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The impact of Pfumvudza Programme in Marondera District. A case study of Ward 16

By

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ABSTRACT

This study evaluates the effectiveness of the Pfumvudza Programme in enhancing the climate change resilience of farmers in Ward 16, Marondera District. The programme, launched by the Zimbabwean government, aims to promote climate-resilient agricultural practices among smallholder farmers. Using a mixed-methods approach, this study combines questionnaires for 20 farmers with unstructured interviews and focus group discussions to assess the programme's impact. The study reveals that while the programme has improved farmers' knowledge and adoption of climate-resilient practices, challenges such as limited access to inputs, inadequate training, and poor extension services hinder its effectiveness. The study provides evidence-based solutions to address these shortcomings, including strengthening extension services, improving access to inputs, and enhancing farmer training. The findings of this study contribute to the existing literature on climate change resilience and agricultural development, and provide valuable insights for policymakers and practitioners seeking to promote sustainable agriculture in Zimbabwe.

DECLARATION FORM

I, Tinotenda Mugamu declare that this dissertation is my original work and has not been submitted elsewhere for examination. I acknowledge that I have read and understood the regulations of Bindura University of Science Education regarding plagiarism and academic integrity.

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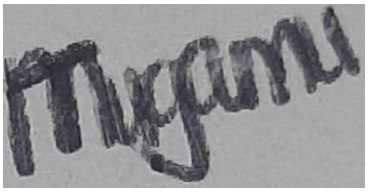
Signature : 

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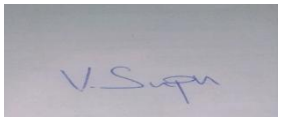
Signature : 

Date : 10September 2025

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DEDICATION

I dedicate this work to my beloved father, whose love and support made this journey possible

ACKNOWLEDGEMENTS

I sincerely thank the Almighty for making me sail through this journey. I would like to express my humble gratitude to my supervisor, for guidance and support. My family and friends, for their love and encouragement.

ABBREVIATIONS

CA	-	Conservative Agriculture
FAO	-	Food and Agriculture Organization
IPCC	-	Intergovernmental Panel on Climate Change
MoALG	-	Ministry of Agriculture, Lands, and Rural Resettlement
UNDP	-	United Nations Development Programme

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CHAPTER ONE

INTRODUCTION

1.0Background to the study

Conservation Agriculture (CA) principle have been embraced by governments across the globe. An increasing number of farms are expressing a commitment to sustainability due to the significant impacts of climate change that are being witnessed worldwide. One approach to achieving sustainability is through conservation agriculture, which enhances productivity and optimizes natural resources while preserving biodiversity and soil health. CA utilizes minimal soil and water conservation techniques, particularly in arid regions and during periods of low rainfall, as noted by Mhlanga et al. (2015). This concept is based on three core principles—limited tillage, mulching, and crop rotation—aiming to boost yields and strengthen resilience against the negative impacts of climate change. Evidence suggests that CA mitigates the effects of climate change-related drought on food insecurity, which can result in famine and starvation, particularly in European nations like Turkey (Gultekin, 2012). Research conducted in southern Europe and Spain indicates that tilling and mulching fields can enhance productivity by 10-15%, improve soil fertility under CA, especially in dry years, and alleviate the repercussions of climate change (Arrue et al., 2007).

Across the continental, the agricultural sector is a major contributor to the world's food supply. About 39% of Europe's land is used for agriculture and they mainly major with maize,rye, barley, sugar beet and potatoes. In Europe, there is Common Agricultural Policy (CAP) that supports rural areas through funding and actions that promote rural development, sustainable resource management and climate action. Rural residents are most affected by drought brought on by climate change, especially) in the farming sector. The primary challenge arises from the reliance of most communal farmers on rain-fed agriculture, which renders them vulnerable to drought conditions. The Common Agricultural Policy (CAP) in Europe has led to a notable increase in Gross Domestic Product. Agriculture has positioned Europe as a pivotal player in the realm of global food security, while also generating approximately 20 million jobs. A significant factor contributing to the rise in agricultural output in Europe was the advent of a more robust plow. In Mexico, a comparative analysis of maize yields under Conservation

Agriculture (CA) and conventional farming practices on Tropical Clay soil revealed that tilled land produced 4.31 t/ha, whereas zero till land yielded 5.65 t/ha (Verhulst et al., 2011). In Argentina, productivity enhancements were attributed to the extensive adoption of no tillage practices (Peiretti & Dumanski, 2014). This innovation allowed farmers to cultivate more land and increase their productivity. The increase in agriculture was also caused by Europe's climate that is warmer and also the introduction and use of advanced farming machines including G-series motor grades in 2019.

According to AU-NEPAD (2023), the agricultural sector has been crucial in promoting democratic processes throughout the region by encouraging the inclusive involvement of stakeholders, especially farmers. The development of agriculture has not only played a significant role in reinforcing the democratic structure of nations but has also been vital in tackling the urgent issue of food insecurity, which threatens both sovereignty and social stability.Food insecurity remains a significant challenge in Sub-Saharan Africa, with rising hunger rates, as indicated by a 1.5% increase from 2014 to 2019 (FAO et al., 2020).This situation highlights the pressing necessity for sustainable agricultural practices and interventions aimed at alleviating the negative impacts of climate change, a phenomenon that has intensified food insecurity and environmental degradation across the continent.Climate change has become a serious threat to Africa, evident in unpredictable weather patterns, extended droughts, and extreme temperatures that have adversely affected agricultural productivity and food security (Main, 2020).The growing frequency and severity of climate-related disasters have disrupted farming operations, resulting in crop failures, livestock losses, and reduced water availability.

Droughts, floods, and erratic rainfall patterns are among the consequences of climate change that have adversely affected agricultural productivity globally, particularly for smallholder farmers in developing countries (IPCC, 2021).These climate-induced shocks have exacerbated food insecurity, poverty, and vulnerability among rural households in sub-Saharan Africa, with Zimbabwe being especially affected (Ncube et al., 2021).In response to enhance the productivity and resilience of smallholder farmers, various governments and development organizations have initiated Conservation Agriculture programs (Thierfelder et al., 2018). By introducing the Pfumvudza Programme, the Zimbabwean government has acknowledged the necessity to tackle food security and climate change issues at the national level (Government

of Zimbabwe, 2020).To enhance soil fertility, moisture retention, and overall agricultural productivity, this program promotes the adoption of conservation agriculture practices such as crop rotation, mulching, and reduced tillage (Manyeruke et al., 2022).For the farmers involved, the techniques promoted by the program have led to improved soil fertility, reduced water consumption, and ultimately increased agricultural yields.

Scholarly interest has been directed towards the Pfumvudza programme, which is being executed across the state with a specific emphasis on smallholder farmers, who are particularly susceptible to the impacts of climate change.The success of the programme is credited to its targeted initiatives that enhance the agricultural productivity and resilience of smallholder farmers, tackling the challenges of food insecurity and diminished agricultural yields caused by climate change (AU-NEPAD, 2023).The Pfumvudza programme has proven its ability to boost crop yields, ensure food security, and enhance the livelihoods of participating farmers by advocating for sustainable agricultural practices such as conservation agriculture and efficient water management.Nevertheless, scholars also point out significant challenges faced by the Pfumvudza programme. These challenges include issues such as limited resources, inadequate extension services, and variable implementation quality across different regions (Manyeruke et al., 2022).Such challenges may hinder the programme's capacity to maximize its impact on smallholder farmers and achieve the desired outcomes.To sustain the programme's success and ensure its ongoing relevance as a mechanism for agricultural development and resilience-building in the face of climate change, it is crucial to address these challenges through improved resource allocation, capacity-building efforts, and tailored support systems.

One of the regions where the Pfumvudza Programme has been implemented is Marondera District, which is situated in Zimbabwe's Mashonaland East Province. Since Ward 16 in this district is a rural area with a high concentration of farmers, it provides crucial context for comprehending the program's effects (Marondera District Council, 2021). For the purpose of assessing the Pfumvudza Program's efficacy and guiding future policy and implementation initiatives, it is imperative to comprehend the experiences and viewpoints of farmers in Ward 16. With an emphasis on food security, climate change resilience, and agricultural production, this study attempts to look into how the Pfumvudza Programme affects farmers in Marondera District, Ward 16. The study will advance knowledge of the program's efficacy and offer insights that can guide future interventions in comparable circumstances by examining the viewpoints and experiences of the intended beneficiaries.

1.1 Statement of the problem

The Pfumvudza Programme in Marondera District, Ward 16, has been established as a strategic measure to tackle the urgent issues arising from various climate change effects, which have resulted in food insecurity and diminished agricultural productivity. Consequently, this has led to a decline in crop yields, a reduction in the quality of produce, decreased water availability for irrigation, and heightened pest and disease pressures. These factors have profound implications for the food security and economic stability of local communities, as well as for the Government. Climate change has caused a decrease in farmers' income, an increase in food prices, and has ultimately contributed to economic and social unrest (Manyeruke et al., 2022). Nevertheless, the degree to which this program has successfully enhanced the livelihoods and resilience of these farmers remains ambiguous. The current body of literature regarding the Pfumvudza Programme reveals a significant gap in the thorough evaluation of the program's concrete outcomes on the livelihoods and resilience of local farmers. While certain studies recognize the program's implementation as a reaction to climate change challenges, there is still a lack of empirical evidence that outlines its effectiveness in improving agricultural productivity and community welfare. This gap highlights the urgent need for comprehensive research to bridge the understanding of the program's actual impact and to offer critical insights for practitioners involved in agricultural development.

