Assessing the Role of Institutional Support in the Adoption of Climate-Smart Agriculture (CSA) Practices among Smallholder Farmers in Macheke, Murewa District

A dissertation submitted in partial fulfillment of the requirements for the Master of Science Degree in Food Security and Sustainable Agriculture Policy

Bindura University of Science Education

Faculty of Agriculture and Environmental Science

Department of Agricultural Economics, Education and Extension

Patricia Dziva

B232984A

Name of Supervisor : M. Wiri

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RELEASE FORM

Name of Candidate: DZIVA PATRICIA

Reg Number: B232984A

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Name of supervisor: MRS M. WIRI

Signature: M.WIRI

Date:

DECLARATION

I hereby declare that the research project entitled "**Assessing the role of Institutional Support in the Adoption of Climate-Smart Agriculture (CSA) Practices among Smallholder farmers in Macheke, Murewa District.**" submitted to Bindura University of Science Education, Department of Agricultural Economics, Education and Extension is a record of an original work done by me under the guidance and supervision of **Mrs Wiri** and this work is submitted in partial fulfilment of the requirements for the award of a Master of Science Degree in Food Security and Sustainable Agriculture. The results embodied in this thesis have not been submitted to any University or Institute for the award of any degree or diploma.

Author: Patricia Dziva
Reg Number: B232984A
Date: 25/06/2026

DEDICATION

I dedicate this dissertation to my beloved parents whose unwavering love, sacrifices, encouragement and support have made this achievement possible. Your belief in me has been a constant source of strength and inspired me to persevere through every challenge in my academic journey.

This achievement is as much yours as it is mine. Thank you for your prayers and guidance.

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ABSTRACT

Climate change represents one of the biggest threats to the global food system. In developing countries, where the majority of food is produced by smallholders, this has potential to be especially severe.The study sought to assess the role of institutional support in the adoption of Climate-Smart Agriculture (CSA) practices among smallholder farmers in Macheke, Murewa District. Mixed-methods research design was used in the research. Data was collected using questionnaires and interviews. A total of 326 respondents answered the questionnaires while 20 participants were interviewed in the study. The study found that the adoption of Climate-Smart Agriculture (CSA) practices among smallholder farmers was moderate but uneven, with farmers preferring low-cost and knowledge-based practices while high-cost, long-term interventions such as agroforestry recorded low uptake due to financial and resource constraints. Institutional support, particularly access to agricultural extension services, was identified as the most significant determinant of CSA adoption, while limited access to credit, agricultural inputs, investment capital, and weak coordination among government agencies, NGOs, and financial institutions remained major barriers to effective implementation. Based on these findings, the study recommends strengthening agricultural extension systems through increased staffing and digital advisory services, expanding rural financial inclusion by providing affordable climate-smart credit, scaling up farmer training and capacity-building programmes, improving access to subsidized CSA inputs, enhancing coordination among stakeholders through a unified CSA framework, and investing in ICT-based climate and market information systems to improve farmers' decision-making, resilience, and sustainable agricultural productivity.

Keywords: *Climate-Smart Agriculture (CSA), Smallholder Farmers, Institutional Support, Climate Change Adaptation.*

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Full Meaning
AGRITEX	Department of Agricultural, Technical and Extension Services
CSA	Climate-Smart Agriculture
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
ICT	Information and Communication Technology
NGO	Non-Governmental Organization
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
ZIMSTAT	Zimbabwe National Statistics Agency

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Climate change represents one of the biggest threats to the global food system. In developing countries, where the majority of food is produced by smallholders, this has potential to be especially severe. The Intergovernmental Panel on Climate Change (2022) forecasts food systems will be most negatively impacted by climate change in the most vulnerable places due to changes in temperature, precipitation and extreme weather events. In the absence of adaptive and resilient farming systems, this would result in food insecurity, malnutrition and poverty.

Smallholder farmers in Sub-Saharan Africa are particularly vulnerable to climate change due to their reliance on rain-fed agriculture and limited adaptive capacity (Nyasimi & Amwata, 2019). CSA practices, such as conservation agriculture, agroforestry, and crop diversification, have been shown to considerably improve productivity and resilience in the region (Andersson & D'Souza, 2019). However, socioeconomic, institutional and policy barriers continue to affect uptake (World Bank, 2020). Southern Africa is a climate change hotspot where climate variability affects subsistence and commercial agriculture across the region. As more than 70% of the rural population in SADC are dependent on rain-fed agriculture for their livelihoods (SADC, 2021), climate shocks impact food and livelihood security. Despite all member states possessing policies for CSA, weak extension services, limited availability of farm inputs, lack of credit facilities and institutional capacity have constrained adoption of practices (Makate et al., 2019).

Agriculture remains the backbone of the Zimbabwean economy and the main source of livelihood for 67% of the people living in the country (ZimStat, 2022). However, climate change has negatively affected agriculture, with recurrent droughts, irregular rainfall patterns and land degradation causing a decrease in both crop and livestock productivity (Chanza & Musarandega, 2020). Government and development partners have presented CSA as a way to improve food security and build resilience sustainably (Moyo & Nyoni, 2021). The promotion of conservation agriculture, diversification and agroforestry systems, and

integrated soil fertility management is part of many national climate change strategies and agricultural policies. Nonetheless, these practices only have limited uptake, and in many cases, institutional support systems for smallholder farmers are still weak (Muchara et al., 2016).

Institutional support, particularly extension services, farmer training, provision of different inputs, provision of credit and a conducive policy environment, plays a key role in the adoption of CSA technologies (Musiyiwa et.al 2022, Makate, 2019). However, institutional support in Zimbabwe has been weak, inadequate and poorly coordinated. According to Musiyiwa et.al 2022, smallholder farmers with higher levels of institutional support are more likely to adopt and maintain CSA technologies and practices compared to those with lower levels of institutional support. The nature, effectiveness and accessibility of institutional support for CSA adoption and sustainability by smallholder farmers in Zimbabwe must be explored.

The Murewa District of the Mashonaland East Province is one of the main agricultural districts in the country. The Macheke area has many smallholder farmers who partake in maize, horticulture, and livestock farming (Moyo, 2021). Climate change threatens food production in the region as the frequency of droughts, dry spells and late onset of rainfall events is increasing (ZimVAC, 2021). On the other hand, farmers are often not supported with institutional services such as extension, climate information systems and access to climate finance and CSA technologies. Thus, assessing the role of institutional support in improving CSA adoption is important to ensuring resilience, food security, and sustainable agricultural development (FAO, 2022).

1.2 Problem Statement

Climate-Smart Agriculture (CSA) is widely held as a technology with transformative potential that can help farmers and farming cope with the effects of climate change, through a simultaneous increase in productivity, adaptation and resilience to shocks and food security. Despite its potential economic and welfare benefits, CSA uptake by smallholder farmers in the Murewa District is low. Additionally, the lack of institutional capacity and poor collaboration between government departments, non-governmental organizations, and other stakeholders also obstruct the uptake of CSA innovations. As a result, smallholder farmers

are still highly vulnerable to climate variability and change, including recurrent droughts, erratic and unpredictable rainfall patterns, and gradual loss of productivity due to land degradation (Muchara et al., 2016; Musiyiwa et al., 2022). This translates to lower productivity, potentially increased food insecurity, and persistent poverty among farming communities.

Despite its importance, there appears to be limited empirical evidence investigating the mechanisms through which institutional support translates to CSA adoption within the Zimbabwean context. Hence, this study seeks to fill the empirical gap by investigating the role of institutional support on the adoption of CSA innovations by smallholder farmers in the Macheke area of Murewa District, thus providing information that can be used to strengthen institutional support systems and promote the adoption of CSA.

1.3 Objectives of the Study

1.3.1 Main Objective

To assess the role of institutional support in the adoption of Climate-Smart Agriculture (CSA) practices among smallholder farmers in Macheke, Murewa District.

1.3.2 Specific Objectives

1. To identify the types of CSA practices adopted by smallholder farmers in Macheke.
2. To identify the sources of institutional support available to small holder farmers.
3. To assess the relationship between institutional support and the level of CSA adoption.
4. To determine the challenges faced by smallholder farmers in accessing institutional support for CSA adoption.

1.4 Research Questions

1. What types of CSA practices are currently being adopted by smallholder farmers in Macheke?
2. What sources of institutional support are available to smallholder farmers?
3. How does institutional support influence the level of CSA adoption?
4. What challenges do farmers face in accessing institutional support for CSA adoption?

1.5 Hypotheses

H_0: Institutional support has no significant influence on the adoption of CSA practices among smallholder farmers.

H_1: Institutional support positively and significantly influences the adoption of CSA practices among smallholder farmers.

1.6 Justification of the Study

The study will contribute to the limited literature on institutional factors affecting the adoption of CSA and the understanding of the role of institutions in farmers' decision-making processes. The study will also ease sustainable development by increasing the uptake of CSA among farmers, thereby improving their resilience. No adequate studies have been done on CSA adoption in Macheke, Zimbabwe thus the rationale for this study.

The results can inform government institutions and non-governmental organizations of context-sensitive and targeted policies and strategies regarding CSA adoption, resource allocation and agricultural resilience to achieving development objectives for food production, food security and poverty reduction. It can also give recommendations to farmers, community leaders and practitioners which could improve the livelihoods and resilience of farmers and rural communities to climate change.

1.7 Scope

The target population for the study was the smallholder farmers who were members of Wards 7, 9 and 23 in Macheke, a small community from the Murewa District in Zimbabwe. The study objected to investigate the influence of institutional support on smallholder farmers' adoption of climate-smart agriculture (CSA). To develop a better understanding of conditions, socio-economic, institutional and local level dynamics affecting farmers' uptake of CSA practices, this study was focused on the Macheke region. Different CSA practices relevant to the Macheke region namely conservation agriculture, crop diversification, agroforestry and water harvesting were also studied based on their applicability to farmers in

Macheke. The practices were largely chosen for their potential to raise agricultural yields, improve resilience to climate variability, and sustainably manage the natural resource base.

1.8 Delimitation

The selected CSA measures (conservation agriculture, crop diversification, agroforestry, and water harvesting) are the most widely promoted and popular CSA measures within the CSA agenda in the smallholder farming sector in Zimbabwe. In terms of institutional actors considered, only selected actors, namely, government, NGOs involved in CSA, cooperatives, and financial institutions were considered in this study. It did not consider other actors such as private agribusinesses and international donor agencies. The study was limited to Macheke in Murewa district and was conducted between January 2021 and December 2024.

1.9 Limitations

There are limitations to this study, as the size of the sample and area covered by the results may be limited by time and financial resources, which may affect the study's generalizability.

1.10 Definition of Key Terms

1.10.1 Climate-Smart Agriculture

CSA involves the integrated development of agricultural strategies to increase productivity, resilience (adaptation), and reduce or remove greenhouse gas emissions (mitigation) while improving food security (FAO, 2017; IPCC, 2022).

1.10.2 Institutional Support

Institutional support is the assistance given by formal organizations such as government agencies, non-governmental agencies (NGOs) and financial institutions to improve agricultural practices and introduce new technologies (World Bank, 2020).

1.10.3 Smallholder Farmers

Smallholder farmers, defined as individuals who depend on family labor to cultivate land ranging from less than 2 hectares to as much as 5 hectares, have limited access to tools, technology, and market knowledge (FAO, 2015; Lowder et al, 2016).

1.10.4 Adoption

Adoption is said to have occurred when farmers decide to use newly-developed agricultural technologies or practices and continue undertaking them with sustained use (Rogers, 2013).

1.10.5 Agricultural Extension Services

Agricultural extension services are systems that provide knowledge, information, and skills to farmers through training, advice, and demonstrations with the objective of improving agricultural productivity and sustainability (Anderson & Feder, 2017).

1.10.6 Climate Variability

Climate variability refers to fluctuations in precipitation and temperatures on shorter timescales of months to years, which influence agricultural production (IPCC, 2022).

1.10.7 Resilience (Agricultural Resilience)

Agricultural resilience is the capacity of agricultural systems to absorb shocks, adapt to their changing environment, and recover from disturbances such as droughts and floods (FAO, 2017).

