good returns for the women farmers in the area which has seen these helping households to become food secure. The adoption of conservation farming (*Pfumvudza*) has not only proved handy in being climate change proof only but also has helped in ecological resilience of the smallholder farmers (Mavesere and Dzawanda, 2023). This is mainly so because this method uses zero tillage or minimum tillage which helps in preserving the soils and reducing soil erosion in the area. Through this the siltation of the rivers and lakes which contributes also to climate change is greatly reduced thereby helping in boosting sustainable resilience to climate change in the area. Thus, the conservation farming adopted by women farmers in the areas has been very pivotal in the reduction of the impacts of climate change on the household level and community level.

Contradicting what Chiweshe and Bhatasara (2019) explained that *Pfumvudza* was for all people on the farms and rural communities, the study realised that there is need for good bodily health and strength to participate in this programme. Thus, the programme is not all inclusive as the elderly and those with various health conditions in communities are left out in it as they cannot do the holes as per the desired depth and cover ground needed by the extension officers. The dependence of rain-fed agriculture has made also the *Pfumvudza* programme fail to fulfil its mandate fully in the farms. Though this programme has brought reliance to climate change for most farmers in the area, when there is not enough rainfall in the area as what happened in 2021 season, the crops wilted greatly, and harvest plunged greatly plunging families into hunger and starvation. Thus, the study discovered that though *Pfumvudza* is saving the environment, there is need for this agricultural initiative to be buttressed by good mechanization such as good irrigation facilities for it to yield and give much benefit to more people and communities in Zvimba East District.

In responding to climate change, the women farmers have now resorted to the use of hybridised seeds to beat up the changes in the environment (Tirivangasi and Nyahunda, 2019). In interviews conducted on the farm most of the farmers explained that they now used seeds that have faster maturity times for these to beat the fast-changing weather conditions in crop cultivation. Some of

the seeds that these now use include *NTS 576*, *SEED CO SC517* and *SEED CO katsoko* maize seed which are fast maturing maize seeds. These normally take between 90-120 days to reach fully maturity which is a good space of time for production. The maturity level of these seeds of between 3-4 and half months is crucial as it is the timing when the rains will be still raining in the farms thereby helping realize a good harvest in the area. The use of such fast-maturing crops has seen the improved food security of the area. This is mainly so because these fast-maturing seeds help mainly in reducing the time of production thereby helping farmer to be on time with the rains that are being received on the farm. Hence, most farmers have had good harvests due to their ability to grow these fast-maturing seeds as was noted in the study.

#### 8.2.3.1.2 Diversified animal husbandry mechanisms

Women have now ventured into animal husbandry as another livelihood option. Of the 337 households under study, 287 households had diversified into small livestock women with the remainder particularly having big and small livestock on their plots. In terms of herding of the livestock such as cattle, goats and sheep which has been one of the key roles of men on the farm has been shifted its role. The herding of cattle has now shifted as now the women are now also involved in the herding of cattle, goats, and sheep in the area. Adding on to this, though household livestock upkeep was mainly for women men have now also ventured into poultry keeping as a way of coping with climate change. In the interviews conducted it was noted that small livestock such as ducks, chickens and geese that were normally on the upkeep of women have now also been taken up by men.

In terms of responding to climate change, the farmers in the selected farms have also resorted to selling livestock for sustenance in climate change times. The selling of livestock was politicized so much at family level as assets such as livestock were believed to be the father's only (Scoones et al., 2011). As a result, most women and children wallowed in poverty as these did not have access to these assets for selling. However, this has been changed in the Post-Fast Track Resettlement Farms as the selling of livestock is now need based and anyone who leads the family can sell. Many women who were involved in the study explained that livestock now can be sold even by them if there is a basis for them to sell them. Thus, because of this it can be noted that, the patriarchal hold on assets has now been broken in most Post-Fast Track Resettlement Farms. This is clearly so because the decision-making power is now being shared between the men and the women thereby making these successful in responding to climate change as households in these

farming communities. The breaking up of this patriarchal hold has been a crucial component in the development of women and their independence when it comes to being strong and resilient to climate change in Zimbabwe.

#### 8.2.3.1.3 Water innovations

Climate change has also affected the availability of underground water for agriculture, the women farmers in the selected post fast track farms have responded through deepening wells in the plots to have water for agriculture and home use. Of the 337 households across the three farms 147 of these have wells on their plots with the remaining having no water sources near them. In the studies carried out it was noted that most of the wells that were found in the area ranged from 8m-10 meters in the years 2000-2005 (Mutopo and Chiweshe, 2017). However, since then the communities have been depending on these and now, they have gone as deep as between 12 meters to 20 meters on average. This has been so because with the changing temperatures, ground water table was fast moving downwards and as a result the response that the women farmers took was to further deepen the wells for these to have water for domestic use and for commercial purposes such as farming and brick making to mention but a few.

Irrigation of crops were also adopted by women farmers because of climate change affecting the area (Chiweshe, 2023). Rain-fed agricultural activities in the area were greatly affected by climate change taking place in the area. As a response to this, irrigation schemes have been developed in the area to help these farmers to realize better yields particularly in Pension Farm and parts of Ingwe-Gomo Farm. As was noted in Pension farm and Gomo farms, the women farmers in these areas have been largely dependent on sewerage disposal through the makeshift river channels that they also channel into their farms. These have been very useful as it has managed to boost their crop yield through the years.

In as much as irrigation is the way to go for the conditions in which many women are facing across the farming communities, most of the women do not afford these farming innovations. Most of the women are married by men who are not going to work, hence they cannot afford setting up irrigation mechanisms. This is the same with the women who are widows and those that are divorced who also cannot afford to install irrigation on their plots which has affected production and their resilience to climate change in times of droughts and lean seasons.

#### 8.2.3.1.4 Indigenous Knowledge Systems based Responses.

In treating livestock diseases, people in the area have opted to use natural means and herbs that are found in the environment. As the climate is changing, this has caused several diseases in animals such as sheep goats and cattle and poultry that are being kept across the three farms. The study noted mostly because of high temperatures most animals are exposed to heat stress which is affecting their growth confirming what Mubaya and Ndebele-Murisa (2017) also unearthed in his study. The women mainly deal with this by providing the animals with much water with salt to help the animal rehydrate faster. Thus, in line with this it can be noted that most farmer use the locally available resources in responding to climate change in the area.