1.2 Purpose of the study

The objective of this research is to evaluate the effects of the Pfumvudza Programme in Marondera District, specifically in ward 16

1.3 Research Objectives

1.To assess the impact of the Pfumvudza Programme on improving the climate change resilience of farmers within the research area.

2.To assess the difficulties encountered in the implementation of Pfumvudza Programme.

3. To provide Evidence based solutions to the short comings of Pfumvudza Programme.

1.4 Research Questions

1. How effective is the Pfumvudza Programme in enhancing the climate change resilience of smallholder farmers in Marondera District, Ward 16?

2. What are the challenges faced in the implementation of Pfumvudza Programme?

3. Which solutions can be proffered to improve the implementation of Pfumvudza Programme.

1.5 Assumptions of the study

- The study believes that Pfumvudza enhanced yields in Zimbabwean rural communities where it was implemented and strengthened resilience against the effects of drought brought on by climate change.
- The study assumes that Pfumvudza comes with gender bias as women farmers are marginalised in being engaged
- Farmers in Zimbabwe face challenges that highlight profound disparities in the agricultural sector

1.6 Significance of the study

Farmers

The study will illuminate the necessary efforts that should be directed towards improving resource accessibility and creating a supportive environment for farmers within the agricultural sector. Additionally, the study will underscore policies that ought to focus on guaranteeing equitable access to resources, enhancing technical skills, thus emphasizing the research's importance to farmers.Furthermore, the study will evaluate the advantages of adopting the Pfumvudza farming method. These advantages encompass increased productivity, improved food security, better soil health, reduced water consumption, and the enhancement of farmers' livelihoods. Farmers who do not implement Pfumvudza are dependent on rain-fed agriculture, which leads to diminished yields due to the effects of climate change, ultimately jeopardizing their food security. Consequently, the research aims to motivate them to adopt the Pfumvudza approach.

Ministry of Lands, Agriculture and Rural Settlement

The results of this research study will be of considerable importance to the Ministry of Lands, Agriculture and Rural Settlement, as they illuminate the effectiveness and impact of the Pfumvudza Programme in enhancing the nation’s food security. By exploring the experiences and viewpoints of farmers in Marondera District, Ward 16, the study will offer essential insights into how the execution of this climate-smart agricultural initiative has affected agricultural productivity, soil health, and water usage patterns.The comprehensive analysis of

the program's implementation and results will highlight the advantages of adopting sustainable farming practices, such as zero-tillage and mulching, which are fundamental to the Pfumvudza approach. The research will clarify how these methods have resulted in improved soil fertility, decreased water consumption, and ultimately, higher crop yields for the farmers involved. This empirical evidence can assist the Ministry in its decision-making processes and inform the development of policies and strategies that further promote and expand the Pfumvudza Programme throughout the country.

Moreover, the research will highlight the positive impact of the Pfumvudza Programme on the livelihoods of farmers, providing valuable insights into how the improved agricultural productivity and resilience have translated into enhanced food security and improved economic well-being at the household level. This data can guide the Ministry in creating extensive support systems and specific interventions that cater to the distinct requirements and obstacles encountered by farmers, thereby enabling them to achieve greater self-sufficiency and resilience against climate change and various socioeconomic challenges.

To the academic Community

The study will also be of great importance to the academic community, as it adds to the expanding corpus of knowledge regarding farmer development and climate-smart agricultural methodologies. A thorough investigation of the Pfumvudza Programme and its effects on farmers in Marondera District, Ward 16 will yield significant empirical data to either support or contest current theories and models pertaining to agricultural transformation, climate resilience, and sustainable livelihoods.The comprehensive qualitative data collected through interviews, along with insights derived from documentary analysis, will provide detailed and context-specific understandings of how farmers navigate the intricate interactions of environmental, economic, and social factors in their agricultural practices.These findings can inform future research agendas, fostering interdisciplinary dialogues and collaborations among scholars in fields such as agricultural economics, environmental studies, and rural development. Moreover, the methodological approaches employed in this study, particularly the utilization of purposive and snowball sampling techniques, can serve as a reference for other researchers conducting qualitative investigations within similar settings or target populations.

1.7 Limitations of the Study

One potential limitation of this study lies in its dependence on self-reported data from smallholder farmers, which could introduce subjective biases. To address this issue, the research employed triangulation by cross-referencing farmer interviews with additional data sources, including government records and reports, to validate the findings. Moreover, the study is limited by the available timeframe and resources, which may restrict the comprehensiveness of the data collection and analysis. The research endeavored to enhance the validity and reliability of the findings within these constraints. Additionally, the results of the study may not be easily generalizable to other districts or contexts, owing to the localized implementation of the Pfumvudza Programme and the distinct characteristics of the Marondera District, Ward 16, environment. However, the in-depth insights gained from this research can still contribute to the broader understanding of the effectiveness of similar agricultural interventions in Zimbabwe and other developing countries.

Delimitations of the Study

The study is delimited to the effect of the Pfumvudza Programme in Marondera District, Ward 16, of Zimbabwe. The focus will be on assessing the program's influence on the food security, agricultural productivity, and climate change resilience of smallholder farmers within this specific geographical area. The study will not extend to other wards or districts in Marondera or other parts of Zimbabwe Additionally, the research will not cover the broader national-level policies and strategies related to the Pfumvudza Programme, but will instead concentrate on the experiences and perceptions of the targeted smallholder farmers in Ward 16.

Definition of key terms

Pfumvudza Programe- Pfumvudza program is a Zimbabwean Government initiative aimed at promoting climate-resilient agriculture and improving food security. (Cheura, 2021).

Conservation Agriculture - The United Nations' Food and Agriculture Organization (FAO, 2020) defines it as an agricultural system that encourages the preservation of continuous soil coverage, minimal disruption of soil, and the diversification of plant species.

Climate change

As stated by the United Nations, climate change pertains to enduring alterations in temperature and weather patterns. It also contended that human activities are the primary catalyst of climate change, chiefly as a result of the combustion of fossil fuels such as coal, oil, and gas (UN, 2020).

Resilient Strategies

The Intergovernmental Panel on Climate Change (2007) defined resilient strategy as actions that people, countries and societies take to adjust to climate change that has occurred.

1.11 Dissertation outline

Chapter 1

The initial chapter presented the research by offering an introduction and background to the study, which encompasses several key headings such as the practical problem and the research problem. The chapter includes the purpose of the study, the statement of the problem, research objectives, research questions, assumptions, significance of the study, delimitations, limitations, definitions of key terms, and references.

Chapter 2

This chapter examined the literature review and the theoretical framework that underpins the study. The literature review substantiates and validates the research topic, providing a robust theoretical framework and illustrating the contributions of other researchers in the field.

Chapter 3

This chapter delineated the research methodology and design employed in the study, outlining the fundamental plan of the research. Research methodology refers to the compilation of practical decisions regarding data collection, including the sources, methods of collection, and analysis. Conversely, research design represents the overarching strategy adopted for the research. Both elements are crucial as they ensure that the research methods align with its objectives, facilitating the collection of high-quality data and enabling valid conclusions to be drawn.

Chapter 4

This chapter consisted of the presentation of data, analysis, and discussion of findings. Relevant results were to be presented clearly. Various forms of diagrams, including figures, tables, graphs, and pie charts, were utilized for clarity and conciseness. Additionally, the chapter included discussions derived from the research, interpreting and elucidating the significance of the findings in relation to existing knowledge. The discussions also provided new understandings or insights regarding the research, taking into account the findings.

Chapter 5

This chapter is made up of a summary whereby the researcher will be rewriting the research through shortening and stating main ideas that supports the points. Conclusions were also presented in this chapter from the research findings. The conclusions were a synthesis of key points intended to help the reader understand the research. Also recommendations are available in the chapter based on the research findings. These recommendations were based on the results of the research indicating the specific measures or directions that can be taken. This chapter also consisted of areas suggested for further research.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter delved into a comprehensive exploration of the Pfumvudza Programme within the context of Marondera District's Ward 16, focusing on its impact on local farmers. The Literature Review section critically examined existing research and knowledge related to the program's effectiveness in enhancing climate change resilience and improving food security among farmers. Through the chapter, a full understanding of challenges faced and potential

solutions within the implementation of the Pfumvudza Programme was elucidated, setting the stage for the subsequent analysis and discussion.

2.2 Theoretical Framework

2.2 1. Sustainable Livelihoods Approach (SLA)

The research utilizes the Sustainable Livelihoods Approach (SLA) as a framework for the study. Developed in the 1990s by entities such as the Department for International Development (DFID) and the United Nations Development Programme (UNDP), the SLA serves to comprehend and evaluate the elements that influence individuals' capacity to sustain their livelihoods (Scoones, 1998; Chambers & Conway, 1992). A fundamental premise of the SLA is that individuals need a variety of assets or 'capitals'—including human, social, natural, physical, and financial—to attain favorable livelihood results. Furthermore, their capacity to utilize these assets is affected by the vulnerability context, which encompasses shocks, trends, and seasonality, as well as the surrounding policy, institutional, and political landscape (DFID, 1999). This approach underscores that sustainable livelihoods extend beyond mere income; they also encompass wellbeing, capability, and resilience (Chambers & Conway, 1992).

