ASSESSING THE EFFICACY OF AGRICULTURAL EXTENSION SERVICES IN THE GROUNDNUT VALUE CHAIN IN KASUNGU AND MZIMBA DISTRICTS OF MALAWI

By

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DECLARATION

I declare that "**Assessing the Efficacy of Agricultural Extension Services in The Groundnuts Value Chain in Kasungu and Mzimba Districts of Malawi**" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references. I further declare that I submitted the thesis/dissertation to the appropriate originality detection system which is endorsed by UNISA and that it falls within the accepted requirements for originality. I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



. …….

Alifeyo Mjuma Nyasulu

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ABSTRACT

Although extension services play a crucial role in agricultural commercialisation and diversification, the capacity of extension workers to support value chain-based and market-oriented production remains underexplored, particularly for crops such as groundnuts. This study assessed the effectiveness of extension services within the groundnut value chain in the Kasungu and Mzimba districts, focusing on the capacity of extension workers, the impact of extension support, and the challenges encountered. A mixed-methods approach was employed, combining farmer surveys with key informant interviews conducted with extension staff.

The findings revealed that, while extension workers actively support production practices, they often lack the capacity to assist with the more advanced stages of the value chain, such as value addition, processing, and marketing. Farmers substantiated this finding by reporting improved productivity resulting from production-focused extension support, but they noted limited assistance beyond the harvest phase. The study also found that government officers are the predominant source of agricultural information, with minimal involvement from non-governmental organisations or private sector actors. This is despite the Extension Policy promoting the involvement of multiple stakeholders in extension service delivery through its pluralistic approach. Consequently, farmers have limited access to an adequate number of extension workers, resulting in a high farmer-to-extension worker ratio.

The study concludes that, although extension services have contributed to increased groundnut productivity, there is a critical need to strengthen support in post-harvest handling, value addition, and market access. The study recommends a reorientation of extension services from a production-centric model to a holistic value chain approach, including capacity building for extension workers and improved stakeholder coordination across the production-to-consumption continuum.

OKUCASHUNIWE

Nakuba izinhlelo zokwelulekwa zidlala indima ebalulekile ekwandiseni nasekuhlukanisweni kwezolimo, ikhono labasebenzi abangabeluleki lokweseka ukukhiqiza okuhambisana nezindlela zokusetshenziswa komkhiqizo kanye nezimakethe alikahlolisiswa ngokwanele, ikakhulukazi emasimini afana nawamakinati.

Lolu cwaningo luhlole ukusebenza ngempumelelo kwezinsizakalo zebhizinisi zamakinati esifundeni saseKasungu naseMzimba, lugxile ekutheni abasebenzi bezokweluleka banamandla kangakanani, umthelela wokweseka ezokweluleka kanye nezingqinamba abahlangabezana nazo. Indlela exubile yocwaningo yasetshenziswa, ehlanganisa izinhlolovo zabalimi kanye nezinhlolovo zabanolwazi abasemqoka, olwenziwa kubasebenzi bezokweluleka.

Imiphumela yadalula ukuthi, nakuba abasebenzi bezokweluleka babesebenza ngokuzimisela ukweseka izinqubo zokukhiqiza, bavame ukwentula amakhono okusiza ngezigaba ezihlabahlosile zokuqhuba ibhizinisi, ezifana nokwengeza inani, ukucubungula nokumaketha. Abalimi baqinisekise le miphumela ngokubika ukuthuthukiswa komkhiqizo okungumphumela wokwesekwa kwabezokweluleka okugxile ekukhiqizeni, kodwa baphawule ngokungabi nalo usizo olwanele emva kwesikhathi sokuvuna.

Ucwaningo luphinde lwathola ukuthi izikhulu zikahulumeni zingumthombo obanzi wolwazi lwezolimo, ngokubamba iqhaza okuncane kwezinhlangano okungezona ezikahulumeni kumbe ababambiqhaza bomkhakha ozimele. Lokhu kwenzeka ngenxa yokuthi Inqubomgomo Yezokweluleka igqugquzela ukubandakanywa kwababambiqhaza abaningi ohlelweni lokuhlinzekwa kwezokweluleka ngokusebenzisa izindlela ezahlukahlukene. Ngenxa yalokho, abalimi banokufinyelela okukhawuliwe kubasebenzi bezokweluleka abanele, okuholela ekutheni kube nesibalo esiphezulu sabalimi kubeluleki abambalwa.