Women farmers have now resorted to the use of IKS to deal with climate related impacts in Zimbabwe. In terms of treating livestock, the women have adopted the use of organic herbs to treat livestock in the selected PFTRFs to respond to the impact of climate change. In responding to climate change, the natural resources in the area were key in providing solutions. Supporting this, Masoga and Kaya (2011) explains that climate change responses in communities have been hinged also on their interaction with the environment such that solutions to some of the impacts are found in the vicinities of their communities. In treating chickens and ducks of their diseases a key plant called *gavakava* is used by the people in the area.

In dealing with cattle and goats, the women farmers have also used organic responses as they could not afford to buy veterinary medicines. Since most women lack income to buy veterinary vaccines to deal with livestock diseases, the women had to be innovative to cure livestock diseases. As a result, these have now opted to use locally available methods to take care of their animals. One of the key interventions that this use is mainly the use of natural herbs such as mahogany pods, *mutamba* leaves and *mutova* barks for treating various ailments such as abrasion, diarrhoea and other diseases that are affecting their livestock. Thus, the use of the ethno-veterinary medicines has been noted as one of key coping mechanisms that these farmers have adopted to cope with the impacts of climate change in their area.

#### 8.2.3.2 Women's off-farm climate proofing

In responding to climate change impacts in the area such as hunger, starvation and poverty emanating from droughts, heatwaves, cold waves, and other climate change manifestations women have now resorted to off farm responses to circumvent climate change impacts. According to



Fisheries and FAO (2022) the off-farm income encompasses all non-agricultural -related activities that occur beyond the farm which are climate dependent. In this study the off-farm livelihood options are the defined as all activities that are done on the farm but without an agricultural bearing on them. Hence women have adopted such means to fight the effects of climate change such as hunger, starvation and poverty that is now creeping in because of climate change.

#### 8.2.3.2.1 Disengagement from agriculture

The women across the three farms have also disengaged from agriculture in a bid to cope with climatic changes through various means and ways. As a result of droughts and lean seasons that have hit the areas for long across the three farms some of the women have resorted to hiring out agricultural land, equipment and selling inputs and even land in a bid to cope with the climatic changes happening in the area. These have been taken aboard as the means and ways that are being used in by women to generate income that can be used to meet the day-to-day expenses such as food, school fees, clothes to mention but a few. The value of land and ownership is something that has become so contested in the area and a gap that is exploited to cope with the ravages of climate change such as lean seasons, droughts, and floods across the three farms faced by women (Chiweshe and Bhatasara, 2019). As most of the primary landowners who were the fathers in the farms have died, the issue of the posterity of land and being help in high honour has become fluid in nature. Most of the land across the three farms has now been left in the hands of mothers or the firstborn sons that are now the custodians of the land. Due to climate change these now have resorted to selling of the land to earn a living in the times of climate change.

Some of the wives and children of the deceased have opted to sell the plots to others by mutual consent with other family members and migrate to the urban areas as a way of survival. Selling of plots by mutual consent is done at family level but the buyers may be introduced in the area as relatives of the deceased again. Sometimes issues of corruption also emerge as the village leadership is given some money to ratify a sale of the plots by children of the deceased in the areas. This has been the case at Amalinda Farm and parts of Ingwe-Gomo Farm when it comes to land ownership. Mutopo (2014) highlighted that with the founding generation of land reform programme passing on, the generation that has inherited this land from their fathers has not held land with respect as most of these sell the plots because of hunger and poverty. As a result, the area is now filled by some new people who were not the face of the FLTRP of 2000 or the children of those that were there at first.

Women who lead households with various agricultural assets have started building their resilience to climate change using these in Post-Fast Track Resettlement Farms by hiring them out. Hiring out of agricultural assets has proved handy to most farmers that are found in the area. Assets that are mostly hired out include cattle, cattle ploughs and even hoes that are used in agricultural practices. The hiring of these assets is meant to cushion the households hiring out these assets in climate change times thereby helping these to build their resilience to climate change. Muzari et al., (2012) highlighted that assets have proven to be very handy in climate change management for Post Fast Track Resettlement Farmers as these are fall back plans for these communities. Assets such as ploughs, cattle, and even tractors have been hired out to the farmers thereby generating income for the households that would be hiring out the assets. As some of the women are sceptical now about rain-fed agriculture every season they opt for hiring out their agricultural assets to others. In Amalinda Farm and Pension farm farmers with tractors have also used these for income generation through hiring them out.

#### 8.2.3.2.2 Foraging for dietary supplementation and medicinal benefits

The women inhabitants of the three farms in Zvimba East District have also turned to foraging as a survival antique against droughts and leans seasons that have been experienced across the three farms. There are times when the Lake water levels go down such that fish will be hard to catch normally between May-August. Not only will this be the case but also some of the food reserves would have been finished around June-December. It is during such times that foraging for wild fruits and vegetables in the area becomes handy in Zvimba East district for most of the families living below the poverty datum line as it helps to cushion the families against hunger and starvation.

Women farmers in Zvimba East also rely on the environment for food during times of climate change induced drought in the area. As was noted Mashizha et al., (2020) the relationship between the environment and the people inhabiting it is mutual in nature as the environment depends on people for its sustainability whilst the people depend on the environment for their sustenance. This has been the case across the three farms as they depend on foraging on the natural environment for their survival in the crisis times. During the rainy season, farmers also rely on mushroom for relish. The area in which three farms are located is strategic as in each season, there is a natural fruit or vegetable that can be found and some people in the area grow mushrooms. From this it can be noted that the mushroom has gone from being something that can be consumed by farm households

only to something key for income generation. The families on the farm are using mushroom for income generation by selling it to surrounding areas. Hence, the environment is now being used as basis for saving the families from poverty and hunger through the provision of food and acting as part of the income generation circle of people in selected PFTFs in Zvimba East District.

Due to climate change, hunting is now not only done for leisure but now also serves as a livelihood option across the three farms in Zvimba East District. Through hunting the farmers now get meat which diversifies their diet and income helping them navigate the challenges that climate change has posed on most of them on the farm. However, hunting has led to the depletion of wild animals in the area. IPCC (2014) highlights that the entitlement of all people living in the vicinity of game parks to hunting has led to the depletion of animals whilst some are even also becoming extinct in some areas as is the case in Zvimba East District.