Additionally, the SLA acknowledges that individuals and households function within a wider context influenced by sociopolitical, economic, and environmental factors (Scoones, 1998). This consideration is particularly pertinent to the Pfumvudza programme, as its execution and effectiveness are likely shaped by existing policies, market dynamics, and climatic conditions in the Marondera District. By employing the SLA as the theoretical foundation for this research, the investigator can attain a more profound insight into how the Pfumvudza programme impacts the livelihoods of smallholder farmers in Ward 16, while considering the diverse types of capital, the livelihood strategies adopted, and the contextual elements that influence the programme's results (Carney, 1998; Scoones, 1998). This comprehensive approach can yield significant insights into the efficacy and sustainability of the Pfumvudza programme, ultimately guiding policy choices and interventions aimed at enhancing the livelihoods of smallholder farmers in the area.

2.3 Climate Change

Climate change, as a multifaceted and pressing global issue, has been defined and described by various academic sources, regional bodies, and international organizations alike. The United Nations (2021) characterizes climate change as the substantial alteration of weather patterns over extended periods, leading to shifts in temperature, precipitation levels, and other climatic variables. This transformation often manifests as heightened temperatures, rising sea levels, increased instances of droughts, and more frequent occurrences of flooding. Such alterations have far-reaching implications for essential resources like water, energy sources, and human

health, impacting societies on a global scale. Farmers, in particular, are identified as highly susceptible to the ramifications of extreme climatic events, changes in precipitation patterns, and the degradation of natural habitats. These shifts not only disrupt agricultural practices but also jeopardize the availability and reliability of food sources, exacerbating food insecurity in many regions. Moreover, the IPCC highlights that climate change contributes to global human insecurity by intensifying resource scarcity, amplifying existing social, economic, and environmental challenges.

Academic sources offer nuanced perspectives on climate change as well. Scholars such as Smith et al. (2018) emphasize the intricate interplay between anthropogenic activities and environmental changes, underscoring how human actions significantly contribute to the acceleration of climate change processes. Additionally, regional organizations like the European Environment Agency (EEA) provide localized insights into climate change, detailing its effects on ecosystems, biodiversity, and human well-being within the European context. The EEA (2020) stresses that climate change-induced disruptions not only threaten natural habitats but also pose risks to sustainable development and societal resilience across the continent. Furthermore, global organizations such as the World Bank (2020) offer a comprehensive perspective, framing climate change as a cross-cutting issue that intersects with various sectors, including agriculture, health, and infrastructure. The World Bank, emphasize the importance of international cooperation or coordinated efforts to address this complex and far-reaching challenge.

2.3.1 Effects of Climate Change

Climate change, characterized by its increasing effects on global temperatures, is altering weather patterns and ecosystems across the globe, with significant repercussions for agricultural sectors. The gradual increase in temperatures has resulted in a multitude of consequences, disrupting the fragile equilibrium of nature. This transformation presents various threats to agriculture, influencing crop development, livestock well-being, and overall food security. As noted by Smith et al. (2018), the rising occurrence of extreme weather phenomena, including heatwaves and extended droughts, highlights the pressing necessity for adaptive measures within the agricultural sector to effectively mitigate these threats. One of the most alarming consequences of climate change is the intensification of drought conditions in numerous regions. As temperatures rise and precipitation patterns become unpredictable, water scarcity is emerging as a widespread concern in many locales. Extended droughts not

only reduce water supplies essential for crop irrigation but also lead to the formation of damaging sand and dust storms. These storms, capable of moving billions of tons of sand across vast distances, pose immediate risks to human health and contribute to soil degradation and land loss, especially in areas experiencing increased desertification.

The growth of deserts due to shifting climatic conditions poses a serious risk to agricultural land use. According to N. Sitko (2019), arid regions are encroaching upon fertile land, resulting in a decrease in the available acreage for cultivation and diminishing the overall capacity for agricultural output. The advance of deserts not only restricts the arable land accessible for farming but also accelerates soil erosion and degradation, further intensifying the difficulties encountered by farmers. This situation emphasizes the critical need for sustainable land management strategies and focused interventions to combat desertification and safeguard agricultural lands for future generations.Moreover, the intensification of extreme temperatures and precipitation patterns poses a direct threat to crop yields and agricultural productivity, (FAO, 2021). With crops being particularly sensitive to fluctuations in weather conditions, the increased frequency of heatwaves, floods, and erratic rainfall patterns can lead to crop failures and reduced yields. Furthermore, the proliferation of weeds, pests, and fungal infections under warmer and wetter climates presents a significant challenge to agricultural sustainability. As temperatures rise, these agricultural pests and diseases find more favorable conditions for reproduction and proliferation, posing a threat to crop health and productivity. The increased prevalence of these agricultural threats not only necessitates the adoption of integrated pest management strategies but also underscores the importance of developing resilient crop varieties capable of withstanding these evolving challenges in a changing climate.

According to Climate Change (2021), climate change has had profound effects on agriculture globally, with numerous countries experiencing significant disruptions to their food production systems as a result of shifting weather patterns and environmental conditions. One notable example of a country severely impacted by climate change is India. The Indian agricultural sector, heavily reliant on monsoon rains for irrigation, has been increasingly vulnerable to erratic rainfall patterns and prolonged droughts attributed to climate change. According to the World Bank (2020), India has witnessed a rise in weather events including heatwaves, leading to crop failures, reduced yields, and water scarcity in many regions. These challenges have

exacerbated food insecurity and livelihood vulnerabilities among rural communities dependent on agriculture for their sustenance.

In sub-Saharan Africa, nations such as Ethiopia have encountered considerable agricultural difficulties stemming from disruptions caused by climate change. Ethiopia, which relies heavily on agriculture, has been struggling with the consequences of unpredictable rainfall, rising temperatures, and frequent droughts, threatening food production and the livelihoods of its population. The African Development Bank (AfDB) (2020) highlights the pressing necessity for adaptive measures and investments in climate-resilient agriculture to alleviate the negative impacts of climate change on Ethiopia's farming communities. These issues illustrate the intricate relationship between climate change, food security, and rural development in a region that is particularly vulnerable to the effects of a shifting climate. Furthermore, Australia, recognized for its varied agricultural environment, has also felt the repercussions of climate change on its agricultural sector. The continent has faced extended droughts, unprecedented bushfires, and severe heatwaves, resulting in significant declines in agricultural productivity and biodiversity. Australian government, as highlighted by the Australian Department of Agriculture, Water and the Environment, has been implementing measures to support farmers in adapting to these changing climatic conditions, including promoting sustainable farming practices, water conservation strategies, and climate-resilient crop varieties. These efforts underscore the critical need for proactive adaptation measures to safeguard agricultural livelihoods and ecosystems in the face of climate-related challenges.

Moreover, in South America, nations such as Brazil are contending with the repercussions of climate change on their agricultural production systems. As a significant global exporter of agricultural goods, Brazil has faced disruptions in its crop yields and livestock production due to alterations in rainfall patterns, deforestation, and land degradation intensified by climate change. The European Environment Agency (EEA) (2020) underscores the interconnected nature of the environmental issues confronting Brazil, highlighting the necessity for integrated strategies for sustainable land management, forest conservation, and climate adaptation to alleviate the effects of climate change on the nation’s agricultural sector. These challenges emphasize the critical need for international collaboration and coordinated initiatives to tackle the intricate relationship between climate change, agriculture, and environmental sustainability in Brazil and beyond.

2.4 Relationship between Agricultural Programs and Climate Change Resilience

The connection between agricultural initiatives such as the Pfumvudza Programme and resilience to climate change has garnered increasing scholarly attention in recent years. In this regard, agricultural strategies aimed at bolstering farmers' resilience to climate change have gained significant importance. The Pfumvudza Programme, which emphasizes the promotion of climate-smart agricultural methods, including minimum tillage, mulching, and the application of organic fertilizers, exemplifies such an initiative (Marongwe et al., 2021). Research indicates that the implementation of these practices can assist smallholder farmers in Zimbabwe in enhancing their productivity, mitigating their susceptibility to climate-induced shocks, and improving their overall resilience (Mazvimavi & Twomlow, 2009; Mupangwa et al., 2017). For example, Mupangwa et al. (2021) discovered that smallholder farmers engaged in the Pfumvudza Programme were more capable of enduring the effects of droughts and unpredictable rainfall patterns, resulting in increased crop yields and food security. Likewise, Marongwe et al. (2021) noted that the program's focus on soil and water conservation methods, such as contour ridges and water harvesting, enabled farmers in the Marondera District to adapt more effectively to the impacts of climate change. Nevertheless, while these studies underscore the potential advantages of the Pfumvudza Programme in enhancing resilience to climate change, further investigation is required to comprehend the specific mechanisms through which the program facilitates these results, as well as the contextual elements that may affect its efficacy (Scoones et al., 2020). Furthermore, additional evidence is necessary regarding the long-term sustainability of the program and its capacity to endure emerging challenges, such as shifts in government policies or economic circumstances (Mazvimavi, 2017).