1.10.8 Conservation Agriculture

Conservation agriculture is a system of minimum soil disturbance, permanent soil cover and crop rotation with a view to long-term improvement of soil health and productivity (Hobbs et al, 2018).

1.10.9 Sustainable Agriculture

Sustainable agriculture seeks to produce food at current levels, without putting environmental quality, economic sustainability and social equity for farmers, workers and communities at risk (FAO, 2017).

1.11 Outline of the Thesis

The structure of the thesis is.

Chapter 1- Introduction contains the background, statement of the problem, objectives of the study, research questions, hypotheses, justification of the study, scope, delimitations and

limitations of the study and overview of the structure of the thesis. It provides an overview of the rationale for and framework for exploring institutional support for the adoption of CSA practices by smallholder farmers at Macheke.

Chapter 2- Literature Review presents theoretical frameworks, empirical research, and conceptual issues on CSA practices and supporting institutions. Knowledge concerning climate-smart agriculture (CSA) practices, factors that influence their adoption, the process of scaling them up, and their supporting institutions is reviewed. The chapter also highlights gaps that the current study attempts to fill. It will discuss the conceptual and theoretical frameworks that will be utilized.

The third chapter is the Research Methodology which deals with the research design, description of the study site, population and sampling procedures, research methodology, data collection and analysis, research ethics, and reliability and validity approaches of the study. It gives a description of how the research questions were answered with regard to the study.

Chapter 4- Results and Discussion (Manuscript 1) presents results from the first manuscript and discusses these in relation to the study objectives 8 and 8 research questions. This chapter also gives analyzes of the results in terms of overall trends and patterns in CSA adoption by smallholder 8 farmers. It also discusses challenges encountered during data collection and compares its findings to those in the literature.

Chapter 5- Results and Discussion (Manuscript 2), describes the results and the interpretation and discussion of those results and also provides additional suggestions and challenges for Manuscript 2.

Chapter 6- Summary, Conclusions, and Recommendations summarizes the research, makes general conclusions, identifies policy and practice recommendations, and suggests future research opportunities.

CHAPTER 2:LITERATURE REVIEW

2.1 Introduction

This chapter presented a systematic review of the available literature on CSA, smallholder farmer adoption of CSA practices and the role of institutional support in strengthening resilience and promoting sustainable agriculture at the household and community level. The global, regional and local literature was reviewed, focusing particularly on Sub-Saharan Africa and Zimbabwe. It reviewed the theory, evidence, and conceptual issues with climate change adaptation in agriculture, followed by a discussion of research gaps and a conclusion to the chapter.

2.2 Climate-Smart Agriculture (CSA)

Climate-smart agriculture (CSA) is an integrated approach to managing cropland, livestock, forests and fisheries that seeks to address the interlinked challenges of food security and climate change, and contribute to the broader goal of sustainable development. It pursues three objectives: sustainably increasing agricultural productivity, adapting to climate change, and reducing greenhouse gas emissions, where possible (FAO, 2022). This again reinforces the need for agriculture to be sustainable from economic, social, and environmental perspectives.

CSA includes a range of practices that improve farmers' resilience to the impacts of climate-related hazards while raising productivity and improving rural livelihoods. Some of these include conservation agriculture, crop diversification, agroforestry, integrated soil fertility management, and water harvesting (Lipper et al., 2020). The practice of conservation agriculture involves minimum soil disturbance, permanent soil cover and crop rotation to improve soil fertility and moisture. Crop diversification reduces loss risks by increasing crop variety among farmers. Agroforestry including trees in farming systems may improve biodiversity, soil and household income. Water harvesting technologies generally help

farmers to cope with erratic rainfall and prolonged drought, particularly in semi-arid regions, and contribute to resilience, food security and environmental sustainability.

Studies in Sub-Saharan Africa (Ken E Giller, Fred Kanampiu, Mariangela Hugria & Bernard Vanlauwe 2019; Menale Kassie,Johannes Arndt, and Amare T Mekuria 2015) revealed that CSA adoption is influenced by socio-economic, institutional and environmental factors. These include farmers' knowledge and familiarity with CSA technologies, access to agricultural inputs, credit facilities, secure land tenure, market access and the quality of agricultural extension services. Institutional support has also been identified as playing a major role in the adoption of CSA. Providing farmers with technical information, training, financial resources, and climate information services can help farmers adopt and sustain CSA practices. Farmers with greater access to extension services and other agricultural support systems typically are more likely to adopt and sustainably implement CSA practices. Understanding these determinants would aid the development of climate resilience policies and interventions for smallholder farming communities.

2.2.1 Climate-smart agriculture (CSA) methods

Climate-smart agriculture (CSA) is sustainable agriculture that includes conservation agriculture, crop diversification, agroforestry, water harvesting, and climate-resilient agriculture that seeks to sustainably improve the three dimensions of food security: food production, resilience to climate change, and environmental sanitation.

2.2.1.1 Conservation Agriculture

Conservation agriculture (CA) is a sustainable farming system which uses minimum tillage, cover cropping, and crop rotation to conserve soil and improve soil health in order to reduce soil erosion, increase the availability and storage of water, and promote long-term soil health and productivity by maintaining soil structure and improving soil microbial activity (Moyo, 2021). In semi-arid regions, these practices help to prevent land degradation through soil erosion and nutrient depletion.

CA is stressed as especially appropriate for drought-prone and erratic rainfall areas, as it minimizes moisture loss and increases crop resilience to climate shocks (Chimonyo et al., 2020). Implementation of CA practices in Zimbabwe has resulted in improved crop yields and more predictable agricultural production among smallholder farmers despite high rainfall

variability. Water retention and fertility of the soil rise (due to the improved structure) and contribute to food security and sustainability, e.g., by reducing the need for chemical fertilizer.

Successful CA adoption also typically involves intervention from institutions such as government extension services, NGOs or agricultural cooperatives, providing farmers with training, inputs such as mulch and cover crop seeds, and guidance on using CA techniques (FAO, 2013). Different interventions can address areas of knowledge that farmers are lacking, cover some of the economic and institutional barriers to adopting CA in the short term, and can provide the support necessary for resource-poor smallholder farmers to practice CA in the longer term.

2.2.1.2 Crop Diversification

Crop diversification involves the planting of several different crops within a farming system. Its main objective is to minimize uncertainties caused by climate variability, pest and disease outbreaks, and price fluctuations (Altieri et al., 2015). This seeks to reduce production risks and provide a more stable and constant food supply throughout the year. Soil fertility can also be improved through diversification by crop species that require different nutrients and add different amounts of organic matter.

Diversity of crops has been shown to increase food and economic security of smallholder producers. For example, farmers in Zimbabwe, and in Sub-Saharan Africa as a whole, minimize the risk of crop failure from variable rain or drought by diversifying their crops (FAO, 2019). Diversity helps to generate different sources of income, which can protect households from price shocks and market volatility. For farmers, diversity can include complementing staples with high-value crops, which in turn can diversify their livelihoods and contribute to sustainable agriculture.

Actually, institutional support such as provision of technical support, training, improved seeds and market information by the government, non-governmental organizations and cooperatives in crop diversification decision making can help overcome some of the other constraints such as inadequate knowledge about crop diversification and access to inputs (Muzerengi et al., 2021). In this way, institutional reforms and diversification on the farm can strengthen agricultural productivity and resilience to climate change.

2.2.1.3 Agroforestry

Furthermore, agroforestry can provide an important level of food security for the household, as trees can provide food, timber, and fodder, therefore diversifying different income sources. In Zimbabwe, research shows that smallholder farmers practicing agroforestry can improve crop yield and farm-level income, especially in semi-arid regions with high climate variability (Muzerengi et al., 2021). Furthermore, agroforestry improves the ecological sustainability of land by supporting the habitat, water infiltration and microclimate conditions of land, and increasing biodiversity (Muzerengi et al., 2021).

Institutional support (including training, technical assistance, and seedling provision) through government extension services, non-governmental organizations (NGOs) and cooperatives generally had a positive effect on adoption of agroforestry (Ajayi et al., 2019). Such institutions played a key role in overcoming knowledge gaps (in agroforestry agronomy and technologies) as well as barriers to labor and investment. Farmers' successful practice of agroforestry is affected, to the greatest extent, by the effectiveness of institutional interventions that may improve environmental and socio-economic conditions.

2.2.1.4 Types of CSA practices adopted by smallholder farmers

In Southern Africa the common core CSA practices by smallholder farmers are conservation practices (minimum or no tillage, crop residues and crop rotation), agroforestry, crop diversification (intercropping, rotations and introducing legumes), drought-tolerant crop varieties, improved soil fertility and water-harvesting practices. Andersson and D'Souza (2019) have listed the possible main CSA practices in Southern Africa, noting also the variation depending on agro-ecological zone and institutional context which could explain partial uptake in some cases.

Studies in Malawi and Zimbabwe (Makate et al. 2019, Michler et al. 2019) using farmer surveys have found that CSA practices such as conservation agriculture and crop diversification were adopted, and led to increased resilience and productivity. Conservation agriculture reduced yield losses in extreme rainfall years in Zimbabwe, although this required that the farmer adopt the practice in the right way, and have the knowledge.

Zondo 2024 further show that water harvesting technologies under CSA increase productivity and sustain it in direct semiarid areas when paired with cropping and soil management practices, reflecting the importance of considering regional context and local institutions in tailoring specific CSA measures to the region's agroecological zone and institutional conditions.

2.2.1.5 Water Harvesting

Water harvesting refers to a range of small-scale techniques used for the collection, storage and management of rainwater to increase agricultural productivity in semi-arid and drought-prone areas (Rockstrom et al., 2020). Water harvesting techniques include small dams, contour bunds, bunded terraces and storage tanks. Collectively these techniques are used to capture runoff for crop irrigation and livestock watering. Water harvesting can also help improve the available supply of water during dry periods, reduce soil erosion, improve moisture retention, and thereby sustain crop yields across variable climates.

Water harvesting is one approach to climate change adaptation by smallholder farmers, and an assured water supply eases the implementation of CSA practices such as diversification of crops, conservation agriculture and agroforestry (Lal, 2020). Nyamadzawo et al (2013) and Mupangwa et al (2007) reported that water harvesting technologies could improve crop yields, decrease vulnerability to droughts, improve household food security, improve the sustainability of household livelihoods, make better use of limited water resources, and improve the sustainability of land resources.

The institutional support for water harvesting comes in the form of training and technical advice as well as sometimes the provision of financial support for construction and maintenance work by government agencies, non-governmental organizations (NGOs) and agricultural cooperatives (FAO, 2022). This is especially important where smallholder farmers do not have the funds or knowledge to implement such measures themselves, and is important in overcoming barriers posed by knowledge and resource constraints to the uptake and maintenance of water harvesting in rural farming communities.

2.2.2 Institutional Support and CSA Adoption

Institutional support is any external support provided by government, non-government organizations (NGOs), cooperatives, and financial institutions aimed at supporting innovation in agriculture (Andersson & D'Souza, 2019). Institutional support can take the form of technical assistance, access to credit and agricultural inputs, market linkages, and policy advocacy. Institutional support mechanisms, often under the framework of CSA, can help smallholder producers surmount these resource limitations and knowledge constraints to adopt conservation agriculture, agroforestry, and water harvesting techniques.

Government-supported agricultural extension services are vital to encouraging smallholder farmers to adopt CSA practices by providing technical assistance and training, disseminating information, and monitoring adoption rates (FAO, 2019). Extension officers are tasked with teaching farmers about methods such as conservation agriculture, water harvesting and agroforestry to help farmers adjust to climate change. Frequent interaction with farmers ensures these methods are learned and enacted.

Beyond training, government agencies can support CSA adoption through provision of policy support, subsidies for inputs and investments in infrastructure (e.g., provision of certified seeds, fertilizers, irrigation) that increase the likelihood that smallholder farmers will adopt CSA practices as well as maintain the practices over the long-term. The more responsive and supportive the government, the higher the rate of adoption (FAO, 2019). Public agencies play a pivotal role in creating an enabling environment for CSA. Thus, through a combination of institutional frameworks, technical, and monitoring capacities government actors support the scaling-up of climate-resilient practices by farmers. Their efforts go in tandem with those of other actors, contributing to the scaling-up of CSA practices in a sustainable manner.