Foraging for medicines in the area also helps people to cope with climate change. Climate change has taken a toll on the health of livestock, plants, and the people in the area. Most of the participants in the FGDs conducted highlighted that diseases such as hypertension, diarrhoea, typhoid, heat stress and headaches were now emerging in the area because of changes in climate in the area. As a result of this the people across the three farms now depend on their environment for their healing and wellbeing health-wise. The farms have become pharmaceutical in nature as they are now sources of medicines for the communities. Unlike in prior times when people shunned traditional medicines, the populations on the farm are very much knowledgeable of the different medicinal plants that help them fight various diseases and ailments. In the FGDs conducted it was noted that some of the basic medicinal plants foraged for in the area include *gavakava* which treats constipation and diarrhoea, *mutsamvi* which treats bilharzia, *chifumuro* which deals with stomach upsets and *mupfura* which deals with sore eyes amongst other climate related illnesses in the area. Buttressing this argument Makhubele et al., (2016) explained that through IKS individuals in the community are one with the nature around them as they use it to sustain themselves. Thus, the change of climate has also made more people on the farm to be aware of medicinal herbs found on the farm to help fight climate related sicknesses that are being noted on the farms.

#### 8.2.3.2.3 Socio-cultural responses

Different socio-cultural initiatives have been used to adapt to climate change and build resilience to climate change in PFTRFs selected for this study. Adapting to climate change in Post-Fast Track

Resettlement Farms and building resilience in the area, most of the farmers have used socio-cultural initiatives to build their resilience to climate change. The households across the three farms under study have been using various socio-cultural innovations to cope with the ravages of climate change in the area. Thebe (2011) explains that as climate change is affecting all forms of life in Zimbabwe in a holistic in nature as all sectors of life in societies are now tailor making their initiatives to respond to the demands of climatic changes in their communities.

Religion is also another firm livelihood that has been used to build resilience to climate change in the post Fast Track Resettlement farms in Zvimba East District. In the farms under study one of the most prevalent and dominant religion is Christianity with African Indigenous churches being the key churches that are more widespread in these farming churches. Both African Traditional Religion and Christianity have been used to cope with the climate change manifestations such as lean seasons, droughts, and floods (Thebe, 2018) that have been occurring across the three farms. Most of the participants explained that Christians must do the all-night prayers for rain at their churches and their shrines (if they are the apostolic sects). However, the ATR mostly do the rain making ceremonies that are done by Lake Chivero particularly on the *Guva raChivero* island (Grave of Chivero Island).

Religion has not only been used as transactional in coping with climatic changes but also as a pacifier of climatic shocks and stresses in PFTFs which has helped communities in coping with climatic changes in the area. The religious leaders are critical in bringing hope to the people concerning rain and good harvests. This helps households to keep on farming in the area with the hope of good rain and bumper harvests as promised by the religious leaders of the area. Scoones and Chaumba (2014) explained that though we are living in a postmodern society, theological explanations of the events such as climate change have been critical in keeping composure in communities when faced with threats of it thereby helping in developing resilience to climate change in the mind.

Another mechanism that has been adopted by households across the three farms in Zvimba East to cope with climate change is the use of marriage as a coping mechanism. Different forms of marriages are taking place in Amalinda, Ingwe-Gomo and Pension farms. These marriages are not borne out of love, but out of the need to survive the scourges of climate change. Child marriages were also another means adopted by the different families in the farms to cope with climate change

in Zvimba East District in Zimbabwe. The drive to push the children into marriages is not coming from love but from the need to survive. McLeod et al., (2019) explained that the impacts of climate change are now leading to an increase in child marriages in many farming towns across the world particularly in developing countries. This has been the case across the three farms under study where mostly children from 14 to 17 years of age are married off to older men found in the area as was observed in the study. Some of the children explained that sometimes there is no other option because they would have dropped out of school and marriage is seen as the best possible way out of poverty for them and their families. Another form of marriages that was noted in the study was that of polygamy. Mostly the children that would have been married off when young are plunged into polygamous marriages. These come in as the second, third or fourth wives to mention but a few. Amidst the apostolic sects such as Johanne Masowe and Marange found in the area, the children are married off and can become 6<sup>th</sup> or 7<sup>th</sup> wives in the set up.

#### 8.2.3.3 Non-Farm responses

In responding to climatic changes happening in the area such as droughts and flooding and livestock health issues, the women farmers across the three farms have employed several livelihood diversification strategies to cushion themselves against the negative impacts of climate change that they are facing. The responses that these have employed can be classified as agricultural as well as non-agricultural responses.

##### 8.2.3.3.1 Social capital networks

Failed harvest due to droughts and floods have greatly limited the income of women across the farms in Zvimba East District. This has forced most of the women farmers (77%) of these to be innovative outside the farms and form other fall back plans to save themselves and their families from hunger. Johnson (2018) notes that *mikando* (savings schemes) have been one of the keyways that women farmers living on the farm have used to survive the scourges of climate change occurring in their places. The savings clubs for women have become something that these women can fall back on when climate related disasters such as hunger and starvation. Savings clubs help women with income generation that can be used to boost survival for families.

The savings club are handy in lean seasons as they to provide income and food to households in difficult times. In the FGDs conducted it was noted that extra income was coming from the savings clubs which are helping households to cope with climate change. Others explained that the income

from the savings club has been used in various household initiatives such as paying school fees for children and buying in puts that are used from farming in the area. Gukurume (2013) highlighted that the village savings clubs have proved to be handy in lean seasons and even good seasons as these offer households' a viable alternative income that can be used to cover many other expenses that are crucial for households.

Another form of social network and capital that is helpful in building resilience to climate change through helping people to cope with hunger and starvation emanating from droughts across the farms has been remittances. Of the 337 households understudy across the three farms, 277 of these highlighted that the remittances they receive from friends and relatives have been one of the mechanisms that have been used by to survive the scourge of climate change in times of lean seasons and drought in the area. As was noted in FGDs conducted most of the participants highlighted that they received money from their friends and relatives from as far as South Africa, Botswana and even United Kingdom. The amounts of money that these received range from USD50-300 a month depending on the stability of income of the sender. These monies have gone a long way in helping these people to build resilience to climate change in Post-Fast Track Resettlement Farms in Zvimba East District as they are used for food, paying school fees, and getting inputs amongst other issues.

Jones et al., (2012) explains that remittances have become a cushioning and a building block for resilience for most women farmers and their families in times of climatic changes such as droughts and floods in Zimbabwe. This has been noted across the three farms as most participants explained that the monies, they receive has been helping them in acquiring small livestock and buying food in these farms as noted in the FGDs conducted. Others explained that it's not only money from abroad but also money that comes from their children that are in Zimbabwe working in Harare and other surrounding towns. Remittances of food, clothing and money were noted to be helping these families to develop and build their resilience to drought induced poverty emanating from climate change. Some explained that they managed to build houses and granaries through the money being sent by their friends and relatives which have helped them to store food to cushion themselves in times of droughts and floods. Thus, remittances have been key in building climate change resilience in Post-Fast Track Farms as was noted in the study across three farms.