One initiative is the Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project, which has been operational in nations such as Malawi, Mozambique, and Ethiopia since 2010 (Thierfelder et al., 2017). The SIMLESA project encourages the adoption of conservation agriculture techniques, including minimum tillage, retention of crop residues, and the incorporation of legumes, with the objective of enhancing productivity, resilience, and food security among farmers. Research has indicated that the SIMLESA project has positively influenced food security in the regions involved. Ngwira et al. (2021) discovered that farmers in Malawi who embraced the conservation agriculture methods advocated by the project saw increases in maize yields, improved household dietary diversity, and greater food availability, particularly during periods of drought. Likewise, Corbeels et al. (2020) noted that the integration of legumes into maize-based cropping systems in Mozambique resulted in improved soil fertility, increased crop

yields, and better household nutrition. Conversely, the Pfumvudza Programme, which focuses on minimum tillage, mulching, and the application of organic fertilizers, has also demonstrated a beneficial effect on food security in the areas where it has been implemented (Mupangwa et al., 2021). However, the extent to which the Pfumvudza Programme has been able to achieve similar levels of success in improving food security outcomes as the SIMLESA project remains an area that requires further investigation.

Furthermore, the integration of the Pfumvudza Programme with other agricultural initiatives, such as input subsidy programs or market-based interventions, may be crucial in enhancing its effectiveness in addressing food security challenges (Jayne et al., 2019). Examining the potential of the Pfumvudza Programme could provide valuable insights for policymakers and development practitioners. While the existing literature provides a useful foundation for comparing the impacts of different agricultural programs on food security, there is a need for more comprehensive, cross-country studies that systematically analyze the initiatives in various socio-economic and agro-ecological contexts. Such research could help to identify best practices and guide the design of more effective and context-appropriate interventions for improving food security among smallholder farmers.

2.5 Challenges in Implementation of other Agricultural programs

Implementing agricultural programs linked to the Pfumvudza initiative, despite their potential benefits, encounters several challenges that impede their effectiveness and long-term sustainability. One prominent obstacle lies in the realm of financial constraints and resource limitations. This is evidenced by the Malawi's Farm Input Subsidy Program (FISP) which aims to provide subsidized seeds and fertilizers to smallholder farmers but is grappling with financial constrains. Adequately funding such programs, ensuring consistent access to necessary inputs, and maintaining support services often strain the financial capacities of implementing bodies (McCarthy & Brubaker, 2016). Insufficient funding can hinder the procurement of critical resources like seeds, fertilizers, and equipment, thereby compromising the program's ability to deliver tangible benefits to participating farmers.

Another significant challenge pertains to the intricate nature of behavioral change within farming communities. Encouraging smallholder farmers to adopt new practices and technologies, especially those diverging from traditional methods, demands robust extension services and tailored training programs (Kiptot & Franzel, 2016). Resistance to change, varying

levels of education among farmers, and deeply ingrained agricultural practices can impede the smooth implementation of innovative approaches, requiring sustained efforts in education and capacity building to overcome these barriers effectively. Furthermore, the scalability and adaptability of agricultural programs like Pfumvudza pose notable challenges in diverse agro-ecological settings. What proves successful in one region may not seamlessly translate to another due to differing climatic conditions, soil types, and socio-economic contexts (Debela et al., 2020). This can be withdrawn from the Indonesia's Agricultural Development Program that aims to improve agricultural productivity and food security through sustainable practices but is facing cooperation from the local farmers. Tailoring program interventions to suit the specific needs and challenges of each unique agricultural landscape necessitates a nuanced understanding of local dynamics and a flexible approach to implementation, which can be complex and resource-intensive.

Inadequate infrastructure and technological support present additional hurdles in the successful execution of agricultural programs aimed at enhancing smallholder productivity. Limited access to irrigation systems, post-harvest facilities, and market linkages constrains farmers' ability to maximize their yields and capitalize on the benefits of improved agricultural practices (Omiti et al., 2018). Insufficient infrastructure not only undermines the efficiency of production but also impedes farmers' capacity to store, process, and transport their harvests effectively, limiting their market opportunities and income potential. The sustainability of agricultural programs like China's Agricultural Modernization Program hinges significantly on policy frameworks, institutional support, and governance structures that facilitate their implementation and long-term impact. Weak policy coherence, inadequate regulatory frameworks, and governance gaps can undermine the continuity and effectiveness of such initiatives (Doss et al., 2018). While agricultural programs hold promise in bolstering smallholder productivity and resilience, navigating the myriad challenges inherent in their implementation is essential to realize their full potential. Addressing financial constraints, fostering behavioral change, adapting interventions to local contexts, improving infrastructure support, and strengthening governance mechanisms are pivotal steps towards overcoming these obstacles and fostering sustainable agricultural development on a broader scale.

2.7 Strategies used by other Countries to Overcome Challenges for Better Program Effectiveness

The successful implementation of agricultural programs like the Pfumvudza Programme requires the identification and adoption of effective strategies to overcome the various challenges that have been highlighted in the literature. These strategies can help to enhance the overall effectiveness and inclusiveness of such interventions. One key strategy is to improve the accessibility and affordability of the necessary agricultural inputs and resources for farmers. This can involve the implementation of targeted input subsidy programs, the strengthening of input distribution networks, and the promotion of innovative financing mechanisms, such as microfinance and credit schemes (Jayne et al., 2019). By addressing the barriers to accessing essential inputs, policymakers and development practitioners can facilitate the widespread adoption of the climate-smart practices promoted by the Pfumvudza Programme.

Another important strategy is to invest in strengthening the knowledge and technical capacities of participating farmers. This can be achieved through the expansion and enhancement of agricultural extension services, including the provision of hands-on training, demonstration plots, and farmer field schools (Ngwira et al., 2021). Additionally, the integration of indigenous and local knowledge with scientific expertise can help to develop more context-appropriate and user-friendly training and extension materials.

To guarantee the long-term viability of the Pfumvudza Programme, it is essential to adopt a systems-oriented approach that considers the wider environmental, economic, and social factors affecting its execution. This may entail the creation of comprehensive monitoring and evaluation frameworks, the alignment of the program with complementary initiatives (such as market-based interventions and social safety nets), and the formulation of flexible and adaptive implementation strategies capable of responding to evolving circumstances (Scoones et al., 2020). Additionally, to improve the inclusivity and equity of the Pfumvudza Programme, it is imperative for policymakers and development practitioners to focus on the execution of targeted strategies that tackle the specific challenges and obstacles encountered by women, youth, and other marginalized groups. This could involve the provision of gender-sensitive extension services, the encouragement of women's involvement and leadership in program decision-making, and the incorporation of social protection measures to assist the most vulnerable households (Frelat et al., 2016).

2.8 Case Studies

2.8.1 United States

The adoption of Conservation Agriculture is most prevalent in the North-Western regions of North America, particularly in the United States, where adoption rates exceed 50%. This trend arises from the understanding that agricultural intensification through conventional intensive tillage in the United States has adversely impacted the quality of vital natural resources, including soil, water, terrain, biodiversity, and the ecosystem services that nature provides. The degradation of the land resource base in the United States has led to a decline in crop yields and factor productivity, thereby encouraging the shift towards an alternative production method known as Conservation Agriculture, which is both ecologically sustainable and economically viable. To enhance soil fertility and conserve water, particularly in arid areas and during periods of reduced rainfall, Conservation Agriculture involves practices such as zero tillage and mulching of farmland (Mhlanga et al., 2015). The no-till system paradigm of Conservation Agriculture has successfully achieved these goals in the United States, resulting in reduced energy and mineral nitrogen consumption in farming, which in turn lowers greenhouse gas emissions and boosts biological activity in the soil. This has led to sustained long-term yields and increased factor productivity. In this context, Conservation Agriculture has promoted effective agronomic practices, including timely operations and improved overall land management for both rain-fed and irrigated agricultural production across the United States. As a result, Conservation Agriculture has positioned the United States as the leading exporter of agricultural products as of 2023.

2.8.2 Mozambique

Mozambique has embraced Conservation Agriculture in numerous regions over the past 20 to 25 years due to the increasingly pronounced effects of climate change on the agricultural sector, which have manifested with greater frequency and severity. Rural communities are particularly vulnerable to droughts induced by climate change, especially within the agricultural domain (Frischen et al., 2020; Maia et al., 2015; Tadesse, 2016). This situation has adversely affected degraded ecosystems that have ceased to fulfill essential functions such as water infiltration and the maintenance of hydrological cycles. In response, the government of Mozambique has developed a new framework for sustainable production intensification through Conservation Agriculture, which acknowledges the necessity for agriculture that is both productive and profitable while also conserving and enhancing the natural resource base and environment. When combined with other established best practices, such as the utilization of high-quality

seeds and integrated management of pesticides, nutrients, weeds, and water, Mozambique's agricultural sector has experienced a significant boost in productivity. The government's implementation of Conservation Agriculture has led to improved food security by enhancing local access to nutritious food and promoting sustainable intensification. Additionally, there has been a notable increase in resilience to climate change.