2.2.2.2 Role of NGOs

NGOs complement government agricultural extension services with new practices, demonstrations, training, climate information and providing subsidies (Nyanga et al., 2020). They further frequently focus on the provision of services to rural, marginalized and remote farmers, that may not be reached by the formal services provided by the state. Their work stresses participatory approaches enabling farmers to take decisions about adapting to climate change.

NGOs can closely address farmers' knowledge and input gaps by easing technical advisory services, establishing demonstration plots, and supplying improved inputs such as drought-resistant seeds or organic fertilizers. Such initiatives can help better equip farmers to adopt CSA practices. Additionally, community engagement benefits, such as peer-to-peer learning, can also increase the likelihood of adoption of CSA practices (Nyanga et al., 2020).

The objective of this study is to understand the complementarities between NGO support and government interventions in promoting CSA, their role in maximizing the effectiveness of government interventions, reaching the poor and marginalized groups, and scaling up climate-smart agricultural technologies and practices. Understanding the role and effectiveness of NGO support can help design complementary interventions to ease integrated and high rate CSA uptake by smallholder farmers.

2.2.2.3 Role of Cooperatives and Financial Institutions

Cooperatives and microfinance institutions ease input, credit and market access that enables smallholder farmers to afford CSA practices that they could not afford otherwise (Gine & Yang, 2019). Cooperatives collectively pool resources, reducing individual financial risk and providing members access to technologies such as seeds, fertilizers and irrigation equipment that enable them to implement climate smart practices.

Financial institutions may offer credit schemes to smallholders, as well as insurance and savings products, that help them weather climate shocks and provide farmers and producers with the financial capital needed to invest in short- and long-term CSA practices. Cooperatives, banks and government agencies work together to make such financial interventions common and easy to adopt.

Cooperatives and financial institutions are also important to strengthen CSA by improving access to resources, connecting farmers to markets and reducing financial constraints, and complementing government and NGO technical programs. This requires an integrated institutional support system that can enable smallholder farmers to implement climate-resilient agriculture (CSA) practices at scale and sustainably.

2.2.3.2 Forms and sources of institutional support available to farmers

Support for CSA is delivered through public extension systems and diverse private and non-state actors, including NGOs, farmer organizations, cooperatives, private input suppliers, and financial service providers. Public extension systems provide the bulk of extension and training while NGOs run demonstration plots and subsidize inputs. Cooperatives provide access to markets and microfinance institutions offer credit. A systematic review of the studies by Partey et al. (2020) concluded that complementarity of these institutional actors is key for CSA scaling.

Parwada et al. (2020) also found trained farmer adopters to adopt agroforestry more readily than untrained farmers. This points to the importance of the type of support being a priority, whether training, credit or market facilitation. On the contrary, provision of inputs without training had low adoption. Thus, institutional support has to combine knowledge dissemination with provision of physical resources.

In addition, Makate et al. (2019) found that there was a meaningful association between institutional support and CSA uptake of smallholder farmers. The study found that in Zimbabwe and Malawi, farmers who had access to extension and training services were more likely to adopt a number of CSA practices, i.e. CA and crop diversification. Studies show farmers practicing these techniques are more productive and resilient. Michler et al. (2019) also found evidence that conservation agriculture can reduce yield loss during extreme weather events, but requires knowledge and effective implementation to be successful in this aspect.

Furthermore, access to both credit and extension services considerably increased the likelihood of CSA adoption. This indicates that CSA uptake is more likely if farmers receive both financial and technical service inputs (Teklewold et al., 2019, Ethiopia). This reflects the importance of an integrated institutional response to climate-smart agriculture uptake. Other studies such as Khonje et al. (2015) have also confirmed that bundled support systems (mechanized credit and training) can increase adoption.

Nyanga et al. (2020) found NGO programs to disseminate CSA technologies in Zimbabwe that deliver training, establish demonstration plots, and provide inputs are effective at increasing adoption. Cooperatives increase adopter access to markets and decrease financial risk (Giné & Yang, 2009). These studies also found uneven adoption that often corresponds

to socio-economic factors such as income, education, and access to resources in a community.

This framework is associated with the Diffusion of Innovations Theory (Rogers, 2003), which describes how knowledge, social systems and enabling environment promote diffusion, and the Sustainable Livelihoods Framework (Scoones, 1998), which describes institutional access as a livelihood outcome.

2.2.3.3 The relationship between institutional support and CSA adoption level

Makate et al. (2019) found that access to extension and perception of outcomes were important positive predictors of CSA intensity adoption. In a survey in Ethiopia, Teklewold et al. (2019) found that access to training and credit had a strong positive predictive strength for the multi-practice adoption.

In addition Khonje et al. (2015) also show that farmers who received both credit and extension services are more likely to adopt multiple CSA practices than farmers who received credit or extension services only. This suggests that the provision of finance and technical support needs to be closely coordinated to achieve positive synergies from institutional interventions. Bias targeting can also occur when better connected/wealthier farmers receive more institutional support, leading to higher adoption rates for this subgroup of farmers (Makate et al., 2019), which is why Shikuku (2019) argues for systematically testing the effect of institutional support separately from the selection effect.

2.2.3.4 Institutional and Networking Barriers for Smallholder Farmers

Although availability and access to institutional support are essential for the uptake of CSA, smallholder farmers in Zimbabwe and elsewhere in Southern Africa face meaningful challenges. Institutional capacity is limited, with issues such as scarce financial and human resources, weak infrastructure, and dependence on donor funding and short-lived donor-driven initiatives. FAO (2018) reported that rural extension infrastructure is under-funded and overstretched in Zimbabwe. Rural extension services are limited in coverage to a small

number of farmers, and limited in capacity and resources to provide technical support and CSA training services. This has reduced the effectiveness of institutional efforts to improve agricultural resilience.

However, while the benefits of CSA are being promoted for smallholder farmers by many institutions, a range of socio-economic constraints often limit adoption of CSA technologies. According to Andersson & D'Souza (2019), landlessness, along with low literacy and education, limited labour supply and lack of financial resources often characterize poorer households, making full adoption of CSA technologies by such households unlikely. Mujeyi and Chigumira (2020) also attribute gender disparities in land, credit and agricultural input access to disparities between women and men farmers in terms of the CSA adaptation techniques they implement in their farms and their limited participation in institutional level capacity building initiatives that promote good agricultural practices.

Furthermore, specific CSA practices present unique adoption challenges. Kpoviwanou et al. (2024) found that agroforestry adoption is often constrained by insecure land tenure systems and the long period required before farmers realize economic benefits from tree planting. Similarly, Zondo et al. (2024) reported that water-harvesting technologies demand substantial labour and financial investment, making them difficult for resource-constrained farmers to adopt. These barriers demonstrate that although institutional support promotes CSA adoption, practical, economic, and social constraints continue to limit widespread implementation among smallholder farmers.

2.3 Theoretical and Conceptual and Frameworks

2.3.1 Theoretical Frameworks

2.3.1.1 Diffusion of Innovations Theory

The Diffusion of Innovations Theory, proposed by Everett Rogers (2003), explains how new ideas, technologies, or practices are communicated and adopted within a social system over time. In agriculture, the theory provides a useful framework for understanding how smallholder farmers become aware of, evaluate, and eventually adopt innovative farming

practices such as climate-smart agriculture (CSA). According to Rogers, the adoption of an innovation is influenced by five key characteristics: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the extent to which an innovation is perceived as better than existing practices, while compatibility measures how consistent the innovation is with farmers' existing values and experiences. Complexity relates to the ease or difficulty of understanding and using the innovation, trialability refers to the opportunity to test the innovation on a limited scale, and observability concerns the visibility of the innovation's results to other farmers. These characteristics collectively determine the rate and extent of adoption within farming communities. Diffusion of Innovations Theory in CSA Adoption is diagrammatically illustrated in the following figure.

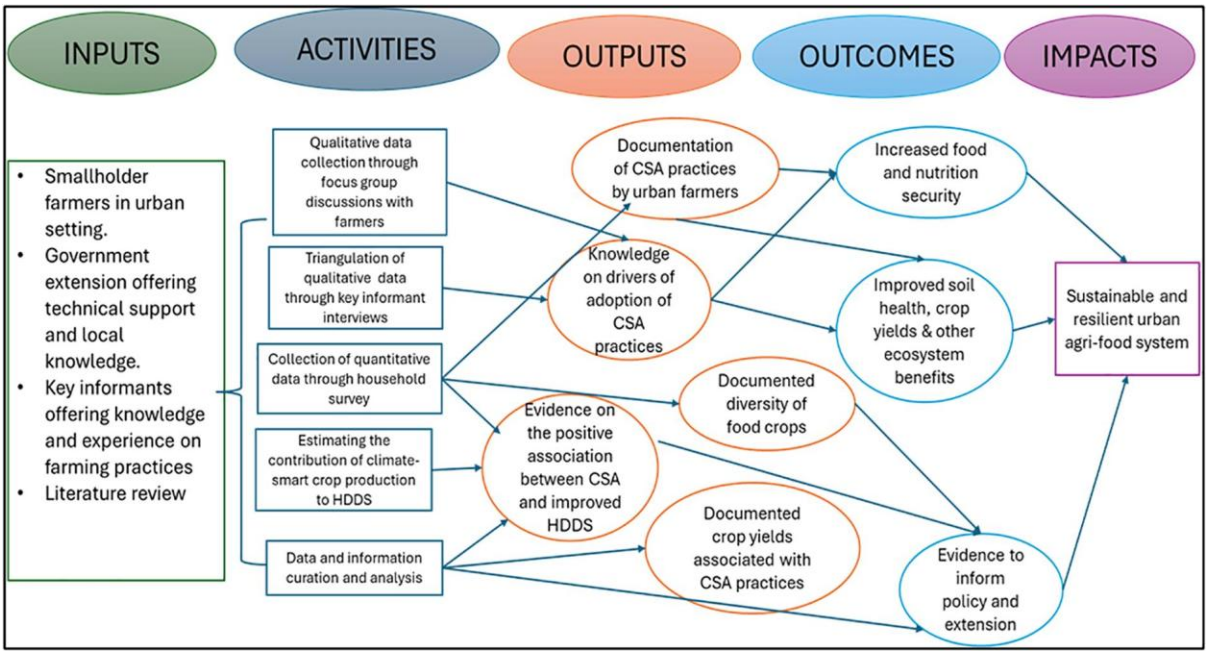

Figure 2.1 : Diffusion of Innovations Theory in CSA Adoption (Rogers, 2003)

Institutional arrangements are also considered as important in the diffusion of agricultural practices. Provincial governmental agencies, non-governmental organisations (NGOs), farmer cooperatives and financial institutions become change agents when they provide agricultural training, inputs and finance through extension services that help smallholder farmers in adopting agricultural innovations (Rogers, 2003). Extension officers can show conservation agriculture and NGOs provide seedlings to implement agroforestry and install rainwater harvesting structures. This helps address the risk and uncertainty encountered by farmers in adopting a technology and increases the likelihood of farmers continuing to practice conservation agriculture long term.

The role of institutions in the communication diffusion of CSA technologies within clusters of farmers is that when institutions provide training, demonstration, or other resources about CSA technologies, farmers can make an informed decision to adopt (i.e. adapt) the technology based on their subjective cost-benefit analysis. Innovations that are productive, technically feasible, and easy to adopt will be adopted. Given that the adoption of CSA technologies can result in increased crop productivity, improved food security and increased resilience to climate change, and hence sustainable environmental management, the Diffusion of Innovations Theory is useful for this study to explain the mechanism through which institutional support influences smallholder farmers' uptake of CSA practices.