#### 8.2.3.3.2 Sole Trading

Women have also practised perching the farm as also a non-agricultural economy due to droughts. Droughts have plunged most families into poverty forcing most of the families to diversify and innovate also whilst being on the farm. In the study it was noted that when normally the mainstream function is not producing the intended results the alternative becomes a solution. In line with this, most women farmers have also tended to look at their stay on the farm with this view of looking at what other possible alternatives are there for them on the farm to survive the scourge of climate change affecting them. Chiweshe et al., (2022) notes that though the primary focus of many farmers on the farm is to draw the power of the farm from it as an agricultural economy, one of the subtle powers of the farm economy is also its non-agricultural side that many have realized in this time of climate change. Many women have now resorted to doing various other non-farming business on their plots to help them survive the scourge of climate change.

Since lean seasons have affected their income, women have looked on to bring alternative and innovative solutions to the scourge of climate change in the area thereby helping them to become resilient. The realisation that the farm can also be a non-agricultural economy for most of the women prompted by climate change has brought joy and stability financially for these women and their families. Despite being farmers most of the women have now risen also to become entrepreneurs which has greatly helped them in taking care of the family and making sure there is food security in their homes. Chagutah (2010) explains that the ability for women farmers to see opportunities in crises has greatly helped them to ward off some of the scourges of climate change in many places in the African continent. As a result, the solutions that are created by a people for themselves and through themselves in the face of climate change help them develop sustainable resilience to the scourge of climate change.

Adding on to this, due to hunger and starvation been brought by droughts and floods in the area about 67% of the women have now engaged in paid work to cope with climate change across the three farms. Paid work has also changed its nature because of climate change in the Post-Fast Track Resettlement Farms. Most women farmers (67%) noted that with heat waves and droughts, the yields were going down, these have now opted for paid work to supplement their income. In as much as most men were going to work in most of these farms, the housewives would man the household and family. As climate change is now ravaging these farms, the phenomenon has changed as also mainly catalysed by the economic meltdown that the country is experiencing,

women now have taken to look for wage work to supplement the income of their husbands and the families (Chiweshe and Bhatasara, 2019). In the interviews conducted, it was noted that most women are now into jobs such as those of security guards, house maids, general farm workers and general hands in several small and medium enterprises in areas such as Budiro, Kuwadzana, Mufakose and Harare CBD to mention but a few.

Women have taken up such jobs to ward off hunger and starvation that is being experienced in their families as due to droughts that have been incessant on the farms. In as much as the piece jobs do not give them much as was noted in the FGDs with most of these averaging between 50-150 USD a month, the women have resorted to these to find their way-out of climate change induced hunger and starvation. The need to put something on the table for the children to eat in times of crisis has pushed the women farmers into these jobs across the three farms. Scoones et al., (2010) explains that even though some of the women have been allocated farms, the changes in climate noticeable through incessant droughts and heatwaves in the farms has now pushed some of these to move on and look for wage work in neighbouring A2 farms.

#### 8.2.3.3.3 Going beyond gendered adaptation.

However, in as much as women were the ones who are involved much in crop cultivation, the control of the produce was not in their hands but in the hands of patriarchy which now has changed. The study noted that the livelihood options control has now gone beyond gender as now women are now in control of produce and farming production at the farm because of climate change. In as much as women still have their hands on the production of food, men have now been removed as controllers of produce but are now involved and become part of the production process. This is mainly so because due to the economic meltdown in Zimbabwe most men have lost their jobs and now resort to staying home which has made these to also lose control of produce as they now have also to work on the field as their controlling power which is the economic input has been cut. Even though men have now moved out of the locations and now stay on the farms with their women and children and are now part of the production process in terms of crop cultivation, this has shown how the control and power have shifted towards women.

The selling of produce in these farms; especially that coming from the farm, was highly patriarchal in nature. Though men were not in direct production of crops on the farm these wanted to oversee the money from the sale of the produce. Some even went further to be the ones who would sell the



produce for their women. However, these have changed now as was noted in the study as most women have now developed means and ways to go round the challenges that they are facing in the sale of produce. Women are now in charge of the sale of produce nowadays as we only give our men only portions but keep the larger chunks for family development.

Most of the women no longer even give the man any single cent if they are not part of the production process. The aspect of having 50/50 shares on the farm is now common as women are now in control of produce. This development has been noted in most households who are now able to buy properties. In the FGDs conducted some participants explained that they have been able to buy solar panels and even build small houses through the money they have realised from the profits gained from their field produce. Others highlighted that they have been able to take their children to school through the produce from the field. This clearly shows how the gendered adaptation to climate change has changed over time in Post-Fast Track Resettlement Farms. The state of being male or female economically has been left hanging in these societies as sleeves have been rolled to fight issues of hunger and starvation in the society (Folke, 2006). Even gendered roles of young boys and girls are now being fast eroded in these farms. Cases sited include those of divisions of labour that if one is manning the tuck-shop whether the boy or the girls the other is doing house chores at the family homestead. Such acts of gender blindness and balance have been necessitated more through the issues of how climate change has brought about hunger and starvation at the family unit. Thus, climate change has brought about positive disruptions in the gendered notions of climate change adaptation and resilience in the farms under study.

#### 8.2.4 Level of socio-ecological resilience to climate change and transformation of livelihoods

As social-ecological resilience is the capacity to adapt or transform in the face of change in social-ecological systems, particularly unexpected change, in ways that continue to support human well-being (Dube et al., 2020), the adopted means and ways that women have taken aboard to cope with climate change have to be measured to see how environmentally friendly these means and ways are.

In terms of the on-farm livelihood options that have been adopted in the study, it was noted that most of the means and ways adopted are not environmentally friendly and ecologically sustainable as was highlighted in the study. As highlighted in the pie chart in chapter 7, about 74% of the participants highlighted that women's on-farm livelihoods are low or very low implying that these

are not socio-ecologically resilient enough to help them cope with climate change whilst 26% of the participants highlighted that the livelihood options are normal or high when it comes to being socio-ecologically resilient. This thus highlights that most of the means and ways that have been adopted by the women such as early planting, conservation farming and deepening of the soils are not that sustainable.

The socio-ecological resilience of women's off-farm livelihood options in the selected Post-Fast Track Resettlement Farms remains highly unsustainable. Based on the survey, 70% of the participants highlighted that the women's off-farm livelihood resilience levels were either low or very low whilst 22% explained that the level of resilience was normal whilst 8% of these explained that it was high to very high. Hence as was noted in the study, most of the off-farm livelihood methods used to survive the scourges of climate change in the post Fast Track Resettlement Farms in the selected farms are not very much environmentally friendly in Zimbabwe. Most of these means and ways are damaging the environment instead of preserving the environment which is a deep call for concern for authorities (Folke, 2006).