2.9 Chapter Summary

Mozambique has embraced Conservation Agriculture in numerous regions over the past 20 to 25 years due to the increasingly pronounced effects of climate change on the agricultural sector, which have manifested with greater frequency and severity. Rural communities are particularly vulnerable to droughts induced by climate change, especially within the agricultural domain (Frischen et al., 2020; Maia et al., 2015; Tadesse, 2016). This situation has adversely affected degraded ecosystems that have ceased to fulfill essential functions such as water infiltration and the maintenance of hydrological cycles. In response, the government of Mozambique has developed a new framework for sustainable production intensification through Conservation Agriculture, which acknowledges the necessity for agriculture that is both productive and profitable while also conserving and enhancing the natural resource base and environment. When combined with other established best practices, such as the utilization of high-quality seeds and integrated management of pesticides, nutrients, weeds, and water, Mozambique's agricultural sector has experienced a significant boost in productivity. The government's implementation of Conservation Agriculture has led to improved food security by enhancing local access to nutritious food and promoting sustainable intensification. Additionally, there has been a notable increase in resilience to climate change.

This extensive literature review has offered significant insights into the elements affecting food security, the effects of agricultural initiatives such as the Pfumvudza Programme, and the obstacles related to their execution. The results indicate that the Pfumvudza Programme holds the promise of improving food security for farmers by encouraging climate-smart agricultural methods, including minimum tillage, mulching, and the application of organic fertilizers. Nevertheless, the program's effectiveness is influenced by various individual, household, community, and systemic factors, such as resource accessibility, technical skills, social connections, and the overarching policy landscape.The literature also highlights key

implementation challenges, such as input accessibility, knowledge gaps, and the need for long-term sustainability and equity, and provides strategies and recommendations to address these issues. This theoretical and empirical foundation lays the groundwork for a more in-depth exploration of the Pfumvudza Programme's impact and the factors shaping its implementation within the specific context of the study region.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter delineated the research methodology utilized in this study to examine the effects of the Pfumvudza Programme in Marondera District, Zimbabwe, particularly focusing on Ward 16. The chapter elaborated on the research philosophy, methodology, design, target population, sample size, sampling techniques, data collection methods, data analysis and presentation, along with considerations for validity, reliability, and ethical issues.

3.1 Research Philosophy

The research philosophy that underlies this study is interpretivism. Research philosophy pertains to the foundational assumptions and beliefs that inform the researcher's approach to investigating a phenomenon (Saunders et al., 2019). Interpretivism represents a research paradigm that highlights the subjective interpretation of social reality and recognizes the researcher's role in shaping the research process (Creswell & Creswell, 2018). This interpretivist approach is particularly appropriate for the current study, as it aims to comprehend the experiences, perceptions, and meanings that smallholder farmers associate with the Pfumvudza Programme and its effects on their lives. By adopting an interpretivist perspective, the researcher can achieve a nuanced and contextual understanding of the program's implementation and its impact on the participants' resilience to climate change and food security. This philosophical framework enables the researcher to investigate the subjective experiences of the farmers, capturing the complexities and nuances of their interaction with the Pfumvudza Programme within the specific socio-cultural and environmental context of the study area (Bryman, 2016).

3.2 Research Methodology

Research methodology pertains to the organized strategies and techniques utilized to carry out research and fulfill the research aims (Creswell & Creswell, 2018). This investigation adopted a qualitative research approach. Qualitative methodology encompasses the amalgamation of data, methods, and analyses within a singular study to offer a more thorough comprehension of the research issue (Tashakkori & Teddlie, 2010). The application of qualitative methodology enabled the researcher to leverage the advantages of qualitative data, thereby delivering a more enriched and comprehensive analysis of the Pfumvudza Programme's execution and its effects on the smallholder farmers involved.The qualitative component of the study explored the participants' experiences, challenges, and perspectives regarding the program. By combining

and employing this approach, the researcher gained a deeper and more nuanced understanding complex factors shaping Pfumvudza Programme's effectiveness and the unique contextual considerations within the study area.

3.3 Research Design

Research design pertains to the comprehensive strategy and framework utilized to explore a research issue and fulfill the research aims (Yin, 2018). In this study, a case study research design was adopted, which entails a thorough investigation of a particular phenomenon within its actual context (Yin, 2018). Case study research encompasses an exhaustive and meticulous analysis of a single case or a limited number of cases, with the objective of delivering an in-depth understanding of the intricacies and subtleties of the phenomenon being studied (Creswell & Poth, 2018). The case study methodology is particularly appropriate for this research, as it facilitates a thorough examination of the implementation of the Pfumvudza Programme and its effects on the smallholder farmers in Ward 16 of Marondera District. By focusing on a specific geographical area and community, the researcher gained a deep understanding of the unique contextual factors that shape the program's outcomes, generate rich and contextual data, and provide valuable insights that can inform the future development and refinement of the Pfumvudza Programme.

3.4Target Population

The target population for this study comprises smallholder farmers, village heads, and agricultural extension officers in Ward 16 of Marondera District, Zimbabwe, who are participating in the Pfumvudza Programme. This population was selected as the focus of the study due to the program's implementation in the area and the potential for valuable insights into its impact on the local farming community. Ward 16 of Marondera District is a predominantly agricultural region, with a significant number of smallholder farmers who rely on subsistence farming as their primary livelihood. These farmers are the intended beneficiaries of the Pfumvudza Programme, which aims to enhance their climate change resilience through the promotion of sustainable agricultural practices. By focusing on this target population, the researcher gained a deeper understanding of the program's implementation and its effects on the lives and livelihoods of the participating farmers within their specific socio-economic and environmental context.

3.5 Sample Size

The sample size denotes the quantity of participants or observations incorporated in a study (Saunders et al., 2019). In this research, the sample size consisted of 20 participants. This sample size of 20 was established in accordance with the principles of qualitative research and the necessity to attain data saturation. A sample size of 20 was considered appropriate for qualitative case study research, as it provided a rich and detailed understanding of the Pfumvudza Programme's implementation and its effects on the participating smallholder farmers in Ward 16 of Marondera District (Creswell & Poth, 2018). The selection of 20 participants for this study ensured that the researcher can gather a wide range of perspectives and experiences from the target population, while also allowing for in-depth exploration and analysis of the data. This sample size was expected to provide the necessary depth and breadth of information to address the research objectives and generate meaningful insights into the impact of the Pfumvudza Programme participating smallholder farmers. From the selected sample 5 participants were from the academia, 5 were policy makers from the Ministry of Agriculture, 5 were representing community leaders such as village heads, 5 were extension officers.

3.6 Sampling Techniques

Sampling techniques denote the various methods utilized to choose a subset of individuals or units from a broader population for inclusion in a research study (Etikan et al., 2016). This research implemented two distinct sampling techniques: purposive sampling and snowball sampling.

3.7. Purposive Sampling

Purposive sampling is categorized as a non-probability sampling technique wherein the researcher deliberately selects participants based on their significance to the research aims (Etikan et al., 2016). In this investigation, the researcher intentionally chose smallholder farmers who were actively engaged in the Pfumvudza Programme in Ward 16 of Marondera District. This strategy ensured that the sample comprised information-rich cases capable of offering valuable insights into the experiences, perceptions, and effects of the Pfumvudza Programme within the specific context of the study area. Purposive sampling enabled the researcher to focus on the most suitable participants to address the research inquiries and foster a more profound understanding of the phenomenon under investigation.

3.8 Data Collection

Data collection pertains to the organized process of acquiring information from diverse sources to fulfill the research objectives (Creswell & Creswell, 2018). This study utilized two primary methods for data collection: questionnaires and interviews.

3.8.1 Questionnaires

Questionnaires represent a data collection method that employs a series of structured questions or items aimed at gathering information from respondents (Brace, 2018). In this research, the researcher employed questionnaires to obtain quantitative data from the participating smallholder farmers. The questionnaires were crafted to collect information regarding the farmers' demographic characteristics, farming practices, crop yields, household food security, and their perceptions of the Pfumvudza Programme's influence on their resilience to climate change. The use of questionnaires enabled the researcher to gather standardized data that could be analyzed statistically, providing a quantitative assessment of the program's measurable outcomes.

3.8.2 Semi-structured Interviews

Interviews serve as a qualitative method for data collection, wherein the researcher asks questions to participants and engages in dialogue to obtain detailed insights into their experiences, perceptions, and viewpoints (Brinkmann, 2014). In this research, the investigator carried out semi-structured interviews with smallholder farmers who participated in the study. This semi-structured approach enabled the researcher to delve into the farmers' experiences

with the Pfumvudza Programme, their perceived advantages and challenges, as well as their recommendations for enhancing the program's implementation. The qualitative data obtained from these interviews offered a rich and contextual understanding of the elements influencing the program's effectiveness and its effects on the local farming community.

3.9 Data Analysis and Presentation

The qualitative data gathered from the semi-structured interviews underwent thematic analysis, which entails identifying, analyzing, and interpreting patterns and themes present within the interview transcripts (Braun & Clarke, 2006). This analytical process allowed the researcher to achieve a more profound contextual understanding of the farmers' experiences, challenges, and perceptions related to the Pfumvudza Programme. The results from the qualitative analyses were subsequently presented in a clear and thorough manner, utilizing tables, figures, and narrative descriptions to communicate the key insights and their implications for the implementation and future development of the Pfumvudza Programme.