2.3.1.2 Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework (SLF) developed by Scoones (1998) is a tool for assessing the role of human, social, financial, natural and physical assets in people's livelihoods, and how these are used to cope with shocks and change. The SLF has been used to study how smallholder farmers use capital bundles to cope with climate shocks, environmental change and other shocks in agricultural livelihoods. Recognizing capital in its social, institutional, and ecological dimensions, the framework focuses on interaction between them for achieving sustainable livelihoods.

Institutional support is the final SLF enabling condition. It includes access to knowledge, extension, credit, inputs and social networks (Scoones, 1998). Government, NGOs and cooperatives can help farmers access and improve the use of natural and human capital, services and inputs; these intermediaries can also support the adoption of CSA practices: conservation agriculture, agroforestry and water harvesting systems. The result is improved climate change resilience and reduced climate change vulnerability, integrated natural resource management, and improved farm productivity, resilience and diversification. The Sustainable Livelihoods Framework (SLF) has been advocated since the work of Scoones (1998), and used and popularized by the erstwhile British Department for International Development (DFID). As illustrated in the following figure, it can be used to analyze how different actors, including smallholder farmers, can build and sustain livelihoods by increasing their adaptive capacities and their ability to improve their livelihoods faced with multiple stressors (including climate change, poverty, and resource degradation).

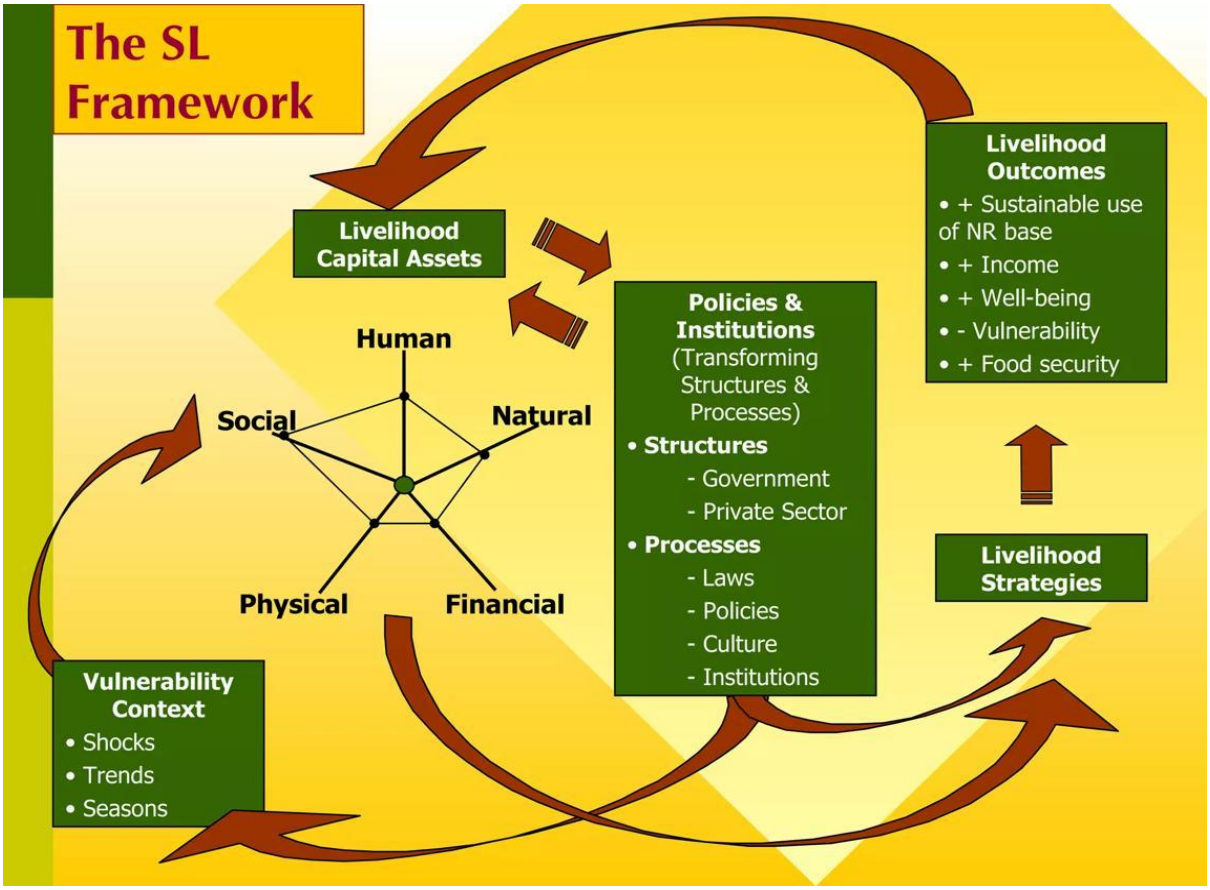

Figure 2.2 Sustainable Livelihoods Framework (Scoones, 1998).

The Sustainable Livelihoods Framework provides a multi-dimensional understanding of CSA adoption based on its four capitals: economic, social, environmental and institutional. In this study, the framework serves to explain one of the elements: how institutional support can be a key driver to strengthen livelihood capitals and ease CSA adoption for resilience.

Within the context of this study, the SLF has implications for studying institutional support and CSA adoption. The SLF helps to understand how access to financial, human, physical, social and natural capital influence the capacity of smallholder farmers to build their resilience, improve their food security and adapt to climate change in the context of institutional support. It could also inform recommendations to policies and interventions that strengthen institutional support of CSA practices, enabling them to be sustainable and viable for vulnerable rural populations.

2.4 Conceptual Framework

The conceptual framework used in this study is that institutional support is the independent variable, and that the farmer adoption of CSA technologies, which results in productivity improvements, resilience, and food security, is determined by institutional support, as well as intermediary factors such as knowledge, resource availability, and socio-economic background. The conceptual framework of this study is illustrated in figure 2.1.

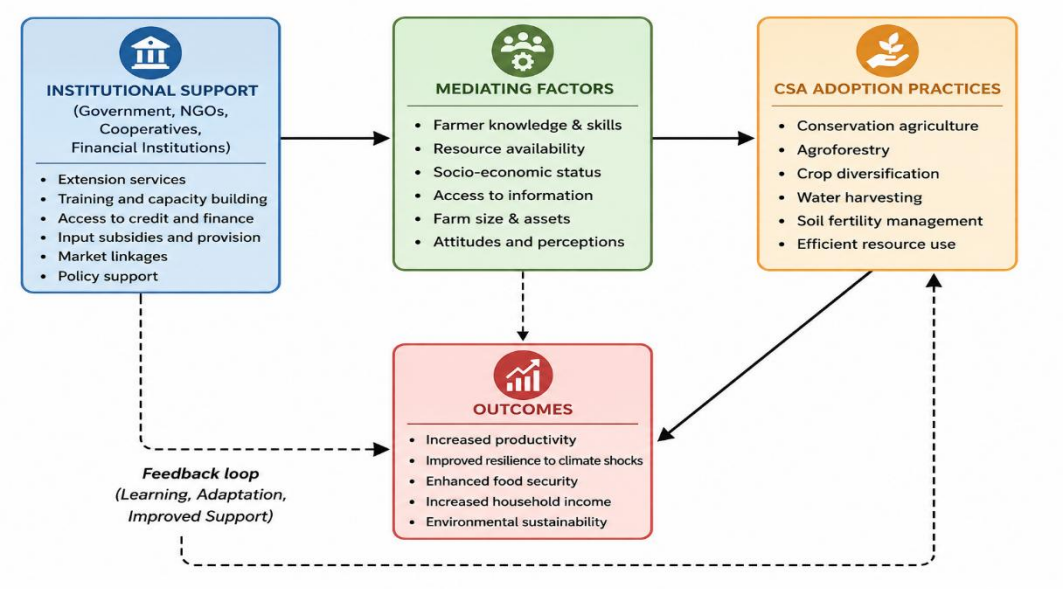

Figure 2.3: Conceptual Framework: Institutional support and CSA adoption

Source: Own Constructs

The institutional framework of the study shows that institutional support is the independent variable of the adoption of CSA practices. The government, non-governmental development organizations (NGOs), cooperatives, and financial institutions have a key role to play in creating enabling conditions, which helps smallholder farmers adopt CSA practices by providing resources, training, agricultural inputs, credit, and markets.

The theoretical framework of the study explains the interaction of institutional support and adoption of climate-smart agriculture practices by the smallholder farmers. This framework explains that institutional support influences the adoption of the CSA practices by smallholder farmers. The institutional support can be from government agencies, NGOs, cooperatives, and microfinance institutions. These technical advisory services, together with access to inputs, credit and market linkages, helped support the uptake of CSA practices such

as conservation agriculture, agroforestry, crop diversification and water harvesting (Andersson & D'Souza, 2019).

2.5 Summary of the chapter

Empirical literature identifies CSA adoption as an avenue to improve resilience and productivity of smallholder farming systems. Institutional support has been identified as an important driver of farmers' adoption of various CSA practices, including conservation agriculture, crop diversification, agroforestry, and water harvesting, among others. However, when it comes to empirical evidence within the local context, few examples exist, and research needs to investigate the institutional mechanisms that drive or support the uptake of CSA at the community level.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter discusses the study design and methodology adopted to assess the role of institutional support in influencing CSA adoption by smallholder farmers. It discusses the study area, study design, target population and sampling procedures, study instruments, data collection, data analysis and ethical considerations. Prior to data collection, permission was sought from the Ministry of Agriculture to conduct the study. The permission is shown in the attached document. Reliability, validity, and ethical considerations are also discussed in the chapter.

3.2 Description of Study

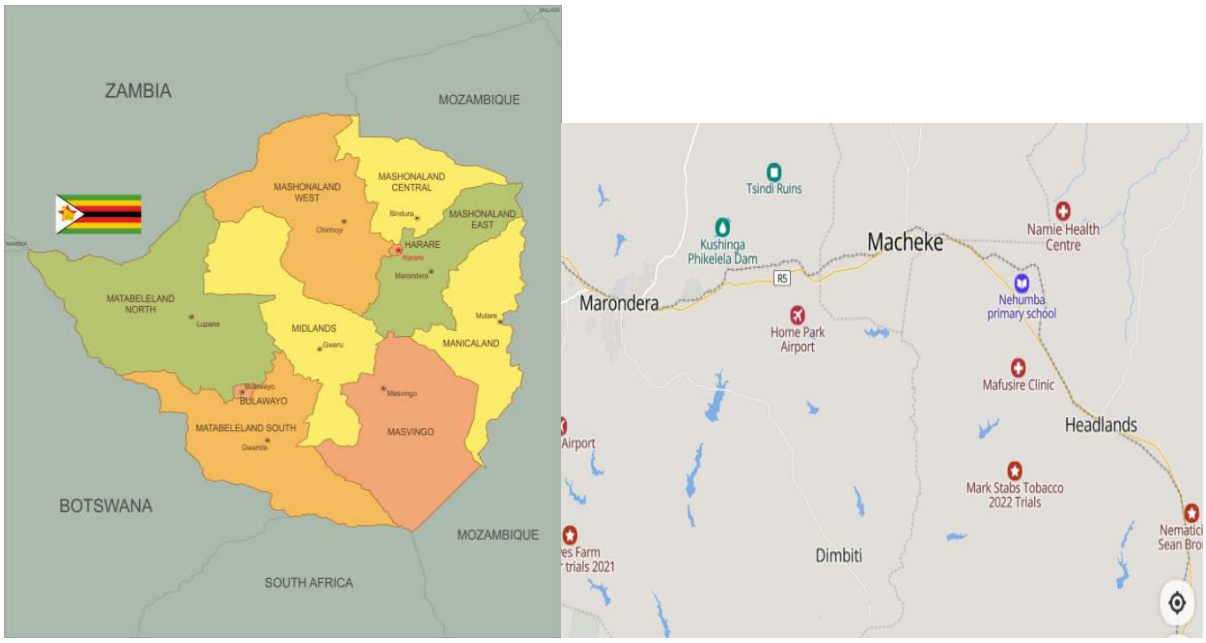

Figure 3.1: Map showing Macheke area (EMA, 2023)

The study was conducted in Wards 7, 9 and 23 of the Macheke area in Murewa District, Mashonaland East Province of Zimbabwe. The study area is mainly agricultural, and small scale farmers rely mainly on rain fed cropping systems for their livelihoods (FAO, 2013). The climate is semi-arid with erratic rainfall and persistent droughts, which have a substantial impact on agriculture, one of the region's main industries (Chimonyo et al., 2020).