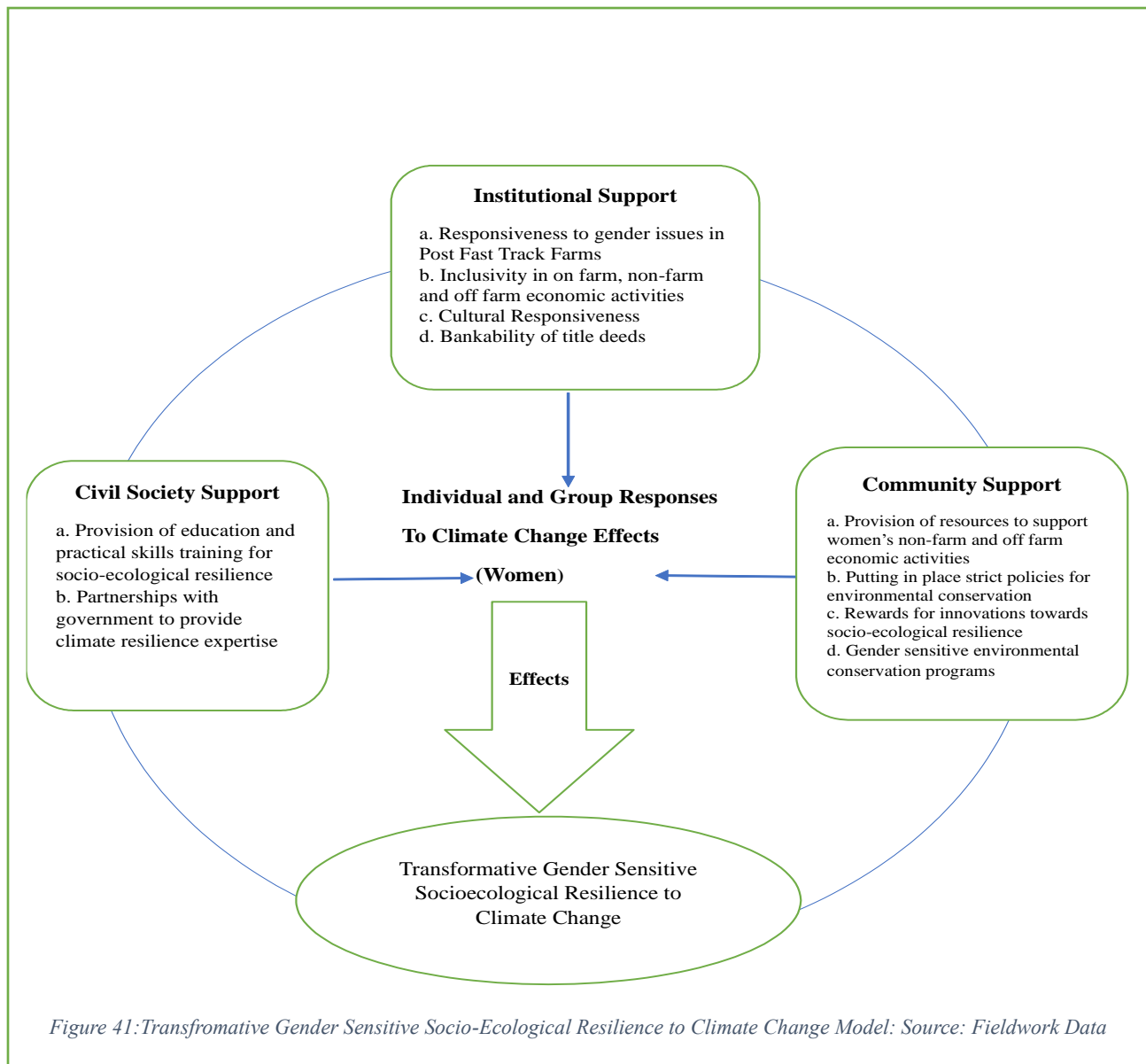
In terms of the level of socio ecological resilience of women livelihood options, the non-farm livelihood options are noted to be high in developing resilience to climate change as these are socio-ecologically friendly (Zamasiya et al., 2017). As highlighted in the study, in as much as the non-farm livelihood options are mostly high-very high (57%) in terms of socio-ecological resilience to climate change whilst 20% of the participants explained that these are normal whilst only 23% of the participants rated them to be low-very low in terms of level of socio-ecological resilience. The study revealed that non-farm livelihood options are the most viable options to for women to survive the scourge of climate change in the Post-Fast Track Resettlement Farms. This is mainly so because most of the methods that the women are using are ecologically friendly and very sustainable when it comes to reducing the impacts of climate change on women and environmental friendliness of the livelihood options used. Sole trading, hiring of assets and religion have been seen to be socioecological resilient and helpful for many women in Post-Fast Track Resettlement Farms in Zimbabwe.

### 8.3 Model Setting and Conclusion

Based on the discussion of findings above, a transformative gender sensitive socio-ecological resilience to climate change model that can be used in resettlement areas and the conclusion of

the study were modelled for this study. The section first discusses the transformative gender sensitive socio-ecological resilience to climate change model and moves on to present the conclusions of the study.

### 8.3.1 Towards a Transformative Gender Sensitive Socio-ecological Resilience to Climate Change Model



The model for a transformative gender sensitive socio-ecological resilience to climate change clearly reflects an actor (in this case women) centred approach which invites the active participation of key stakeholders. The model is grounded on collaborative efforts from the key stakeholders with a common goal of inclusivity. Communities, local leaders, and families in

PFTRFs face several challenges but they require help to come up with effective support for women. There is need for the capacitation of women's groups and their families with knowledge and skills for a transformative gender sensitive resilience to climate change in PFTRFs. This includes provision of resources to support women's off-farm and non-farm economic activities that rely less on the environment, and training women to rely less on the environment for livelihoods and putting in place strict environmental protection policies as well as supporting development initiatives for women. Communities should also be capacitated to reward innovations towards transformative gender sensitive environmental conservation programs at community level.

National institutions should also do the same. Local leaders, communities and families, and development programme implementing officials are expected to be gender sensitive to ensure that gender issues are mainstreamed in self-help projects and development initiatives in PFTRFs. Inclusivity is crucial for all to guard against discrimination based on gender or socio-economic status. Local leaders and communities should come up with policies that guide implementation of self-help projects for the development of sustainable adaptation in PFTRFs. The PFTRFs are a critical pillar of the economy in Zimbabwe as agricultural production is crucial for providing food to the nation. Women constitute a valuable labour force in Zimbabwe and their work is crucial for nation building. Capacitating women with transformative socioecological resilience to climate change is thus a crucial aspect of achieving national development in Zimbabwe.