3.10 Validity and Reliability

Validity and reliability are essential factors in ensuring the quality and credibility of research findings (Creswell & Creswell, 2018). Validity pertains to the degree to which a study accurately measures its intended constructs, while reliability relates to the consistency and dependability of the research process and outcomes (Saunders et al., 2019). In this investigation, the researcher implemented various strategies to bolster the validity and reliability of the research findings

To ensure validity, the researcher employed triangulation, which entails utilizing various data sources and methodologies to validate the findings (Creswell & Creswell, 2018). Furthermore, the researcher implemented member checking, wherein participants were invited to offer feedback regarding the accuracy of the interpretations (Creswell & Creswell, 2018). For the purpose of reliability, the researcher kept meticulous records of the research process, encompassing the procedures for data collection and analysis, to guarantee transparency and consistency (Saunders et al., 2019). These strategies contributed to enhancing the credibility,

transferability, and dependability of the study, ensuring that the findings accurately represent the experiences and viewpoints of the participating smallholder farmers and can be confidently applied to analogous contexts.

3.11 Ethical Considerations

Ethical considerations in research pertain to the principles and guidelines that researchers must follow to safeguard the rights, well-being, and dignity of the participants involved in the study (Bryman & Bell, 2015). Adhering to ethical research practices is essential to uphold the integrity of the research process and to maintain the trust and confidence of both the research participants and the wider community.

In this investigation, the researcher adhered to a thorough set of ethical guidelines to ensure the protection of the participating smallholder farmers. This involved obtaining informed consent from all participants, guaranteeing the confidentiality and anonymity of the collected data, and acquiring the necessary permissions from relevant authorities and institutions (Saunders et al., 2019). The researcher also emphasized minimizing any potential harm or risks to the participants and maintained transparency throughout the research process. Additionally, ethical approval was secured from the appropriate institutional review board or ethics committee prior to the initiation of data collection. By adhering to these ethical principles, the researcher sought to establish a secure and reliable atmosphere for participants to express their experiences and viewpoints, thereby enhancing the credibility and reliability of the research outcomes.

3.12 Chapter Summary

This chapter has delineated the research philosophy, methodology, design, and methods utilized in this investigation. The research embraced an interpretivist paradigm, acknowledging the subjective essence of the participants' experiences and the researcher's influence on the inquiry. A mixed methodology, integrating both qualitative and quantitative strategies, was employed to offer a thorough understanding of the Pfumvudza Programme's execution and its effects on the smallholder farmers involved in Ward 16 of Marondera District, Zimbabwe. The case study design facilitated a detailed analysis of the program within its actual context. The

target demographic comprised 20 smallholder farmers, chosen through a blend of purposive and snowball sampling methods. Data collection was conducted using questionnaires and semi-structured interviews, with analysis performed through both quantitative and qualitative techniques to ensure the findings' validity and reliability. Throughout the research endeavor, the researcher maintained ethical standards to safeguard the rights and welfare of the participants. The comprehensive account of the research methodology lays a solid groundwork for the forthcoming presentation and discussion of the study's results.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter has outlined the findings of the research, which sought to explore the effects of the Pfumvudza Programme in Ward 16 of the Marondera District, Zimbabwe. It commenced with an overview of the demographic attributes of the participants, followed by an analysis of the results regarding the efficacy of the Pfumvudza Programme in bolstering climate change resilience, its influence on food security among farmers, the obstacles encountered during its execution, and the evidence-based recommendations to address its deficiencies. The results are organized thematically, utilizing qualitative data gathered from interviews with farmers, village leaders, and agricultural extension agents. The chapter concludes with a summary of the principal findings and their implications for policy and practice.

4.2 Demographic Profile of Participants

4.2.1 Participant Distribution by Gender

Table 4.1: Distribution of Respondents by Gender

Response	**Frequency**	**Percentage**
Male	13	65%
Female	7	35%
Total	20	100

The results in Table 4.1 showed that majority of the participants (65%) were male, while 35% were female. This indicated that there is a slightly higher representation of males in the study area because it is a patriarchal society where men are expected to be dominant figures in the household, leading them to spend more time at home.

4.2.2 Distribution of Respondents by Age

Table 4.2: Distribution of Respondents by Age

Response	**Frequency**	**Percentage**
20-29	3	15%
30-39	7	35%
40-49	4	20%
50-59	4	20%

60+	2	10%
Total	20	100

The result in Table 4.2 showed that the number of participants (35%) fall within the age range of 30-39 years. The age range of 40-49 and 50-59 years followed closely with 20% of the participants. The youngest age range of 20-29 years had the least representation with 15% of the respondents

4.3 Effectiveness of the Pfumvudza Programme in Enhancing Climate Change Resilience

4.3.1 Enhanced resilience to climate change

The effectiveness of the Pfumvudza Programme in enhancing climate change resilience was assessed through a series of questions that explored the participants' awareness of climate change, perceived benefits of the programme, and challenges faced in implementing the programme. The majority of participants agreed that the Pfumvudza Programme had enhanced their resilience to climate change. When asked about their awareness of climate change, most participants demonstrated a good understanding of the concept and its impacts on agriculture. For instance, P1, a farmer, noted:

> *I know that change of climate is a big challenge which affects our farming. The rains are not coming like they used to, and when they do, they are too much. It's making it hard for us to grow our crops." (P1)*

The findings suggested that the Pfumvudza Programme has been effective in enhancing climate change resilience among participants. The majority of participants reported an increased awareness of climate change and its effects on agriculture, demonstrating a good understanding of the concept. This is evident in P1's quote, which highlighted the farmer's awareness of the changes in rainfall patterns and their impact (Mertz et al., 2009).

Perceived benefits of the programme, as reported by participants, suggested that it has contributed to enhanced climate change resilience. Participants cited improved crop yields, increased food security, and better livelihoods as benefits of the programme. These findings were consistent with previous research on the effectiveness of conservation agriculture and

climate-smart agriculture practices in enhancing climate change resilience (Hansen et al., 2019; Lipper et al., 2014). However, participants also reported challenges in implementing the programme, including limited access to inputs, inadequate training, and insufficient support from extension services. These challenges highlight edthe need for continued support and resources to ensure the sustainability of the programme (Kuntashula et al., 2015)

4.3.2 Improved crop yields

Similarly, P5, a village head, observed:

> *We used to have good rains, but now it's either too much or too little. It's affecting our crops and our livestock. We need to find ways to adapt to these changes." (P5)*

Regarding the perceived benefits of the Pfumvudza Programme, most participants cited improved crop yields, increased food security, and enhanced resilience to climate-related shocks. For example, P10, a farmer, noted:

> *"The Pfumvudza Programme has helped me to improve my crop yields. I'm now able to grow more crops and sell them at the market. It's helped to provide for my family." (P10)*

The findings of this study suggested that the Pfumvudza Programme has been effective in enhancing the resilience of farmers to climate changeThe program emphasizes conservation agriculture, crop diversification, and climate-smart practices, which have enabled farmers to adjust to climate-induced challenges and enhance their crop production. These results align with the literature review, indicating that both conservation agriculture and climate-smart agriculture can assist farmers in adapting to climate change (Hansen et al., 2019; Lipper et al., 2014).However, the findings also highlighted the need for adequate support services, including access to inputs, training, and extension services, to ensure the successful implementation of the programme.

4.3.3 Increased access to food

The majority of participants agreed that the Pfumvudza Programme had improved their access to food, availability of food, and utilization of food. When asked about their access to food, most participants reported that the programme had enabled them to produce more food and have a steady supply of food throughout the year. For instance, P3, a farmer, noted:

"Before the Pfumvudza Programme, we used to struggle to get food. We would have to buy food from the shops, which was expensive. But now, we are able to produce our own food and have a steady supply throughout the year." (P3)

The results indicate that the Pfumvudza Programme has positively influenced participants' access to food, food availability, and food utilization. By emphasizing conservation agriculture and climate-smart agricultural practices, the programme has empowered participants to increase their food production and maintain a consistent supply throughout the year. This aligns with earlier studies regarding the effects of conservation agriculture and climate-smart practices on food security. Furthermore, the findings underscored the significance of initiatives like Pfumvudza in enhancing food security and alleviating poverty among smallholder farmers.

The quote from P3 also highlighted the economic benefits of the programme, as participants are able to save money by producing their own food instead of buying it from shops. This suggested that the programme has had a positive impact on participants' livelihoods and well-being. The findings had implications for policy and practice. Firstly, they suggested that programmes like Pfumvudza should be scaled up and replicated in other areas to reach more smallholder farmers. Secondly, they point out the significance of continued resources to ensure sustainability of such programmes.

4.4.4 Enhanced availability of households food

Regarding the availability of food, most participants reported that the programme had increased the availability of food in their households. For example, P8, a farmer, observed:

"We used to have a lot of food shortages in our household. But since we started the Pfumvudza Programme, we have been able to produce more food and have a steady supply. We no longer have to worry about where our next meal will come from." (P8)

The findings suggested that the Pfumvudza Programme has had a significant impact on the availability of food in participants' households. The programme's focus on conservation agriculture and climate-smart agriculture practices has enabled participants to produce more food and have a steady supply throughout the year. Notably, programme's impact on food security is evident in the participants' testimonies. For instance, P8's statement highlighted the programme's success in improving food availability and reducing food insecurity. The fact that

participants no longer have to worry about where their next meal had came from underscores the programme's effectiveness in addressing food security concerns. This finding has important implications for policymakers and practitioners working towards reducing poverty.