Ucwaningo luphetha ngokuthi nakuba imisebenzi yezokweluleka ibe nomthelela ekwandeni komkhiqizo wamakinati, kunesidingo esisemqoka sokuqinisa ukwesekwa ekunganyelweni komkhiqizo emva kokuvuna, ukwengeza inani kanye nokufinyelela emakethe. Ucwaningo luncoma ukufundiswa kabusha ngemisebenzi yezokweluleka ukusuka kwimodeli egxile ekukhiqizeni kuya endleleni ephelele yochungechunge lwenani, okuhlanganisa ukwakhiwa kwamakhono kubasebenzi bezokweluleka kanye nokuthuthukiswa kokudidiyela ababambiqhaza ohlelweni lonke kusukela ekukhiqizeni kuya ekudleni.

ISISHWANKATHELO

Iinkonzo ezongeziweyo zidlala indima ebalulekileyo kakhulu kuqoqosho lwezolimo nasekwahlulweni kwezi nkonzo, kodwa abukaphononongwa ubuchule abanabo abasebenzi abongeziweyo bokuxhasa imveliso ekunikezelwana ngayo nejoliswe kwimarike, ingakumbi ubuchule kwizityalo ezifana namandongomane. Olu phando luvavanye ukusebenza kweenkonzo ezongeziweyo kwicandelo lokuveliswa nokunikezelana ngamandongomane kwisithili iKasungu nakwisithili iMzimba, lujolise ngokukodwa kubuchule babasebenzi abongeziweyo, ifuthe lenkxaso eyongeziweyo kunye nemiceli-mngeni ekhoyo. Kusetyenziswe iindlela ezixutyiweyo kolu phando, kwadityaniswa uphando olwenziwe ezifama kunye nodliwano-ndlebe olungundoqo olwenziwe kubasebenzi abongeziweyo.

Iziphumo zidalule ukuba abasebenzi abongeziweyo bawuxhasa ngamandla umsebenzi wokuvelisa kodwa abanabo ubuchule bokuncedisa kumanqanaba agqithela phambili afana nokongeza ixabiso, ukulungelelanisa nokuthengisa. Ngelingqina esi siphumo, amafama axele ukuphucuka kwemveliso okudalwe yinkxaso yokuvelisa enikwa ngabasebenzi abongeziweyo kodwa aphawule ukuba emva kokuvuna luncinane kakhulu uncedo olunikwa ngaba basebenzi. Kwakhona olu phando lufumanise ukuba owona mthombo wengcombolo yezolimo ngamagosa karhulumente kwanokuba yinxaxheba engephi ethatyathwa ngamaziko angekho phantsi korhulumente okanye amaziko abucala. Oku kwenzeka nangona kukho uMgaqo-nkqubo wokoNgeziweyo okhuthaza ukubandakanyeka kwabathathi-nxaxheba abaliqela kwiinkonzo ezinikwa ngabasebenzi abongeziweyo. Alonelanga inani labasebenzi abongeziweyo elifunyanwa ngamafama, nto leyo ikhokelela ekubeni ube mkhulu umahluko phakathi kwenani lamafama nelabasebenzi abongeziweyo.

Olu phando luphetha ngelithi iinkonzo ezongeziweyo zibe negalelo elikhulu ekonyuseni imveliso yamandongomane, kodwa kukho imfuneko emandla yokuqinisa inkxaso enikwa emva kwesivuno, ukongeza ixabiso kunye nokukwazi ukuthengisa imveliso. Olu phando luphakamisa ukuba iinkonzo ezongeziweyo maziguqulwe ekugxininiseni ekuveliseni kuphela koko mazijoliswe kunikezelo lwemveliso lulonke, kuquka ukuxhotyiswa ngobuchule kwabasebenzi abongeziweyo nolungelelwaniso oluphucukileyo lwabathathi-nxaxheba kwizigaba ngezigaba zokuvelisa ukuya kuthi ga kwisigaba sokusetyenziswa kwemveliso.