### 8.3.2 Conclusion

In conclusion, the study argues that gender influences the socio-ecological resilience of women farmers in PFTFs which warrants the need for new transformative approach for these to cope with climate change. Since the year 2000 when the resettled farmers were settled in PFTRFs, the nature, trends, and patterns of climate change experienced across these have been changing drastically which has affected agricultural production greatly in Zimbabwe. This has affected women farmers who are the custodians of subsistence production as their agricultural practices are under threat due to climate change. To cope with this, the women farmers have responded to climate change using the on-farm, off-farm, and non-farm innovations. However, although these women have adopted these various forms, the socio-ecological resilience of these mechanisms remains highly questionable as some of these means are further plunging the communities into further climatic distress as they are highly unsustainable. The level of socio-ecological resilience of mostly the on

farm and off farm innovations remain very low in socio-ecological resilience as these are hinged on the need to survive than sustainability.

Consequently, how human society adapts to multiple negative factors when placed in a new and challenging environment such as the PFTRFs in Zimbabwe varies but mostly the easier methods or those close to their abilities are often opted for without consideration of sustainability upon which socio-ecological resilience is built. Therefore, based on this, the study argues that there is need to develop means and ways that will help women cope with climatic changes that are happening in their areas. A gendered, hybridised model that mixes the on farm, off farm and non-farm mechanisms for coping with climate change which is rotational and seasonal based is needed. For the lives and livelihoods of women to be socio-ecologically resilient there is need to develop and help them in their already existing means and ways of coping with climate change. This can help make women's climate change responses to be sustainable which can be helpful in developing women's socio-ecological resilience to climate change. As women continue to be the bedrock of agricultural productivity in PFTRFs in Zimbabwe, empowering these to cope with climate change making them and their household's socio-ecologically resilient to climate change must be prioritised.

#### 8.4 Policy Implications

Based on this study there is need to train women farmers on socio-ecological resilience to climate change so that their livelihood means can be ecologically friendly. This is mainly so because most of the women farmers came from a subsistence mode of production coming into former commercial farm a new space of production which hinders their ability to sustainably adapt to climate change. Hence there is need for training women in PFTRFs on how-to live-in harmony with their environment on particularly conserving the environment for them to cope with climatic changes happening in the area.

Furthermore, the study recommends that there is need for policies that help small holder farmers in mechanisation of their trade in Post-Fast Track Resettlement Farms in Zimbabwe. In as much as the farm mechanisation was done which focused on A2 farmers the small holder farmers have been left out. Hence there is need to tool and retool, the small holder farmers with adequate tools

for irrigation use in ‘*Pfumvudza* farming.’ Funding for other projects that are mainly off farm for sustenance and building socio-ecological resilience in these areas is also crucial.

Adding on to this, the journey of building socio-ecological resilience should not be a burden to the government only but should be opened also to other stakeholders in the country. The study suggests that the government should open the post fast-track farming areas to other stakeholders such as NGOs and civil society organisations so that these can come in and also help the women and the households in these areas on building socio-ecologically resilient livelihood options across the fast-track farms.

The study also recommends that the government should fund some of the projects’ done by women or those they intend to do. There is need to enhance the bankability of title deeds that women have (these include offer letters for farms). These should be bankable across all banking sectors in Zimbabwe not only in the Women’s Bank and AFC bank only in Zimbabwe. This can help in building the socio-ecological resilience of women’s lives and livelihoods in Post-Fast Track Resettlement Farms.

#### 8.5 Suggestions for further study

In conducting this study, I focused mainly on women in the Post-Fast Track Resettlement Farms but there is need to look at other facets of the communities which are mainly the youth and men and understand how these are building resilience to climate change in the PFTRFs. Adding on to this, there is need to understand also why the Post-Fast Track Resettlement farms are closed entities for NGOs in Zimbabwe which is something that is also hindering the socio-ecological resilience to climate change. I also recommend research on climate proofing financing in Post-Fast Track Resettlement Farms which is another key area that I did not fully look at.

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# Appendices

## Appendix 1: UP Ethics Clearance Letter

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**Faculty of Humanities**  
Fakulteit Geesteswetenskappe  
Lefapha la Bomotheo



18 May 2022

Dear Mr PG Karuma

Project Title: Gender and socio-ecological resilience to climate change: a transformative approach in selected post fast track farms in Zvimba East District, Zimbabwe  
Researcher: Mr PG Karuma  
Supervisor(s): Prof V Thebe  
Department: Anthropology, Archaeology and Development Studies  
Reference number: 21817228 (HUM003/1121)  
Degree: Doctoral

I have pleasure in informing you that the above application was **approved** by the Research Ethics Committee on 18 May 2022. Data collection may therefore commence.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.

Sincerely,

A handwritten signature in black ink, appearing to read 'KH'.

**Prof Karen Harris**  
**Chair: Research Ethics Committee**  
**Faculty of Humanities**  
**UNIVERSITY OF PRETORIA**  
**e-mail: tracey.andrew@up.ac.za**

Research Ethics Committee Members: Prof KL Harris (Chair); Mr A Bizos; Dr A-M de Beer; Dr A dos Santos; Dr P Gutura; Ms KT Govinder Andrew; Dr E Johnson; Dr D Krige; Prof D Maree; Mr A Mohamed; Dr I Noomé; Dr J Okeke; Dr C Puttergill; Prof D Reyburn; Prof M Soer; Prof E Taljard; Ms D Mokalapa

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Appendix 2: Fieldwork Permission Letter

All Correspondences to be addressed to:  
**The Chief Executive Officer**  
Telephone: +263 8677007012  
+263 67215 2220/1/2/3  
E-mail: admin@zvimbardc.co.zw



**REFERENCE:**

ZVIMBA RURAL DISTRICT COUNCIL  
P. BAG 2001  
MUROMBEDZI  
Website: www.zvimbardc.co.zw

17 January 2022

Praise Gamuchirai Karuma  
pgkaruma@gmail.com

Dear Sir/ Madam

**Re: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH PROJECT IN PENSION, GOMO FARMS AND PORTSIDE PLOTS IN ZVIMBA EAST DISTRICT**

The above matter refers.

I write to advise you that your request to undertake a research project at Zvimba Rural District Council has been granted. Please liaise with Ms Mushayavanhu for further modalities.

I expect high level of ethics from you whilst carrying out the research project. May you also submit a copy of the final project to council so that it may add value to the organisation.