4.4.5 Improved utilization of food

In terms of utilization of food, most participants reported that the programme had enabled them to make better use of the food they produced. For instance, P12, a farmer, noted:

> *"We used to waste a lot of food because we didn't know how to store it properly. But since we started the Pfumvudza Programme, we have learned how to store our food properly and make better use of it. We are now able to eat a more balanced diet and have better health." (P12)*

The programme has improved farmers' access to food, availability of food, and utilization of food. These findings were consistent with the literature review, which suggested that programmes that promote conservation agriculture and climate-smart agriculture can improve food security. However, the findings also highlighted the need for continued support and training for farmers to ensure that they are able to sustainably produce and utilize food. As noted by P15, a farmer:

4.5 Difficulties encountered during the Implementation of Pfumvudza Programme

The challenges faced in the implementation of the Pfumvudza Programme were assessed through a series of questions that explored the technical, financial, and social challenges encountered by the participants. The majority of participants agreed that the implementation of the Pfumvudza Programme was faced with several challenges, including technical, financial, and social challenges.

4.5.1 Technical challenges

When asked about the technical challenges, most participants reported that they faced difficulties in accessing and using the conservation agriculture equipment and inputs provided by the programme. For instance, P2, a farmer, noted

> "We were given the equipment and inputs, but we didn't know how to use them properly. We needed more training and support to be able to use them effectively." (P2)

This finding highlighted a critical gap in the programme's implementation. While the programme provided participants with equipment and inputs, it appeared that insufficient training and support was provided to ensure that participants could use these resources effectively. This is a significant oversight, as inadequate training can lead to reduced productivity, decreased efficiency, and increased frustration among participants. As P2's statement suggested, participants require more than just equipment and inputs to succeed; they also need the knowledge and skills to use these resources effectively. By providing inadequate training, the programme may be inadvertently limiting its own potential impact.

4.5.2 Financial constrains

Regarding the financial challenges, most participants reported that they faced difficulties in accessing credit and other financial services to support their farming activities. For example, P10, a farmer, observed:

> *"We need credit to buy the inputs and equipment we need, but it's hard to access. The interest rates are high, and the repayment terms are strict." (P10)*

This finding highlighted the financial constraints faced by smallholder farmers in accessing credit and financial services. High interest rates and strict repayment terms can further exacerbate these challenges, making it difficult for farmers to escape the cycle of poverty. Addressing these financial challenges will require innovative solutions, such as microfinance initiatives, mobile banking services, and other financial inclusion strategies that cater to the needs of smallholder farmers

4.5.3 Reluctant to adapt new method

In terms of social challenges, most participants reported that they faced difficulties in changing their traditional farming practices and adopting the new conservation agriculture practices promoted by the programme. For instance, P15, a farmer, noted:

> *"It's hard to change the way we farm. We've been doing it the same way for years, and it's hard to adopt new practices. But we know it's necessary if we want to improve our yields and incomes." (P15)*

The findings of this study suggested that the implementation of the Pfumvudza Programme was faced with several challenges, including technical, financial, and social challenges. These

findings were consistent with the literature review, which suggests that the adoption of conservation agriculture practices is often hindered by technical, financial, and social barriers (Hansen et al., 2019; Lipper et al., 2014).

4.6 Evidence-Based Solutions to the Shortcomings of Pfumvudza Programme

The solutions to the shortcomings of the Pfumvudza Programme were assessed through a series of questions that explored the policy recommendations, capacity building and training, and community engagement and participation. The majority of participants agreed that the Pfumvudza Programme requires policy recommendations, capacity building and training, and community engagement and participation to address its shortcomings. When asked about policy recommendations, most participants suggested that the government should provide more support to farmers, including subsidies for inputs and equipment, and credit facilities to support their farming activities.

4.6.1 Need for more support to farmers

Participants also provided recommendations for government support to enhance the effectiveness of the programme. For example, P5 noted:

> *"The government should provide more support to farmers. We need subsidies for inputs and equipment, and credit facilities to support our farming activities." (P5)*

This recommendation highlighted the need for government support to address the financial constraints faced by smallholder farmers. By providing subsidies for inputs and equipment, the government can help reduce the financial burden on farmers and enable them to invest in their farms. Additionally, credit facilities can provide farmers with the necessary financing to support their farming activities, such as purchasing inputs and equipment. This support can help increase farmers' productivity, incomes, and overall well-being. Furthermore, government support can also help to promote agricultural development and food security, which are critical for the country's economic growth and development.

4.6.2 Enhanced farmer's capacity building and training

Regarding capacity building and training, most participants suggested that the programme should provide more training and capacity building for farmers, including training on

conservation agriculture practices, and business management skills. For example, P10, a farmer, observed:

> *We need more training and capacity building to be able to adopt these new practices. We also need business management skills to be able to market our produce effectively." (P10)*

This finding highlighted the importance of capacity building and training in supporting the adoption of conservation agriculture practices and improving farmers' livelihoods. By providing training on conservation agriculture practices, business management skills, and marketing, the programme can help farmers to overcome the technical and financial barriers that hinder their ability to adopt new practices and improve their productivity and incomes. This, in turn, can contribute to improved food security, reduced poverty, and enhanced resilience to climate change.

4.6.3 Increased community engagement and participation

In terms of community engagement and participation, most participants suggested that the programme should involve more community participation, including the involvement of traditional leaders, and community-based organizations. For instance, P15, a farmer, noted:

> *The programme should involve more community participation. We need to involve traditional leaders, and community-based organizations to ensure that the programme is owned by the community." (P15)*

The findings of this study suggested that the Pfumvudza Programme requires policy recommendations, capacity building and training, and community engagement and participation to address its shortcomings. These findings were consistent with the literature review, which suggested that policy support, capacity building and training, and community engagement and participation are critical for the success of agricultural development. However, findings also highlighted the need for a more nuanced approach to policy support, capacity building and training, and community engagement and participation.

4.7 Chapter Summary

The chapter presented results of the research, which investigated the impact of the Pfumvudza Programme in Marondera District, Zimbabwe. The findings revealed that the programme is effective for enhancing climate change resilience and improving farmer food security, but faced challenges such as limited access to inputs, inadequate training, and poor extension services. The study also identified evidence-based solutions to the program's shortcomings, including policy recommendations, capacity building and training, and community engagement and participation. Overall, the findings provide valuable insights into the impact of the Pfumvudza Programme and highlight areas for improvement to ensure its sustainability and effectiveness in enhancing farmer food security and climate change resilience.

CHAPTER 5

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND AREAS FOR FURTHER RESEARCH

5.1 Introduction

This chapter provided a comprehensive summary of the study's findings, conclusions, recommendations, and areas for further research. The study investigated the impact of the Pfumvudza Programme on climate change resilience, food security, and challenges faced by farmers in Marondera District, Ward 16.

5.2 Summary of the Study

This research investigated the effects of the Pfumvudza Programme on climate change resilience, food security, and the challenges encountered by farmers in Marondera District, Ward 16. The study was driven by the necessity to assess the programme's effectiveness in improving the livelihoods of smallholder farmers in Zimbabwe. Chapter one of this research provided an overview of the issue, serving as the introductory chapter. It outlined the aims and objectives of the study, as well as its significance.

Chapter two began with an extensive literature review that analyzed the theoretical frameworks related to climate change resilience, food security, and sustainable agriculture. The review indicated that conservation agriculture, a fundamental aspect of the Pfumvudza Programme, is

an essential strategy for bolstering climate change resilience among smallholder farmers. Additionally, the review emphasized the need to take into account the socio-economic and environmental contexts in which farmers operate.

In Chapter three the study employed a research design of qualitative data collection and analysis methods. A survey questionnaire was administered to farmers in Marondera District, Ward 16, to gather data on their demographic characteristics, farming practices, and perceptions of the Pfumvudza Programme. Additionally, participants were interviewed were unstructured interviews were conducted with farmers, agricultural extension officers, and other stakeholders to gather more detailed information on the program's implementation and impact.

Chapter four examined the results of the study. The findings indicated that the Pfumvudza Programme has positively influenced climate change resilience among farmers in Marondera District, Ward 16. The program's conservation agriculture practices, including mulching and crop rotation, have enabled farmers to adjust to climate change. Furthermore, the program's focus on small-grain production has enhanced food security for farmers. Nevertheless, the study also highlighted several obstacles encountered by farmers, such as limited access to inputs, insufficient training, and unfavorable market prices.

5.3 Conclusions

The objective was to assess the effectiveness of the Pfumvudza Programme in improving the climate change resilience of farmers in the study area. The findings revealed that the Pfumvudza Programme has effectively enhanced the climate change resilience of farmers in Marondera District, Ward 16. The program's conservation agriculture methods, such as mulching and crop rotation, have assisted farmers in adapting to climate change by enhancing soil health, minimizing erosion, and boosting crop yields. Additionally, the program's focus on small-grain production has strengthened food security among farmers, decreasing their dependence on maize and other crops sensitive to climate variations. In summary, the Pfumvudza Programme has proven effective in bolstering the climate change resilience of farmers in Marondera District, Ward 16. The program's conservation agriculture techniques and focus on small-grain production have improved farmers' capacity to adapt to climate change, thereby reducing their susceptibility to climate-related shocks. These findings corroborate existing literature regarding the significance of conservation agriculture in enhancing climate change resilience among smallholder farmers. Consequently, it is advised

that the Pfumvudza Programme be expanded to benefit more farmers, especially in rural regions where access to resources is limited

To evaluate the implementation of Pfumvudza Programme on farmer food security in Zimbabwe.