3.3 Research Design

Research design is a process of steps to collect and analyze information to increase our understanding of a topic or issue (Creswell & Creswell, 2018). In this regard, the study adopted a mixed-methods research design to take advantage of using both quantitative and qualitative approaches (Creswell & Creswell, 2018). The purpose of the quantitative study was to measure adoption of CSA among smallholder farmers, and to examine perceptions of institutional support on adoption of CSA practices. Quantitative data collection allowed for the application of statistical analysis to identify patterns, trends, and the relationships between institutional interventions and the adoption of CSA practices.

The qualitative component offers detailed perception into the farmers' experiences and perceptions of institutional support and adoption obstacles. The in-depth interviews capture the context, experiences, and socio-cultural influences related to agricultural adoption that quantitative data might miss (Patton, 2015). Taken together, these methods formed a triangulation of results, increasing the validity, reliability and robustness of the findings, and providing a thorough understanding of the effects of institutional support on CSA uptake in the community.

3.4 Sampling Procedure

Tuckman (2018) defines population of a study as a group which the researcher is interested in gaining information and drawing conclusions. Thus a list of farmers that participated in the study were drawn from a sample frame of 7000 smallholder farmers provided by the AGRITEX extension officers for the research who were directly affected by institutional interventions, therefore they are the most relevant population for the study. The sample size for the study was determined using Yamane's (1967) formula n=N at 95% confidence level and 5% margin of error, which suggests that the sample size for a study from a large population should be 379 respondents.

3.4.1 Sampling method

The study employed stratified random sampling in collecting the sample of farmers (Creswell, 2021). The stratification was done based on the wards to which the farmers belong and the strata were Wards 7, 9 and 23. To obtain a representative sample of farmers from diverse regions and conditions, stratification was employed.

Table 3.1: Distribution of Sample by Ward

Ward	Population (Farmers)	Proportion (%)	Sample Size
7	2,450	35.0	133
9	2,310	33.0	125
23	2,240	32.0	121
Total	**7,000**	**100.0**	**379**

After strata were created, simple random sampling was used to select farmers. Each farmer in a ward was assigned an identifying number and the number of farmers for each stratum was selected using a random number generator. This ensured that all farmers in the study were equally likely to be selected.

Purposive sampling was applied to select key informants (extension and NGO program officers, cooperative leaders, and financial institutions' officers) who were involved in the promotion of CSA and the provision of institutional support. Twenty key informants involved were purposively recruited to provide greater in-depth information of institutions' support mechanisms and challenges.

3.5 Data Collection Instruments

Data were collected using questionnaires and interviews, with the focus on levels of adoption of CSA practices, the type and frequency of institutional support, and the socio-economic characteristics of the respondents. A questionnaire is a data collection form used to solicit responses research participants. According to Vosloo 2014, a questionnaire is a list of

questions where answers of respondents are recorded. The questionnaire was used as a standard guide for the researchers to ensure that the questions were asked in the same way in the collection of data. This approach allowed researchers to obtain relatively uniform responses that could be subjected to statistical analysis. Answers given by researchers were from a literature review.

Focus group discussion (FGD) was done with 30 farmers randomly selected from ward 7.9 and 23 and excluded from the survey, 15 farmers from each ward. The pre-testing of the questionnaire was done with the help of extension officers and trained enumerators. The questionnaire was then standardized before the survey occurred.

3.6 Data presentation and analysis.

The quantitative data collected through the questionnaires was subjected to descriptive statistical analysis including frequencies, percentages and means to determine the socio-economic characteristics of farmers, the extent of adoption of CSA practices, and the frequency of institutional support received. Quantitative data for the Plan of analysis are shown in Table 3.1.

Table 3.1: Data Analysis Plan for Quantitative Data

Study Objective	Variables Analyzed	Type of Variable	Statistical Technique	Purpose of Analysis
To identify the types of CSA practices adopted by smallholder farmers in Macheke.	Conservation agriculture, crop diversification, agroforestry, mulching, water harvesting, drought-tolerant crops and other CSA practices adopted	Categorical	Frequencies, Percentages	To determine the different CSA practices adopted and their prevalence among smallholder farmers
To identify the sources of institutional	Agricultural extension services, training programmes, input	Categorical	Frequencies, Percentages	To identify and describe the various sources

support available to smallholder farmers.	support, financial assistance, credit facilities, NGO support, government programmes			of institutional support available to farmers
To assess the relationship between institutional support and the level of CSA adoption.	Institutional support indicators (training, extension visits, access to credit, input support) and CSA adoption level	Continuous / Composite Index	Pearson Correlation Analysis	To establish the strength and direction of the relationship between institutional support and CSA adoption
To determine the challenges faced by smallholder farmers in accessing institutional support for CSA adoption.	Distance to service providers, lack of information, inadequate funding, limited extension services, high costs, bureaucratic procedures	Categorical	Frequencies, Percentages, Mean Scores (Likert Scale)	To identify and rank the major challenges affecting access to institutional support for CSA adoption

Source: Researcher (2026)

Further, with respect to institutional support and CSA adoption, inferential statistics (i.e. correlation and regression) were employed to identify meaningful predictors and the strength of the associations. According to Creswell & Creswell (2021), this approach allowed the researcher to attain a quantitative measure of the strength of a relationship between the variables of interest. Semi-structured interviews and observations in the field were thematically analyzed as follows: transcription of interviewees' responses, coding the responses for key themes and patterns (Braun & Clarke, 2006). Triangulation, or the use of multiple data types in a single study, allows for quantitative and qualitative results to be repeatedly validated, increasing a study's validity and reliability. This combination allowed

for a subtle picture of the role of institutional support in CSA adoption, covering outcomes and the perceptions of the farmers.

3.7 Ethical Considerations

The study received ethics approval from the relevant institutional research board before data collection began. Obtaining ethics approval in advance ensures that the research was conducted in compliance with the relevant ethical standards for research involving human subjects. Resnik (2018) explains that obtaining prior approval provides independent oversight that protects participants' rights and ensures that risks are considered and addressed before the study commences.

Informed Consent

Informed consent was obtained from each participant, after giving them clear explanations of the nature and purpose of the study, the objective and the process of collection, as well as the potential risks and benefits of participation in a language that was simple and easily understandable, to make the decision freely. Creswell and Creswell (2021) note that informed consent is fundamental to the autonomy and dignity of research participants.

Voluntary participation and right to withdraw

Participation was strictly voluntary. It was made clear that respondents did not have to answer any question and could withdraw from the study at any time. Informed consent from research participants allows for equitable treatment, prevents coercive practices, and empowers individuals to have agency over whether to participate in research (Babbie, 2020).

Confidentiality and Anonymity

No information that could be used to personally identify study participants would be shared with third parties, and anonymity was guaranteed through the use of deidentified questionnaires and interview transcripts. As cited by Saunders et al. (2019), even though only aggregate data were available, anonymization and confidentiality can help gain trust with participants, prompting them to share information freely.

3.8 Validity and reliability

According to Cresswell and Cresswell, (2021) validity refers to whether the research instrument or method measures what it is supposed to measure. In this study validity was the

degree to which the questions were clear, relevant and appropriate to the local farming context. Items in the questionnaire were developed from the literature review on CSA adoption and institutional support and were validated by agricultural extension specialists and academic supervisors to ensure the inclusion of relevant constructs. A pilot study was conducted on a small number of farmers, and feedback from them was used to improve the clarity of the questionnaire.

Reliability, which refers to the consistency and repeatability of the measured results (Field, 2018), was improved by pre-testing the questionnaire with 30 farmers and making adjustments based on respondent feedback. We computed Cronbach's Alpha coefficients for multi-item measures, with a value of 0.70 or higher considered acceptable (Nunnally & Bernstein, 1994).

3.9 Summary

This chapter presented the methodology of the study. It has described the research site, research design, sampling, data collection and data analysis procedures of the study. The ethical considerations described intended to ensure the validity and reliability of the research. The juxtaposition of the quantitative survey and qualitative data improved our understanding of institutional support in the CSA adoption process by smallholder farmers in Macheke.

CHAPTER 4: PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

The remainder of this chapter reports on and considers the findings of this study. The survey results of smallholder farmers in Macheke, Murewa District are presented in tables and graphs based on the objectives of the study. The socio-economic characteristics, adoption of CSA-related practices, institutional support, and barriers and opportunities of adopting CSA are also covered.

4.1 Characteristics of the Respondent Population

Of the 379 questionnaires sent out, 326 were returned, which is an 86.0% response rate. According to Babbie (2017), a 50% response is adequate, a 60% response is good, and responses above 70% are very good for social research.

4.1.1 Gender distribution

This sub-section provides the number of female and male responses to the commodity, as well as the gender composition of farming. Such data can inform on access to resources, adoption of agricultural innovations.

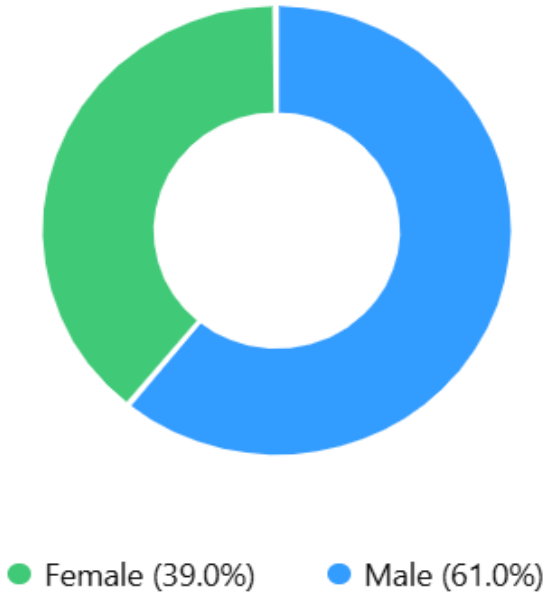

Figure 4.1 Sex of Respondents

Source: primary data

Of the total respondents 61% were male and 39% were female. The predominance of male respondents in agricultural activities was in line with the common experience in many smallholder systems, where cultural norms tend to give men greater control of productive resources and more decision-making power while relegating women to labor-intensive production roles without access to institutions (Njuki et al., 2016). This male bias is consistent with evidence that suggests that men are more likely to hold formal agricultural decision-making and rural institution leadership positions and that this is related to greater access to information on and resources for agricultural technology adoption (Doss et al., 2018).

Despite this potential bias towards the male population, the female response rate (39%) reflects women's growing participation in smallholder farming. Recently, the scholarly literature shows that women constitute a large share of the agricultural labor force in sub-Saharan Africa, with a visible presence in farm production activities (FAO, 2018). Women farmers may, however, be confronted with gendered barriers such as limited access to land, credit, extension services, training, and weather and climate information which may constrain their adoption of new agricultural practices such as CSA (Mujeyi & Chigumira, 2020).

In many countries, women's participation in farming and CSA adoption is constrained by institutional and socio-cultural barriers that limit women's ability to access productive resources (such as land, credit, agricultural inputs, training or extension services), and their role in household decision-making. For example, gender norms can reduce women's access to productive assets such as land and credit and extension services, and men or household heads may be favored in access (Quisumbing et al., 2021).

The gender balance of the sample is important to the interpretation of results, as institutional support, access to information and uptake of adoption practices can work differently for men and women. The representation of women is therefore critical for gender-sensitive analytical frameworks of institutional support mechanisms and the adoption of CSA practices. Help to reduce the gender gap in access to resources and information throughout the research and dissemination process, so that women and men can engage equally in building resilience and climate-smart agriculture.

4.1.2 Age Distribution

The next subsection shows the respondents' age distribution in order to identify the age groups most involved in farming, since age is the most direct common indicator of experience and an important factor affecting technology choice.