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Acronyms

AEDC	Agricultural Extension Development Coordinator
AEDO	Agricultural Extension Development Officer
ADD	Agricultural Development Division
ASWAp	Agricultural Sector Wide Approach
COMSIP	Community Savings and Investment Promotion
DAO	District Agricultural Office / Officer
EPA	Extension Planning Area
FGD	Focus Group Discussion
FISP	Farm Input Subsidy Programme
GDP	Gross Domestic Product
GoM	Government of Malawi
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
KII	Key Informant Interview
MGDS	Malawi Growth and Development Strategy
MoAIWD	Ministry of Agriculture, Irrigation and Water Development
NGO	Non-Governmental Organization
NPC	National Planning Commission
VCA	Value Chain Analysis
WFP	World Food Programme
FAO	Food and Agriculture Organization
JICA	Japan International Cooperation Agency
IIRR	International Institute of Rural Reconstruction
KIT	Royal Tropical Institute, Netherlands
ADB	Asian Development Bank

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1. Introduction

The agricultural sector is the backbone of Malawi's economy, contributing 39 percent to the Gross Domestic Product (GDP) and accounting for 83 percent of foreign exchange earnings (JICA, 2022). It also remains one of the largest sources of employment, absorbing 64 percent of the total labour force. Approximately 80 percent of the population relies on smallholder agriculture for their livelihoods (ILO, 2019), highlighting the sector's critical role in national development. A vibrant and resilient agricultural sector is therefore key to achieving economic growth and structural transformation in Malawi.

This study investigates the efficacy of agricultural extension services in the groundnuts value chain in Kasungu and Mzimba districts of Malawi. The chapter provides a comprehensive background to the study, outlining the importance of agricultural extension services in enhancing productivity, commercialization, and value addition in the groundnuts sector. The background highlights the role of extension workers in facilitating access to knowledge, technologies, and markets for smallholder farmers. The chapter further presents the problem statement, which outlines the gaps in the current extension service delivery, particularly in supporting market-oriented and value chain-based groundnut production. This is followed by a discussion of the research objectives and questions that guide the study. In addition, the significance of the study is presented, emphasizing its potential contribution to improving extension policy and practice in Malawi. The chapter also defines the scope of the study, including its delimitations and limitations, and concludes with a summary.

1.2. Background

Despite its importance, the sector faces persistent challenges that constrain its performance. According to the First Malawi Implementation Plan (MIP-1 2021 to 2030), the contribution of agriculture, forestry, and fishing to GDP was expected to increase from 22.6 percent in 2020 to 27.8 percent by 2030. However, between 2020 and 2024, the sector's share stagnated between 22.0 and 22.8 percent (Ministry of Finance, 2025). Growth rates have also declined, with the sector recording a contraction of -0.2 percent in 2024 and a marginal projected growth of 0.3 percent in 2025 (2025 Annual Economic Report). This sluggish growth undermines the country's long-term vision, which is heavily reliant on agricultural transformation. The constraints facing the sector include limited investment, over-reliance on rain-fed farming, declining soil fertility, weak infrastructure, insufficient research and innovation, and inadequate extension services (Government of Malawi, 2010).

Agricultural production in Malawi is insufficiently diversified, remaining heavily dependent on tobacco as the main cash crop and maize as the staple food (Chirwa & Dorward, 2013). Both crops are increasingly vulnerable: tobacco is subject to international restrictions due to global health campaigns, and maize production is threatened by climate variability and erratic rainfall patterns (FAO, 2021). In response to these vulnerabilities, national policy frameworks such as the National Agriculture Policy and National Export Strategy II have emphasised the need for agricultural diversification to reduce overdependence on a narrow range of crops (Government of Malawi, 2016). Diversification is expected to mitigate climate-related risks, reduce input cost burdens, and expand Malawi's export base.

Among the viable alternatives, legumes have been identified for their high nutritional value, soil-improving properties, and strong local and international market potential (Simtowe et al., 2010). Groundnuts, in particular, offer a dual

benefit: they serve both subsistence and commercial purposes, contribute to household income, support food security, and have established export potential (Simtowe et al., 2010; Shiferaw et al., 2014). Groundnuts are well-suited to diverse agro-ecological zones in Malawi and are less costly to produce compared to other staple grains such as maize.

In recognition of groundnuts' nutritional, economic, and environmental value, several interventions have been implemented to boost their production in Malawi. These include the promotion of improved seed varieties by International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Department of Agricultural Research Services (DARS), dissemination of good agronomic practices through programs such as the Agricultural Sector Wide Approach-Support Project (ASWAp-SP) and the Smallholder Agricultural Productivity Promotion (SAPP) project, as well as efforts by NGOs and donor-funded projects to strengthen farmer organizations and enhance market linkages (Simtowe et al., 2010; Shiferaw et al., 2014). Some initiatives have also aimed to improve post-harvest handling through training in drying, shelling, and storage techniques (Mabaya et al., 2011).