Yours Faithfully

PP re  
RN CHATIKOBO  
ADMINISTRATION & HR MANAGER  
For: CHIEF EXECUTIVE OFFICER



*Our mission Statement: To promote and facilitate sustainable rural development for the well-being of the inhabitants, clients and stakeholders.*

Sub Offices: - Banket: Town Board +263 672142436, Planning Office Banket: +263 672142443, Banket Workshop: +263 672142433  
Nyabira: 08677007014, Showground Office: 08677007188

### Appendix 3: Summary of Methods

<b>Method of data capturing</b>	<b>Nature of participants</b>	<b>Population 2675 Survey: Sample Size</b>	<b>Sampling Method</b>	<b>Actioned Months</b>
<b>Survey (Questionnaires)</b>	Households with women	337	Simple random sampling	July-September
<b>In depth Interviews</b>	Women inhabitants on the farms (8 per farm)	24	Purposive Sampling	July-August
<b>Key informant interviews</b>	MoLAFWCARD official, CCMDZ official, Village Head, EMA, AGRITEX, Zvimba RDC and Zim Parks	7	Expert Sampling	November-Early December
<b>Focus Group Discussions</b>	Women inhabitants and some men (8 women 4 men) each across the three farms	3	Drawn from the survey sample	September
<b>Observations through transect walks</b>	Selected sites in three farms (Lake Chivero, River, Forests, Grazing land, Households)	-----	Study site choice	June and October



Appendix 4: Household Questionnaire

**Questionnaire for Gender and socio-ecological resilience to climate change: A transformative approach in selected post fast track farms in Zvimba East District, Zimbabwe.**

**META DATA**

1.1 Date                      \_\_\_/\_\_\_/2022

1.2 Enumerator’s name                      Surname:    First name:

1.3 Location:

**INTRODUCTION AND INFORMED CONSENT:**

My name is Praise Gamuchirai Karuma, and I am conducting educational research entitled **Gender and socio-ecological resilience to climate change: A transformative approach in selected post fast track farms in Zvimba East District, Zimbabwe.** You have been selected to participate in the survey and I will be asking you a few questions about the study. Our intention is to get from you, information that will assist in building a knowledge base that can be used in future interventions.

- i. Participation in this survey is voluntary and you can choose not to answer any individual question or all the questions. Feel free to stop me whenever you want.
- ii. The information we are collecting will be treated as confidential. We will not take down your personal details
- iii. Feel free to say exactly what you know
- iv. Is there anything you want to know before we start?
- v. Will you participate in this survey? (Single select)

**Yes              No**

If “No”, would you mind giving a reason?

.....  
.....  
.....

I \_\_\_\_\_ the enumerator responsible for the administering the questionnaire on \_\_\_/\_\_\_/\_\_\_\_\_ certify that I have read the above statement to the participants, and they have consented to the interview. I pledge to conduct this interview as indicated on instruction and inform my supervisors of any problems encountered during the interview process.

**HOUSEHOLD SURVEY QUESTIONNAIRE**

**SECTION A: DEMOGRAPHIC SECTION**

<b>A1 Gender</b>	Male	Female	Other	<b>A3 Level of Education</b>		No education	Primary	Secondary	Tertiary		
<b>A2 Marital status</b>	Single	Married	Divorced	Widowed	Other						
<b>A4 Type of household</b>	Male headed		Female Headed		Child headed (Male)	Child headed (Female)	<b>Other</b>				
<b>A5 Age</b>	18-30 years		31-43 years		44-56 years	57 and above	<b>A6 Income (US DOLLARS)</b>				
							0-100	101-200	201-300	301-400	401 & above
<b>A7 Household Religion</b>	Christianity		ATR		Islam	Other	<b>A8 Number of people in the household</b>				
<b>A9 Race</b>	Black		White	Asian		Mixed Race	<b>Other</b>	1-5 people	6-10 people	11-15 people	15 or more
<b>A10 Source of income for the head of the household</b>	Agriculture		Piece Jobs	Government		Sole trader	Pension and disability grants	<b>Other</b>			
<b>A11 Number of years living on the farm</b> <b>A12 Reason for staying this long on the farm</b>	0-5 Years		6-10 years	11-15 years		20 years or more		Employment/Business			
	Ancestry		Easy access to land	Marriage		Better rainfall					

## SECTION B: LIVELIHOOD OPTIONS ASSESSMENT

<b>B1 Livelihood option assessment (Household)</b>	<b>Tick applicable</b>					
<b>B1A Types of crops grown</b>	Maize	Tobacco	Millet	Sorghum	Beans	Others
<b>B1B Type of animals reared</b>	Cattle	Goats	Chickens	Goose	Ducks	Other
<b>B1C Other business done on the farm</b>	Firewood selling	Fishing	Brick moulding	Hunting	Gathering fruits etc	Other

<b>B2 Question</b>	<b>Nature, trends and patterns of climatic changes in the selected post fast track farms</b>
1) What is the nature of climatic change being experience in the selected farms	<ul style="list-style-type: none"> <li>a) Erratic rainfall</li> <li>b) Increased temperatures</li> <li>c) Livestock diseases increase</li> <li>d) Water level in dams going down</li> <li>e) Drought</li> <li>f) Flooding</li> </ul>
2) Tick any noticeable trends and patterns of climate change in the area	<ul style="list-style-type: none"> <li>a) Shortages of water</li> <li>b) Wilting of plants</li> <li>c) Delayed rainfall in summer</li> <li>d) Long hot summers</li> <li>e) Very cold winters</li> <li>f) Crop and livestock diseases</li> </ul>

<b>B3 How has these changes affected female farmers in the area on the following:</b>						
<b>DIRECT IMPACTS (ECONOMIC IN NATURE)</b>	No effect	Little effect	Moderately affected	Affected	Severely affected	
1) Livestock production						
2) Crop farming						
3) Water Resources						
4) Aqua Life and Livelihoods						
5) Off-farm Livelihood option						

<b>B4) How has climate change affected women (Life impacts) (Indirect Impacts)</b>		
<b>a) Social Impacts</b>	Neglect	
	GBV cases	
	Child marriages	
	Poverty	
	Other Specify	
<b>b) Political Impacts</b>	Politicization of inputs	
	Nepotism	
	Corruption	
	Other	
<b>c) Health Impacts</b>	Waterborne diseases	