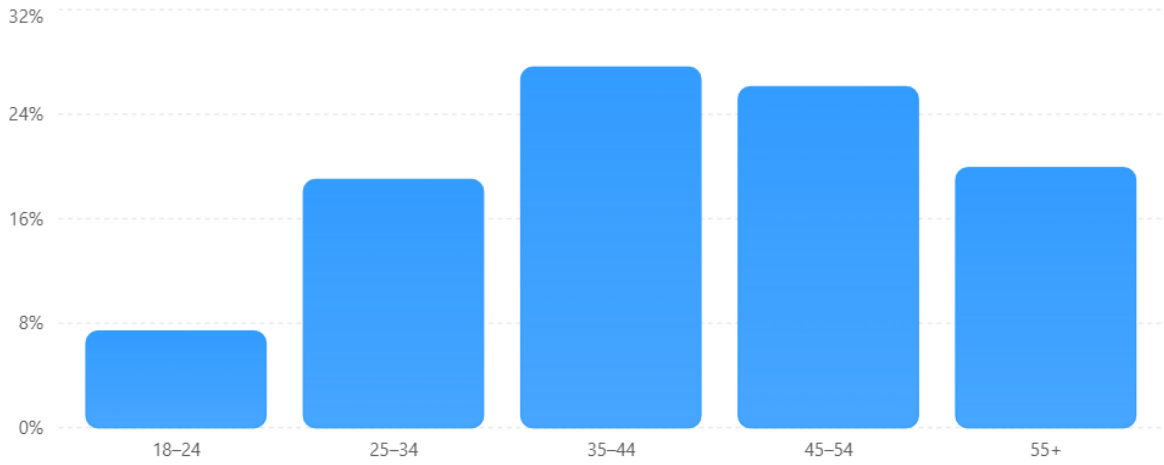

Figure 4.2: Age Distribution of Respondents

Source: Questionnaire

In the Macheke area, results show that most farmers (53.7%) are aged between 35 and 54 years, which means that CSA adoption in the area is mostly influenced by middle aged farmers. This is a productive age group and usually endowed with ample experience in farming, so they are in a better position to adopt CSA. Given that this cohort is responsible for the major management decisions in farms and investments, they are key to agricultural innovation.

Adoption of new CSA practices was higher among farmers aged 35-54, who had an ideal combination of enough experience with existing practices while remaining open to new ones, and made up a larger share of the sample. Their role in decision making also plays a larger role in the adoption of new technologies.

The low percentage of youth aged 18 to 24 years (7.4%) engaged in agricultural activities could be attributed to migration, inadequate access to land and capital as well as socio-

economic factors. This is concerning as it may imply a lack of generational replacement of farmers unless there are programs and policies that promote youth involvement in climate-resilient agricultural practices. 19.9% are aged 55 years or older.

4.1.3 Highest Level of Education Attained

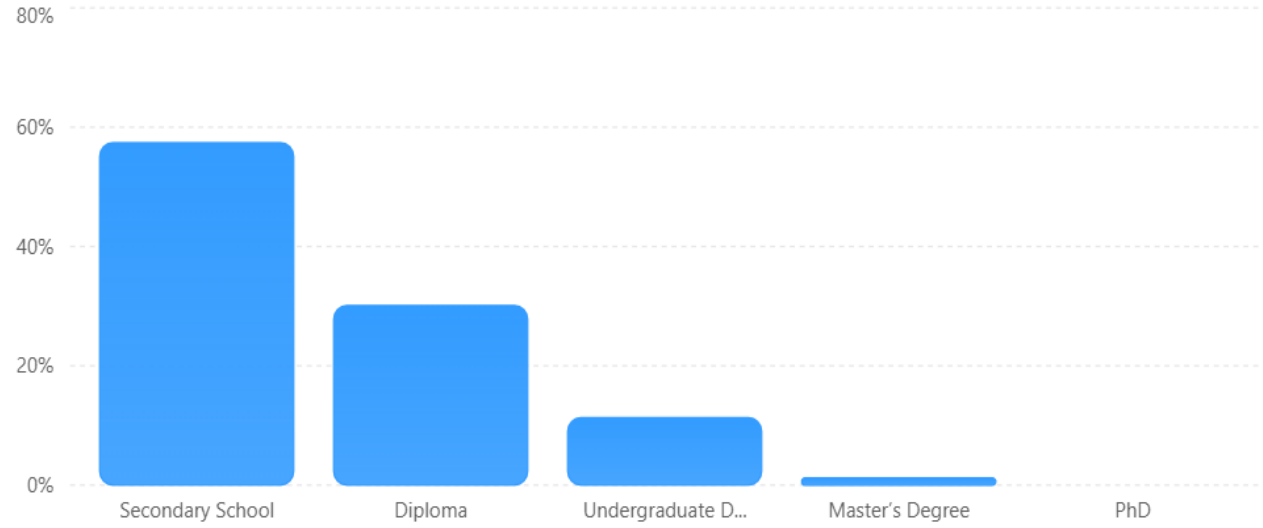

Figure 4.3: Highest Level of Education Attained

Source: Questionnaire

In this regard, most of the smallholder farmers have basic to moderate level of formal education. About 57.4% farmers have completed secondary (high school) education, which is in conformity with the findings of Manda et al. 2020; Tambo & Wunscher 2021 that, secondary education is generally good enough to enable farmers to comprehend extension advice and adopt recommended agricultural practices when the information is presented using practical and participatory approaches.

About 53.9% of the respondents had attended tertiary education. Education plays an important role in the adoption of agricultural innovations such as CSA activities, because educated farmers are more likely to seek information, manage risk and experiment with new technologies (Abegunde et al., 2020; Aryal et al., 2021).

4.1.4 Household Size of Respondents

Table 4.1: Household Size of Respondents **n = 326**

Household Size	Frequency	Percentage (%)
1–3 members	37	11.3
4–5 members	122	37.4
6–8 members	106	32.6
9–10 members	38	11.7
Above 10	23	7.0
Total	326	100

Source: Questionnaire

The results of the household size show that the enormous majority of respondents (88.7%) live in medium to large households. Household size distribution is consistent with the trends of rural smallholder farming communities in sub-Saharan Africa where extended families are customary and the provision of household labor is a key pillar of agricultural production (Mushunje & Mangisoni, 2015).

Household size is another important socio-economic variable which influences agricultural productivity and CSA adoption. It has been reported that large households can provide more family labour, which has a positive impact on the adoption of labour-intensive CSA interventions such as conservation agriculture, mulching, agroforestry, and soil and water conservation measures (Abegunde et al. 2020; Aryal et al. 2021). Household labor supply also reduces the need for hired labor and lowers the cost of agricultural production, providing farmers with the means to implement climate-resilient practices.

All the households with 1-3 household members (11.3% of the sample) may also face labour shortages, limiting the potential for adopting labour-intensive CSA practices.

4.1.5 Major Farming Activities

Table 4.2: Major Farming Activities **n = 326**

Activity	Frequency	Percentage (%)
Maize	300	92.0
Horticulture	228	69.9
Livestock	183	56.1
Other	44	13.5

Source: Questionnaire

In terms of the main crops grown, according to household characteristics, 92% of respondents stated that maize is the main activity. Maize is the staple food and the basis of smallholder livelihood and is consistent with the rest of Zimbabwe as well as the larger southern African region (Chivenge et al., 2020).

Almost 70 percent of farmers diversify into horticulture suggesting diversification into other vegetable and fruit crops for household nutrition and providing a source of income and a means of risk reduction. In the literature, diversification is recommended as a climate-smart adaptation strategy to make households more resilient to climate shocks and market-related shocks (Dube et al., 2021; World Bank, 2023).

More than half of the respondents (56.1%) practiced livestock production. Mixed crop-livestock production is the dominant type of farming system in the study area. In addition to providing draught power and manure for soil fertility, livestock have offered income and savings for households. Integrated crop livestock systems have been viewed as more resilient production systems due to improved soil health and reduced vulnerability to climate variability (Thornton and Herrero, 2020; Rosenstock et al., 2021).

The remaining 13.5% is attributed to tobacco, poultry, and other minor production activities. Smallholders are diversified in their production systems, pursuing risk dislike strategies to achieve stable and constant income and food security. A holistic approach for integrated and

context-specific CSA practices is highly recommended to ensure the sustainability of the farming systems and the livelihood of the smallholders in the region.

4.1.6 Farming Experience of Respondents

Table 4.3: Farming Experience of Respondents **n = 326**

Years of Experience	Frequency	Percentage (%)
< 5 years	24	7.4
5–10 years	74	22.8
11–15 years	88	27.0
16–20 years	87	26.6
> 20 years	53	16.2
Total	326	100

Source: Questionnaire

Over two-thirds of farmers (69.8%) have over 10 years' experience, with 27% having 11 to 15 years' experience, 26.6% with 16-20 years' experience and 16.2% with over 20 years' experience. In terms of local knowledge, this suggests that the respondents represent a long-standing farming community with both knowledge of the local agriculture and of climate variability.

Farming experience positively correlates with the adoption of CSA practices, as farmers with more experience are more knowledgeable about seasonal weather patterns, soil types, crop response to weather changes, shocks, and how to implement adaptive practices and innovations (Abegunde et al., 2020; Aryal et al., 2021). In addition, experience increases the perception of risk and the required skills for climate-sensitive agriculture (Nguyen et al., 2022).

The small percentage of farmers with 5 years or less of experience, only 7.4%, suggests that few farmers are entering the profession, possibly due to low access to land and capital, along with youth migration to urban areas, a frequent topic in Zimbabwe and other sub-Saharan African nations (FAO, 2022). Recruiting younger, less established farmers to adopt CSA is critical for its long-term future, as they make up the future of farming: flexible, entrepreneurial, and able to embrace change.

Farmer field schools, mentorships, and farmers' cooperatives can ease knowledge sharing between experienced and new farmers and hybridized indigenous and scientific knowledge. Training and advice presented by extension services and CSA programs to producers should reflect the level of experience of the producers.

4.2 Adoption of Climate-Smart Agriculture (CSA) Practices

Table 4.5: CSA Practices Adopted **n = 326**

CSA Practice	Frequency	Percentage (%)
Crop diversification	266	81.6
Conservation agriculture	247	75.7
Drought-resistant varieties	215	66.0
Integrated soil fertility management	190	58.2
Water harvesting/irrigation	171	52.4
Agroforestry	114	34.9

Source: Questionnaire

The data on CSA uptake showed that smallholder farmers were diversifying their cropping systems (81.6%) and adopting conservation agriculture (75.7%). This finding confirmed that, as Munyati et.al. 2021 suggested, there was increasing awareness that climate variability affected agriculture and the need for different adaptive strategies to spread risk and build resilience. FAO,2022 states that crop diversification can reduce reliance on monoculture and increase food security. Conservation agriculture, including minimum tillage, mulching and retention of crop residues can reduce soil erosion and degradation and also promote better water retention.

The moderate adoption of drought-resistant variety (66.0%) and integrated soil fertility management (58.2%) by the farmers is a reflection of the awareness and need to use climate-resilient crops and soil fertility management as a mechanism of sustaining productivity in the changing climate. In line with Mupangwa et al., 2020, this is because drought-resistant varieties are essential in areas with erratic rainfall and drought spells due to their effect on the reduced probability of crop failure.

Water harvesting and irrigation is widely used (52.4%); it seeks to effectively manage water scarcity, improve water use efficiency, and promote crop production. The use of water harvesting techniques is increasingly promoted as a CSA intervention because it can improve water availability in dry periods and improve crop production (Mutambara et al., 2023).

Agroforestry, the least common practice (34.9%), can provide climate change resilience through carbon sinks, fertility, and income diversification (Makate et al., 2020). Its low adoption rate compared to other practices may be because the benefits of agroforestry take longer to materialize, as well as a lack of knowledge, underscoring the need for targeted extension. Generally, results describe a willingness and ability of smallholder farmers to adopt climate adaptation measures, but with variable uptake indicating opportunities for education, capacity building, and increased input access.