However, the effectiveness of these interventions has been limited. Adoption of improved varieties remains low due to inadequate input supply chains, affordability constraints, and limited access to extension support (Ragasa & Mazunda, 2018). Post-harvest losses persist owing to poor access to technologies and weak farmer knowledge, while market-oriented interventions have often lacked scale and sustainability, with insufficient integration into broader value chain strategies (FAO, 2021; Mutimba et al., 2010). These shortcomings point to deeper systemic challenges, most notably, an under-resourced and inadequately capacitated extension system that remains focused on production rather than providing end-to-end support across the value chain. Addressing these challenges requires a well-capacitated extension system that

can support farmers across the entire value chain, from production to marketing and value addition.

Extension services are critical to improving agricultural productivity and linking farmers to innovation systems and markets. They act as intermediaries between farmers and stakeholders such as research institutions, NGOs, agribusinesses, and input suppliers (Anderson & Feder, 2007). Through these services, farmers receive technical training and information on best practices. Numerous studies have highlighted the role of extension in disseminating improved farming techniques, enhancing productivity, promoting food security, and increasing household incomes (Rivera & Qamar, 2003; Davis & Place, 2003).

In Malawi, extension delivery has undergone several reforms aimed at improving responsiveness to farmers' needs. Historically, the approach was top-down and focused primarily on production technologies (Government of Malawi, 2016). More recent policy shifts advocate for demand-driven, pluralistic models that involve multiple actors and promote value chain-oriented services. However, evidence suggests that the transition has been slow. Extension services still largely focus on production, with limited attention to post-harvest handling, processing, and marketing (Ragasa & Mazunda, 2018). This shortfall is often attributed to limited skills among extension workers in areas such as marketing and value chain development (Mutimba, Knipscheer, & Naibakelao, 2010).

Given these challenges, there is a growing consensus on the need to reorient extension services toward a more integrated, value chain-based approach that supports farmers beyond production. This study, therefore, seeks to assess the efficacy of agricultural extension services in the groundnuts value chain in Kasungu and Mzimba districts of Malawi, with a specific focus on the capacity

of extension workers to support farmers throughout the value chain, including post-harvest and market-oriented activities.

1.3. Problem Statement

Groundnuts are an important crop in Malawi, serving both subsistence and commercial purposes. Policy frameworks such as the National Agriculture Policy (NAP), National Export Strategy II (NES II), and Malawi Vision 2063 recognise groundnuts as a priority crop for agricultural diversification, value addition, and market-driven production (Government of Malawi, 2016; 2021). These policies aim to reduce over-reliance on tobacco for export earnings and maize as the staple crop, thereby promoting a resilient agricultural sector that supports sustainable livelihoods and economic growth.

Despite these commitments, gaps in agricultural extension service delivery persist, limiting farmers' ability to access market opportunities and participate meaningfully in the groundnut value chain. Smallholder farmers continue to face challenges such as low productivity, poor quality outputs, and inadequate access to markets (Mabaya et al., 2011). These issues signal a need for extension services that are not only production-focused but also value chain-oriented, providing support across input access, production, post-harvest management, value addition, and marketing (Government of Malawi, 2016).

Although the role of extension services in general agricultural development is well documented (Rivera et al., 2009; Anderson et al., 2015), specific evidence on their effectiveness in the groundnut value chain in Malawi remains limited. Existing studies focus broadly on extension systems without addressing the unique technical, market, and policy challenges associated with groundnuts. Yet studies such as Waliyar et al. (2015) have shown that the groundnut sector faces distinctive issues, including high aflatoxin levels, post-harvest losses, low

value addition, and volatile market prices, issues that require tailored extension strategies.

Moreover, previous research highlights systemic constraints in Malawi's extension system such as inadequate staffing, insufficient training, and limited resources (Chirwa et al., 2006), which may further hinder effective support for groundnut farmers.

This study therefore seeks to fill this knowledge gap by assessing the effectiveness of agricultural extension services in the groundnut value chain in Malawi. It focuses on identifying how extension actors operate across various value chain stages and explores both challenges and opportunities for improving value chain integration and outcomes for smallholder farmers.