The study found that the Pfumvudza Programme has improved food security among farmers in Marondera District, Ward 16. The program's emphasis on small-grain production has increased the availability of food for farmers, reducing their reliance on maize and other climate-sensitive. The program's emphasis on small-grain production and conservation agriculture techniques has increased the availability of food for farmers, reducing their reliance on climate-sensitive crops. These findings support the small-grain production and conservation agriculture in improving food security among smallholder farmers. Therefore, it is recommended that the Pfumvudza Programme be integrated with other food security initiatives to enhance its impact on farmer food security in Zimbabwe.

To assess the challenges faced in the implementation of Pfumvudza Programme

The study found that farmers in Marondera District, Ward 16 face several challenges in implementing the Pfumvudza Programme, including limited access to inputs, inadequate training, and poor market prices. These challenges have limited the program's impact, reducing farmers' ability to adopt conservation agriculture techniques and improve their livelihoods. Additionally, the study found that the program's implementation has been affected by inadequate funding, poor extension services, and limited community engagement. In conclusion, the implementation of the Pfumvudza Programme has been affected by several challenges, including limited access to inputs, inadequate training, and poor market prices. These challenges have reduced the program's impact, limiting farmers' ability to adopt conservation agriculture techniques and improve their livelihoods. Therefore, it is recommended that the government and other stakeholders address these challenges by increasing funding for the programme, improving extension services, and enhancing community engagement. Additionally, the programme should be designed to factor out the specific needs of farmers, including access to inputs, training, and markets.

The study's findings supported existing theories on the importance of conservation agriculture in enhancing climate change resilience. The research findings also supported the theory that

small-grain production can improve food security among smallholder farmers (Smale et al., 2011). There are several plausible reasons why the results might have turned out the way they did. Firstly, the Pfumvudza Programme's emphasis on conservation agriculture techniques, such as mulching and crop rotation, may have helped farmers to adapt to climate change. Secondly, the programme's focus on small-grain production may have improved food security among farmers. Finally, the programme's training and extension services may have helped farmers to develop the skills and knowledge needed to implement conservation agriculture techniques.

Nevertheless, the results of the study underscored various obstacles encountered by farmers, such as restricted access to essential inputs, insufficient training, and unfavorable market prices. These obstacles may have constrained the programme's effectiveness and underscore the necessity for enhanced support and resources for farmers. Consequently, the findings of this study offered significant insights into the effects of the Pfumvudza Programme on climate change resilience, food security, and the challenges faced by farmers in Marondera District, Ward 16. The outcomes corroborated existing theories regarding the significance of conservation agriculture and small-grain production in bolstering climate change resilience and food security. Nonetheless, the study's findings also brought to light several challenges faced by farmers, which may have curtailed the programme's overall impact.

5.4 Recommendations

In light of the findings from this study, the following recommendations are proposed for stakeholders:

To the Lands Ministry

- The Lands Ministry should consider scaling up the Pfumvudza Programme to reach more farmers, particularly in remote areas where access to inputs or training is limited.
- The Lands Ministry should increase funding for agricultural extension services to support farmers in implementing conservation agriculture techniques and improving their livelihoods.
- The government should develop policies to support smallholder farmers, including access to credit, markets, and inputs.

To Non-Governmental Organizations (NGOs) and Development Partners:

- NGOs and development partners should consider supporting the Pfumvudza Programme, particularly in places that access to inputs and training is little.
- NGOs and development partners should provide training and extension services to support farmers in implementing conservation agriculture techniques and improving their livelihoods.
- NGOs and development partners should advocate for policies to support smallholder farmers, including access to credit, markets, and inputs.

To Farmers

- Farmers should adopt conservation agriculture techniques, such as mulching and crop rotation, to improve their livelihoods and adapt to climate change.
- Farmers should join farmer organizations to access training, extension services, and markets.
- Farmers should advocate for their rights, including access to credit, markets, and inputs.

5.5 Areas for Further Research

This study has provided valuable insights onto the impact of the Pfumvudza Programme in Marondera District, Ward 16 in Zimbabwe. However, several areas remain for further research:

- This study's findings highlight the need for further research on the impact of conservation agriculture program's, such as Pfumvudza, on smallholder farmers' livelihoods and climate change resilience.
- Future studies could explore the long-term effects of conservation agriculture on soil health, water quality, and biodiversity, as well as the economic and social benefits for farmers.
- Additionally, research could investigate the scalability and sustainability of program's like Pfumvudza, including the role of government policies, market access, and community engagement.

- Furthermore, studies could examine the potential for integrating conservation agriculture with other climate-smart agriculture practices, such as agroforestry and climate information services.

By exploring these areas, researchers can provide valuable insights to inform the development of effective and sustainable agricultural program's that support the livelihoods of smallholder farmers in Zimbabwe and beyond.

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APPENDICES

Appendix A : Research Permission Letter

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Bindura University of Science Education

FACULTY OF SOCIAL SCIENCES AND HUMANITIES

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DEPARTMENT OF PEACE AND GOVERNANCE

20 March 2025

TO WHOM IT MAY CONCERN

RE: REQUEST TO UNDERTAKE RESEARCH IN YOUR ORGANISATION

This serves to introduce the bearer, **MUGAMU TINOTENDA** Student Registration Number **B213852B** who is a **HBSC PEACE AND GOVERNANCE** student at Bindura University of Science Education and is carrying out a research project in your area/institution.

May you please assist the student to access data relevant to the study, and where possible, conduct interviews as part of a data collection process.

Yours respectfully

BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF PEACE AND GOVERNANCE
CHAIRPERSON
20 MAR 2025
FACULTY OF SOCIAL SCIENCES & HUMANITIES
PRIVATE BAG 1020, BINDURA, ZIMBABWE

J.KUREBWA (DR)
Acting Chairperson

COUNCILLOR
MARONDERA RURAL DISTRICT COUNCIL
WARD 16, MARONDERA
23 MAR 2025
SIGN: .....
TEL: 0086 77 009 553

Appendix B : Interview Guide for Farmers

Preamble

You are being invited to participate in a research study conducted by Tinotenda Mugamu, a Peace and Governance undergraduate student. I am undertaking a research study titled The impact of the Pfumvudza Programme in Marondera District, a case study of Ward 16. I am kindly requesting you to participate in the research, your participation will be greatly appreciated. The study is purely for educational purposes and information will be treated with the utmost confidentiality. You are also assured that your responses will be treated with anonymity and that users of the final research report will not be able to trace the responses to you, your family or your organization. To help uphold anonymity, you are encouraged not to state your name or any information that may disclose your personal information.

Please read the following information carefully before agreeing to participate. Participation in this study is completely voluntary, and you are free to withdraw at any time without facing any consequences. You may also choose not to answer any questions you feel uncomfortable with. All responses will be kept confidential and anonymous, and will be used solely for research purposes.

Thank you for taking the time to participate in this study. Your input is greatly appreciated. Should you require further information or clarity please feel free to contact me on **+263785385832**or my supervisor on +263777675495

1. How has the Pfumvudza Programme influenced your farming practices to adapt to changing climatic conditions?
2. Have you noticed any improvements in crop yields or soil health since participating in the programme?
3. How has the Pfumvudza Programme contributed to your household's food security?
4. Have there been noticeable changes in the availability and diversity of food since implementing the program?
5. What are the main challenges you have encountered in implementing the Pfumvudza Programme?
6. Have there been any difficulties accessing resources or support for the programme?
7. Based on your experience, what improvements or changes do you think could enhance the effectiveness of the Pfumvudza Programme?
8. Are there any specific support mechanisms or resources you believe would address the shortcomings of the programme?

Appendix C :Interview Guide for Academic Personnel

1. How do you perceive the role of the Pfumvudza Programme in enhancing climate change resilience among farmers in Ward 16?
2. From an academic perspective, what methodologies could be employed to assess the effectiveness of the programme in this regarg
3. In your opinion, what indicators should be used to evaluate the impact of the Pfumvudza Programme on farmer food security in Zimbab
4. From your academic standpoint, what are the key challenges that have surfaced in the implementation of the Pfumvudza Program
5. In your view, what evidence-based solutions could be proposed to address the shortcomings of the Pfumvudza Programme based on academic research findings?
6. How can academic institutions collaborate with stakeholders to implement and evaluate these solutions?

Appendix D :Interview Guide for Policy Makers

1. How do you perceive the Pfumvudza Programme's role in enhancing climate change resilience among farmers in Ward 16 from a policy perspective?
2. What policy instruments or frameworks could be employed to strengthen climate resilience in agricultural practices?
3. In your opinion, how has the Pfumvudza Programme contributed to farmer food security in Zimbabwe from a policy standpoint?
4. What policy measures could be implemented to further enhance food security outcomes for farmers participating in the programme?
5. From a policy-making standpoint, what are the primary challenges that have emerged during the implementation of the Pfumvudza Programme?2

6.How can policy interventions address these challenges and ensure the programme'effectivenes

7. Based on your policy expertise, what evidence-based solutions could be recommended to address the gaps or limitations of the Pfumvudza Programme?

8. How can policy makers collaborate with stakeholders to implement and monitor these solutions effectively?

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