Key informants confirmed these trends, with one extension officer noting:
"Farmers are more willing to adopt practices that show immediate benefits, like crop diversification, because they can see the results in the same season. Agroforestry takes time to show benefits, which makes it less attractive to farmers who are struggling with immediate food security concerns."

4.3 Access to Institutional Support

Table 4.4: Access to Institutional Support

Support Type	Percentage of Farmers with Access (%)
Extension services	78%
Training/workshops	73%
Inputs	68%
Credit	58%
Weather information	71%
Market linkages	62%

Source: Questionnaire

The percentages for access to various types of institutional support indicate that extension services were accessible to 78.0% of the respondents, making it the most accessible type of support available. This shows that organizations offer relatively good availability and that they address smallholder farmers' needs. This aligns with the pivotal role of extension services in spreading knowledge and guiding technically for CSA adoption, as documented in Zimbabwe and in other similar contexts (Munyati et al., 2021; FAO, 2022).

Access to training in addition to workshops was reported by 73.0% of respondents. This shows active efforts to improve farmers' capacities alongside practical skills for applying CSA practices. Capacity building through training remains critical for effectively overcoming knowledge barriers that exist in organizations. It is also essential for the fostering of technology adoption among users (Abegunde et al., 2020).

Sixty-eight point zero percent of the respondents reported that they received input support from others. This finding shows that while many farmers obtain agricultural inputs like seeds and fertilizers, they continue to encounter difficulties concerning the availability, quality, or affordability. Such constraints can impede the effective uptake of CSA technologies in actual practice. These technologies often require timely input supply in order to maintain adequate input supply (Rosenstock et al., 2021).

Seventy-one percent of the respondents reported that they accessed weather information. This information considerably influences farmers when they decide under climate variability. Accessing timely and accurate weather forecasts allows individuals to plan effectively for and manage risks, although infrastructural or communication challenges may obstruct this process in planning (Mutambara et al., 2023).

Market linkages were found to be available for 62.0% of the respondents, which signifies important challenges in securing reliable yet profitable markets among a considerable number of farmers. Strong market connections are essential for farmers in order to realize important economic benefits from CSA by selling not only diversified and also higher-value produce to consumers (Makate et al., 2020).

Access to credit was reported as being available by only 58.0% of the respondents. This made it the least accessible form of institutional support for individuals in need. This

highlights an important barrier for smallholders without adequate financial resources to invest in CSA technologies along with innovations. Limited access to credit acts as a commonly noted constraint in smallholder agriculture, which restricts investment in superior seeds, equipment, or irrigation infrastructure (Nguyen et al., 2022).

A microfinance officer explained: “Many farmers, unfortunately, lack formal land titles or steady income proofs, which consequently limits their access to credit while slows down necessary CSA investment. The financial institutions are, in fact, often reluctant to lend to smallholder farmers because of perceived risks.”

4.4 Institutional Support and CSA Adoption

Table 4.8: Institutional Support and CSA Adoption

Statement	Percentage Agreeing (%)
Training improved CSA knowledge	85%
Input support eased adoption	82%
Credit increased adoption	71%
Support is consistent	66%
Supported farmers adopt faster	88%

Source: Questionnaire

Overall, there is a pattern among survey participants that indicate that institutional support is a major driver for CSA adoption. The statement with the most agreement (88% of respondents) was "Supported farmers adopt faster", indicating that survey participants believe that institutional support is associated with faster adoption of CSA practices. This is consistent with the literature which describes support systems as catalyzing technology diffusion for smallholders (Nguyen et al., 2022; FAO, 2022).

Training programs were viewed favorably and 85% of respondents agreed that training improved their CSA knowledge. Training is required to build knowledge and skills for CSA practice adoption among farmers. Further, if the training programs are well executed, they may give farmers confidence and the know-how to adopt new practices (Abegunde et al., 2020). Similarly, 82% of the respondents mentioned that the input support contributed to their adoption. Another factor that enables the adoption process is access to inputs, such as good quality seeds, fertilizers and other inputs. Access to inputs is necessary to translate knowledge into practice, and their importance as determinants of adoption has been documented elsewhere (Munyati et al. 2021).

Around 71% of respondents agreed that credit increased adoption. Although access to finance contributes to the uptake of CSA, financial constraints are also a key barrier for farmers who have adopted some practices but not others. Poor access to affordable credit is another common barrier for many farmers in smallholder systems, constraining investments in improved technologies and infrastructure (Nguyen et al., 2022).

However, the statement regarding institutional support having no variance received the lowest level of agreement (66%), suggesting some concerns over the regularity of institutional support. Short and/or uncertain support on behalf of the service provider might weaken the trust and motivation of the farmers and therefore the sustainability of uptake. Making support services more predictable and continuous should therefore be an important aspect in ensuring long-term uptake of CSA technologies (Rosenstock et al., 2021). Thus, the results show the need for institutional support to be made more reliable and accessible to improve the adoption of CSA by smallholder farmers.

4.5 Relationship between Institutional Support and CSA Adoption

Table 4.11: Correlation between Institutional Support and CSA Adoption

Variable	r	p-value
Institutional support vs CSA adoption	0.63	<0.01

The impact of institutional support on the adoption of CSA practices is further corroborated by the inferential statistical analysis which shows that there is a positive and important

relationship between institutional support of smallholder farmers and their adoption of CSA practices at $r = 0.63$, $p < 0.01$. This produced a correlation coefficient of 0.63, indicating a moderately strong association, which explained 39.7% ($r^2 = 0.397$) of the variability in CSA adoption.

This finding highlights the importance of institutions, such as extension services, training providers and financial institutions, in easing the uptake of CSA practices. It may be concluded that effective institutional support that is readily accessible to farmers is an important driver of increasing their capacity to adopt climate-resilient agricultural practices and improve productivity and sustainability. The positive coefficient of this relationship aligns with the findings of Makate et al. (2019) and Teklewold et al. (2019), who identified a statistically meaningful and positive relationship between institutional support and CSA adoption in sub-Saharan Africa.

Table 4.7: Regression Analysis Predicting CSA Adoption

Predictor	β	p-value
Extension services	0.32	0.001
Training access	0.28	0.003
Input support	0.24	0.007
Credit access	0.19	0.021
$R^2 = 0.54$		

Regarding the institutional support, the results of the regression analysis indicate that different types of support are statistically important in influencing smallholder farmers' adoption of CSA practices. The variable institutional support (extension services) has the highest positive effect or influence on the adoption ($\beta = 0.32$, $p = 0.001$).

Hence, training access ($\beta = 0.28$, $p = 0.003$), input support ($\beta = 0.24$, $p = 0.007$), and credit access ($\beta = 0.19$, $p = 0.021$) positively and considerably influenced farmers' adoption decision. This confirmed that capacity building, availability of required inputs, and financial

assistance are critical in easing farmers' adoption decision while the effect of credit access is lower due to farmers' financial constraints. The model accounted for 54% ($R^2 = 0.54$) of variation in CSA adoption, suggesting that institutional support is a key factor. This highlights the need for policymakers and development partners to focus on these factors when developing strategies to scale CSA technologies and practices.

4.6 Challenges in Accessing Institutional Support

Table 4.8: Challenges Faced **n = 326**

Challenge	Frequency	Percentage (%)
High cost of inputs	279	85.5
Lack of credit	260	79.7
Inadequate extension	209	64.1
Poor market access	190	58.2
Limited training	183	56.1
Poor coordination	146	44.7

Source: Questionnaire

The barriers to institutional support for CSA implementation faced by the smallholder farmers show that the high cost of agricultural inputs to ease CSA implementation remains a challenge for smallholder farmers, with nearly nine in ten (85.5%) of respondents highlighting the high inputs price as a challenge. Closely related is the unavailability of credit to procure inputs and/or technology as cited by nearly four-fifths (79.7%) of the respondents.

Other barriers to CSA uptake that were reported by the farmers include: lack of an extension service (64.1%) to provide technical support to farmers in a timely fashion, lack of a market to sell produce (58.2%), lack of training in CSA practices (56.1%), and lack of coordination

among institutions (44.7%). These barriers indicate the need for more integrated, affordable, and accessible institutional support to ease the uptake of CSA practices among farmers.

Factors often cited as limiting institutional support to farmers at the workshop included: poor extension service coverage (limited staff and transportation), limited availability and high market cost of inputs, lack of coordination among institutions, and limited access to credit. As a cooperative leader explained, "Extension officers are stretched thin, and not all farmers get equal attention. Coordination between different support providers is often weak, leading to overlaps or gaps in service delivery."

4.7 Chapter Summary

This chapter shows that CSA uptake among smallholder farmers in Macheke is moderate and is positively correlated to institutional support, including extension services, training, and access to agricultural inputs. High input costs and limited access to credit were identified as barriers to CSA uptake, while improved institutional coordination and low-cost financing would unlock CSA uptake.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter provides an overview of the findings on the effect of institutional support on CSA adoption by smallholder farmers in the Macheke area of the Murewa District. It summarizes the descriptive statistics, results of the likert scale and inferential models (correlation and regression) used to test the hypotheses. The chapter ended with recommendations and recognized areas for further research on frameworks for sustainable agricultural development and increased climate resilience.

5.2 Summary of Key Findings

While uptake of CSA was considered to be moderate, it was noted that uptake was unequal across households. Although low-cost practices and those requiring higher knowledge were adopted widely, high-cost, long-term practices such as agroforestry were reported to have relatively low uptake, likely due to farmers' financial and resource constraints.

Institutional support was also found to be an important factor that smallholder farmers consider when deciding to adopt CSA technologies and practices. Results from the statistical analysis confirmed access to institutional services was an important determinant to the CSA adoption.

Furthermore, agricultural extension services remain the mainstay for diffusion of CSA practices in rural communities. Extension workers provide farmers with information, technical advice and training while promoting agricultural growth in rural areas and the capacity to adapt to climate change.

A further conclusion of the study is that for most farmers, credit, input supply, and investment capital are the most important structural barriers preventing them from adopting CSA technologies and practices that would increase climate resilience and agricultural productivity on their farms.

The study concluded that institutional fragmentation could have a negative impact on the overall effectiveness of CSA interventions. Poor coordination of the efforts between relevant government departments, NGOs, financial institutions and other stakeholders could reduce the overall impact of support programmes.

The study concluded that CSA adoption depends on socio-economic, institutional, and resource factors but institutional support was the most important facilitator and is necessary for effective adoption and maintenance of CSA practices.

5.3 Recommendations

Strengthening Extension Systems

The government should increase extension coverage by hiring more extension officers, improving the mobility of extension officers (for example providing them with vehicles or motorbikes), and investing in digital extension channels (for instance mobile-based advisory services). Currently in some parts of the country, the ratio of extension officers to farmers exceeds 1000:1. This might be reduced to 1:500, with improved levels of service and coverage, and officers trained in climate smart technologies.

Expanding Rural Financial Inclusion

Financial institutions need to offer climate-smart credit products for smallholder farmers, including low-collateral loans, group lending, or loans with payment schedules aligned with production cycles. A government-backed guarantee fund could help reduce the risk of

lending to smallholders. Farmers may be able to buy improved seeds, irrigation, and other inputs to improve their CSA practices. The government could also provide financial literacy training to farmers, to increase their credit use.

Scaling Farmer Training and Capacity Building

Farmer education should include farmer field schools, demonstration plots and creating peer-to-peer networks. The curricula should include CSA practices, financial literacy, market connections, and climate risk assessments. Refresher training ensures that soldiers maintain momentum and adapt to changes they may face.

Reducing Input Constraints

Policies must promote subsidized CSA-related inputs (especially drought-resistant seeds, organic fertilizers and mulch) and ensure the affordability and timely availability of financial and physical inputs. The government must also coordinate with private input suppliers to ensure that input quality remains consistent and that underserved geographic and social areas are not disproportionately affected. The cost of production can be reduced by the use of organic inputs such as compost and manure.