	Malaria	
	Flue	
	Headaches and migraine	
	Back pains	
<b>Tick some of the ways in which climate change has affected the livelihood options cited above in B</b>	a) Livestock disease have emerged. b) Crop diseases also emerged. c) Shortage of water d) Shortage of pastures e) Shortage of drought resistant crops f) Stunted growth of livestock g) Other	
In what ways and through what means have you responded to the various challenges? (Societal responses)		
<b>On farm Livelihood options</b>		
Crop Cultivation Innovations	Early planting	
	Conservation Farming	
	Use of Organic Fertilizers	
	Anthill tilling	
	Use of hybridized seeds	
	Other specify	
Livestock Rearing Innovations	Rearing small Livestock	
	Use of indigenous medicines	
	Herding livestock by the Lake Chivero Banks	
	Digital Platforms	
	Selling animals	
	Other Specify	
Water Innovations	Deepening Wells	
	Borehole drilling	
	Irrigation channels	
	Drawing water from the dam	
	Other specify	
Off-farm Livelihood options	Brickmaking	
	Handcrafts	
	Fishing	
	Farm Piecework	
	Firewood selling	
	Selling and Hiring Out Assets (Land and Farm equipment)	
	Other Specify	
Non-farm Livelihood options	Remittances	
	Sole Trading	
	Savings Club	
	Paid work in nearby locations	
	Other Specify	

<b>Socio-Cultural Responses</b>	1) Religion
	2) Child marriages
	3) Marriage (Monogamy and Polygamy)
	6) Breaking Gender Norms
	7) Other specify

**C: MEASURING LEVEL OF SOCIO-ECOLOGICAL RESILIENCE**

<b>C1) Responding to food shortages in climate change induced challenges</b>	1) Marrying of female children				
	2) Borrowing food				
	3) Asking for remittances from abroad				
	4) Getting assistance from NGOs				
	5) Getting assistance from government				
	6) Restrict consumption of adults for children to eat				
	7) Doing piece jobs				
<b>C2) What strategies have you taken to increase</b>					
<b>a) Crop productivity in times of climatic change challenges</b>	1) Early planting				
	2) Digging ditches				
	3) Growing drought resistant crops				
	4) Zero tillage				
	5) Irrigation				
	6) Other explain				
<b>b) Livestock rearing sustainability in times of climatic changes</b>	1) Use of natural herbs (Gavakava)				
	2) Herding livestock in river banks				
	3) Use of stored Forder for feeding				
	4) Exchanging with smaller livestock				
	5) Other explain				
<b>C3) How socio ecologically friendly is the livelihood you have ticked above summarized below</b>	Very low	Low	Ecologically Friendly	High	Very High
C3i) On-farm Livelihood options (Crop Cultivation and Livestock Rearing)					
C3ii) Off-farm Livelihood options (Fishing, Brickmaking, Handcrafts etc)					
C3iii) Non-farm Livelihood options (Sole trading, piecework, paid work, remittances and mikando)					
<b>C4) How socio-ecologically friendly are the means and ways being</b>	Very low	Low	Ecologically friendly	High	Very High

<b>practiced in post fast track farms overall?</b>					
<b>C5 Rate in order of importance the most important asset to enable you to recover from shocks following climatic change heavy impact on you in the farm</b>	<b>Not very important</b>	<b>Important</b>	<b>Highly important</b>	<b>Very important</b>	
C5i) Access to farming inputs					
C5ii) Access to liquid capital					
C5iii) Getting Aid (NGO or Government)					
C5iv) Remittances					
C5v) Ownership of Assets					
C5vi) Prayer hope and endurance					
C5vii) Availability of piece jobs					
C5viii) Other specify					

## Appendix 5: Key informant Interview Guide

### Key Informant Interview Guide (Key Informants)

- What are some the climatic changes that are manifesting in the selected post fast track farms in Zimbabwe?
- Can you explain the nature of the climatic changes being experienced in the post fast track farms in Zvimba East District?
- Explain the trends and patterns of climate change currently being experienced for the past 15 years till now in resettlement farms in Zimbabwe?
- How have these climate change related phenomena affected women farmers in Zvimba East District?
- Is there a link between climate change and fast track land reform programme in Zimbabwe? (explain)
- What are the different livelihood options available/adopted by women in coping with climate change in Zvimba East District?
- Explain the relationship that exist between gender and socio-ecological resilience of livelihoods to climate change in post fast track farms?
- How are the livelihood options that farmers have adopted been environmentally friendly to your area you live in?
- To what extent are these livelihoods gendered in nature?
- To develop socio-ecologically resilience of livelihood options of female farmers in post fast track farms as organizations what programs have you implemented in the communities and with what effect?
- What do you think can be done to make sure that the livelihood option you are currently using in the wake of climate change be improved so that they can be socio-ecologically friend to the environment you live in?

## Appendix 6: In-depth Interview Guide

### **In-depth Interview Guide (Post Fast Track Female farmers)**

- Identify the climatic changes that are manifesting in the selected farms in Zvimba East District?
- What is the nature of the climatic changes being experienced in the selected farms in Zvimba East district?
- Explain the trends and patterns of climate change currently being experienced for the past 15 years till now in resettlement farms in Zvimba East District?
- How have these climate change related phenomena affected women farmers in Zvimba East District?
- What are the different livelihood options available/adopted by women in coping with climate change in Zvimba East District?
- List and explain some of the livelihood options that you have adopted in the past 15 years to cope and adapt to climate change?
- Have these livelihood options you have adopted been environmentally friendly to your area you live in?
- To what extent are these livelihoods gendered in nature?
- How socio-ecologically resilient are the livelihoods options adopted by the women in post-FTLRRP resettlement farms to cope with climate change in Zvimba East District?
- What do you think can be done to make sure that the livelihood option you are currently using in the wake of climate change be improved so that they can be socio-ecologically friend to the environment you live in?



## Appendix 7: Focus Group Discussion Guide

### **Focus Group Discussion Guide (Post Fast Track Female farmers)**

- Outline climatic changes that are manifesting in the selected farms in Zvimba East District?
- How are these climatic changes being experienced in the selected farms in Zvimba East district?
- Explain the trends and patterns of climate change currently being experienced for the past 20 years till now in resettlement farms in Zvimba East District?
- In what ways and through what means have these climate change related phenomena affected women farmers in Zvimba East District?
- In responding to these climatic changes, what different livelihood options have women adopted to cope with these changes in Zvimba East District?
- List and explain some of the livelihood options that women adopted in the past 20 years to cope and adapt to climate change?
- Have these responses adopted by women been environmentally friendly to your area you live in?
- To what extent are these livelihoods gendered in nature?
- How socio-ecologically resilient are the livelihoods options adopted by the women in post-FTLRRP resettlement farms to cope with climate change in Zvimba East District?
- What recommendations can you give to better the livelihood options being used by women so that they can be socio-ecologically friend to the environment they live in?