Enhancing Institutional Coordination

Establish a multi-stakeholder structure to coordinate all government, NGO, private sector and cooperative CSA activities in a single CSA strategy. This should include regular meetings between stakeholders, a common monitoring and evaluation framework, and an information sharing platform. Clarifying each actor's roles and responsibilities can help avoid duplication and help activities harness one another.

Enhancing Climate and Market Information Systems

Support investment in ICT-based climate advice and market information platforms to enable farmers to make timely and informed decisions to increase climate resilience. The platforms should provide multi-source information on localized weather forecasts, pest and disease outbreaks, and market price information to inform farmer decision-making and improve their resilience to climate change.

5.4 Further research

Future studies could consider conducting longitudinal studies on the long-term impacts of the adoption of CSA technologies and practices on productivity, household income, food security and smallholder farmers' resilience to climate change. Longitudinal studies would provide more information on the long-term sustainability of the adopted CSA technologies and practices. More studies with a gender lens are needed to understand how patterns of institutional access and ownership of economic resources, social norms and agency, and decision-making power do (or do not) shape men and women's engagement with CSA, and to support inclusive agricultural policy and programming for climate-smart agricultural practices.

Future farm-level studies should also focus on the cost-effectiveness of adoption of CSA practices and identify the most economically viable technologies/approaches to smallholder farmers in varying environmental and socio-economic contexts. Furthermore, there is a need for more research on the role of digital agriculture tools such as mobile advisory services, weather information systems and digital extension platforms in raising awareness and scaling up the promotion of CSA practices for rural households. The analysis of different districts and agro-ecological zones could help identify spatial variation in institutional efficiency, resource availability, and uptake to provide stronger evidence on improving climate adaptation initiatives at the local and national levels.

5.5 Chapter summary

The chapter has drawn together the main findings of this study and shown how institutional support is one of the key motivations for CSA uptake among smallholders in the Macheke area. The study has also shown that despite high uptake rates, many barriers to wider adoption exist. This calls for integrated support systems of extension, finance and agronomic inputs as well as strong mechanisms for effective coordination towards climate resilience and sustainable transformation.

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Annexture A: Research Questionnaire

Introduction

I am a student from BUSE doing my Master of Science Degree in Food Security and Sustainable Agriculture. As part of the requirement of the degree program, I am supposed to carry out research work. I am undertaking research on the topic, **"Assessing the Role of Institutional Support in the Adoption of Climate-Smart Agriculture (CSA) Practices among Smallholder Farmers in Macheke, Murewa District."** As such this questionnaire is part of a research study aimed at examining the role of institutional support in the adoption of Climate-Smart Agriculture (CSA) among smallholder farmers in Macheke, Murewa District Your participation in this study is voluntary and confidential. The information collected will be used solely for academic purposes.

Information on how to answer the questionnaire

- Do not write your name on any part of this questionnaire
- Answer all questions in the questionnaire
- Put a tick in the boxes provided in each question
- Where a space is provided, write your comments

Section A: Personal Information

1. Sex of respondent

   Male ☐ Female ☐

2. What is your age group?

18-24 years	
25-34 years	
35-44 years	
45-54 years	
55+ years	

3. Highest level of education attained

High School	
Diploma	
Undergraduate Degree	
Masters Degree	
PhD Level	

4. Household size

1-3 members	

4-5 members	
6-8 members	
9-10 members	
Above 10 members	

5. Major farming activities (tick all that apply)

Maize	
Horticulture	
Livestock	

Other……..

6. Farming experience (years)

Less than 5 years	
5-10 years	
11-15 years	
16-20 years	
More than 20 years	

Section B: Adoption of CSA Practices

7. Which CSA practices do you currently use? (Tick all that apply)

Conservation agriculture (minimum tillage, mulching)	
Agroforestry	
Crop diversification	
Water harvesting/irrigation	
Integrated soil fertility management	

Drought-resistant crop varieties	

8. Please indicate your level of agreement with the following statements on CSA adoption.

Key: tick on box from the following no(2), Yes (1)

Statement	**1**	**2**
CSA practices have improved my yields.		
CSA makes my farm more resilient to climate change.		
Institutional support encouraged me to adopt CSA.		
CSA practices are affordable for smallholder farmers.		
I would recommend CSA to other farmers.		

Section C: Institutional Support Available

9. From which institutions do you receive agricultural support? (Tick all that apply)

Government extension services	
NGOs	
Farmer associations/cooperatives	
Financial institutions	
Input suppliers	

10. Please rate your access to the following types of institutional support

Type of support	**Very poor**	**Poor**	**Fair**	**Good**	**Excellent**
Extension services					

Access to training/workshops					
Access to farm inputs					
Access to credit/loans					
Climate/weather information					
Market linkages					

Section D: Influence of Institutional Support on CSA Adoption

11. To what extent has institutional support influenced your adoption of CSA?

Great extent	
Moderate extent	
Small extent	
Not at all	

12. Please indicate your level of agreement with the following statements on CSA adoption.

Key: tick on box from the following

(2), NO (1)YES

Statement	**1**	**2**
Training programs have improved my CSA knowledge.		
Input support has made CSA adoption easier.		
Access to credit has increased my ability to adopt CSA.		
Institutional support is consistent and reliable.		
Farmers with institutional support adopt CSA faster than those without.		

Section E: Challenges in Accessing Institutional Support

13.What challenges have you faced in accessing institutional support? (Tick all that apply)

Inadequate extension coverage	
Lack of credit facilities	
High cost of inputs	
Poor market access	
Limited training opportunities	
Poor coordination among institutions	

14. Please rate the severity of the following challenges in accessing institutional support

Challenge	**Not a Challenge**	**Minor Challenge**	**Moderate Challenge**	**Major Challenge**	**Severe Challenge**
Inadequate extension coverage					
Lack of credit facilities					
High cost of inputs					
Poor market access					
Limited training opportunities					
Poor coordination among institutions					

Section F: Strategies for Enhancing CSA Adoption

15. In your opinion, how important are the following strategies to improve CSA adoption?

Strategy	Not Important	Important
Increasing extension staff		
Providing affordable credit		
Strengthening farmer training		
Improving access to inputs		
Enhancing weather information systems		
Coordinating institutions better		

Thank you for taking the time to complete this questionnaire!

Annexture B: Interview Guide

Self-Introduction

I am a student from BUSE doing my Master of Science Degree in Food Security and Sustainable Agriculture. As part of the requirement of the degree program, I am supposed to carry out research work. I am undertaking research on the topic, **"Assessing the Role of Institutional Support in the Adoption of Climate-Smart Agriculture (CSA) Practices among Smallholder Farmers in Macheke, Murewa District."** As such, I am conducting interviews as part of data gathering in which I am kindly requesting you assist with answering questions that I will pose to you. In answering these questions, you are free to give insights that best explain your point of view as well as your honest view on issues raised. Furthermore, you are free to withdraw from the interview at any stage of the process.

Questioning Line

Section A: Demographic and Background Information

1. Can you briefly tell me about yourself (age, household size, main farming activities, years of farming experience)?
2. What are your main sources of livelihood, and how important is farming in sustaining your household?

Section B: Adoption of CSA Practices

3. What types of CSA practices do you currently use on your farm (e.g., conservation agriculture, agroforestry, water harvesting, crop diversification)?
4. What motivated you to start using CSA practices?
5. From your experience, how have these practices affected your yields, food security, and resilience to climate shocks?
6. Are there CSA practices you know of but have not adopted? Why?

Section C: Institutional Support Available

7. What types of support have you received from institutions (government extension officers, NGOs, farmer groups, financial institutions, input suppliers, etc.)?
8. Which institutions have been most active in supporting farmers in your area?
9. How would you describe the quality and consistency of support you have received?
10. Do you think the support provided is sufficient to enable wider adoption of CSA? Please explain.

Section D: Influence of Institutional Support on CSA Adoption

11. How has institutional support influenced your decision to adopt or not adopt CSA practices?
12. Can you give examples where training, access to credit, inputs, or climate information helped you adopt or improve CSA practices?
13. In your opinion, are farmers with institutional support more successful in CSA adoption compared to those without? Why?

Section E: Challenges in Accessing Institutional Support

14. What challenges have you personally faced in trying to access institutional support (e.g., distance to extension services, lack of credit, high cost of inputs, lack of coordination)?
15. Which of these challenges do you consider the most serious for farmers in your community?
16. How have these challenges affected your ability to adopt CSA practices?

Section F: Strategies for Enhancing CSA Adoption

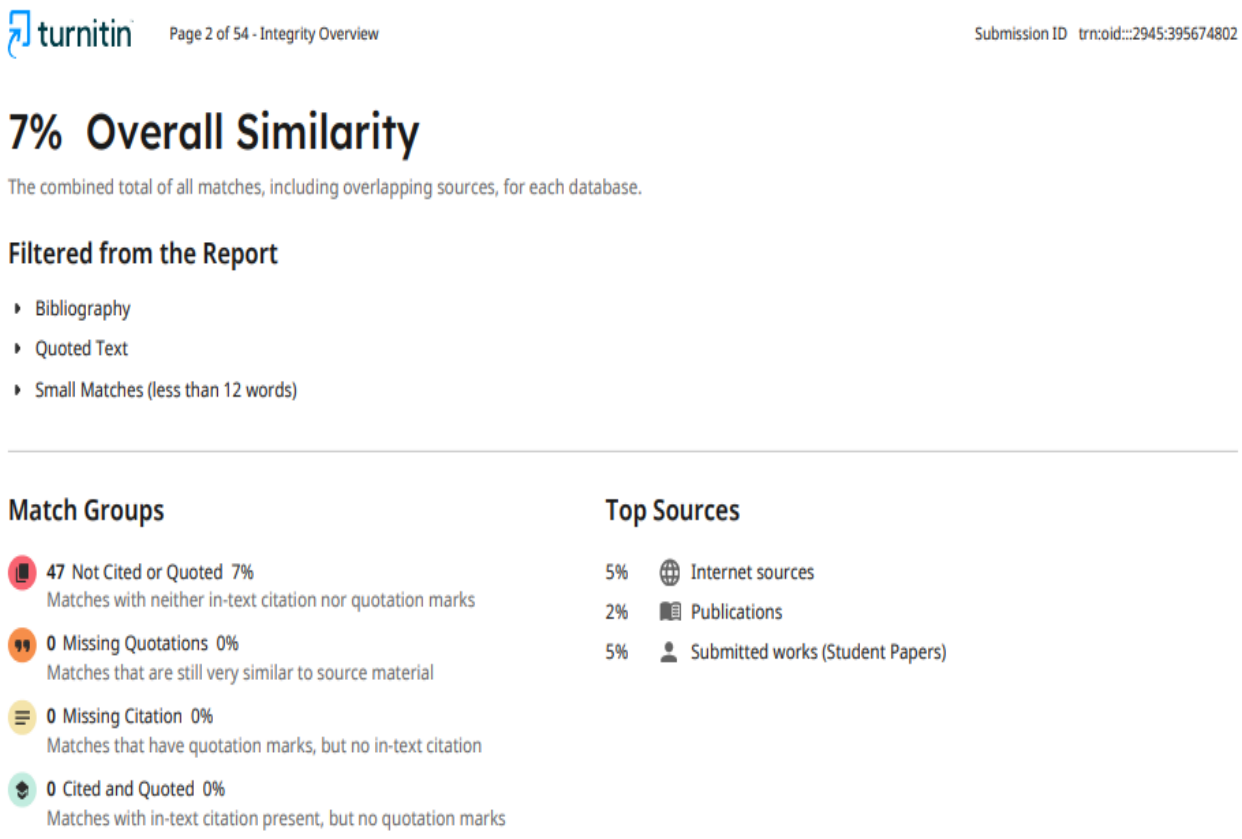
17. What do you think can be done to improve institutional support for farmers in adopting CSA?
18. How important do you think farmer groups, cooperatives, or community associations are in improving access to support?
19. If you had an opportunity to advise government or NGOs on how to promote CSA adoption, what would be your key recommendations?

Closing

20. Is there anything else you would like to share about your experiences with CSA practices and institutional support in your farming activities?

Thank you for your participation!

Annexture C: Similarity Report



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