1.4. Aim of the research

The research aims to assess the effectiveness of agricultural extension services in the groundnut value chain in Kasungu and Mzimba, Malawi.

1.5. Research Objectives

1.5.1. Main Objective

The main objective of this study is to assess the efficacy of agricultural extension services in the groundnut value chain in Kasungu and Mzimba districts of Malawi.

1.5.2. Specific Objectives

The study sought to achieve the following specific objectives:

1. To assess the level of knowledge and skills possessed by extension workers engaged in the groundnut value chain in Kasungu and Mzimba districts.
2. To analyse the current status of extension services and the roles played by extension workers across different stages of the groundnut value chain.
3. To evaluate the perceived effectiveness of extension services in supporting the groundnut value chain in Kasungu and Mzimba.
4. To explore key challenges and opportunities influencing the effectiveness of extension services in promoting food security through the groundnut value chain.

1.6. Research Questions

Given the objectives, the study answered the following research questions:

1. What is the level of knowledge and skills possessed by extension workers involved in the groundnut value chain in Kasungu and Mzimba?
2. What is the current status of extension services, and what roles do extension workers play in the groundnut value chain?
3. How effective are extension services perceived to be in supporting the groundnut value chain in Kasungu and Mzimba?
4. What are the key challenges and opportunities affecting the effectiveness of extension services in promoting food security within the groundnut value chain?

1.7. Significance of the Study

This study contributes to the body of knowledge on agricultural extension by offering a value chain-specific analysis of extension service delivery within the groundnut sub-sector in Malawi, which is an area that has received limited scholarly attention. While previous research has largely focused on general extension effectiveness, this study narrows its focus to the groundnut value chain and provides empirical evidence on the capacity of extension workers to support activities beyond production, including post-harvest handling, value addition, and market access. The study also advances understanding of the institutional and operational dynamics affecting extension performance, especially within a pluralistic extension system. By uncovering systemic and skill-based gaps, the study provides a conceptual basis for designing more holistic, market-oriented, and value chain-aligned extension models applicable not only in Malawi but also in similar contexts across sub-Saharan Africa.

The results of the study provide evidence of the effectiveness of agricultural extension services and identify challenges and opportunities, particularly in the groundnuts value chain. These will be used by policymakers and development practitioners to design interventions for supporting extension service delivery tailored to the groundnut value chain. By studying the capacity of extension workers to support the groundnut value chain, the study documented existing capacity gaps that are instrumental in designing capacity-building programs. By strengthening agriculture extension services in the sector, it is expected that this will contribute to increased productivity, better market access and higher incomes.

1.8. Scope and Limitations of the Study

This study primarily engaged farmers and extension workers to assess the influence of extension services on groundnut production. It did not engage the other stakeholders in the agricultural value chain such as input suppliers, processors, traders, intermediaries, and buyers; the study also targeted only two districts, Mzimba and Kasungu. This was necessary to ensure adequate focus on assessing extension service delivery and the interaction with groundnut farmers in these district. While this focus provides valuable insights, it may limit the understanding of the broader dynamics within the entire groundnut value chain and the generalisability of results to other areas.

Therefore, it is recommended that future research expand geographic coverage and include a wider range of value chain actors to provide a more comprehensive analysis.

1.9. Overview of the Methodology

This study employed a mixed-methods approach, integrating both qualitative and quantitative techniques for data collection and analysis. Quantitative data was gathered through semi-structured questionnaires administered to groundnut farmers, while qualitative data were collected via key informant interviews with agricultural extension officers. The research was conducted in Kasungu and Mzimba districts, selected for being among the top groundnut-producing areas. Quantitative data were analysed using descriptive statistics, and qualitative data were examined through thematic analysis.

1.10. Definition of Key Concepts or Terms

Value Chains: A 'value chain' in agriculture identifies the set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product.

Efficacy: Efficacy is the demonstrated ability of an intervention, treatment, or program to produce the intended effects or desired outcomes under carefully controlled and optimal conditions. It is a measure of how well an intervention performs in a controlled research setting, allowing for the establishment of a cause-and-effect relationship.

Extensionist: An extensionist in the agriculture value chain is a specialist who works to connect farmers, producers, and other stakeholders with knowledge, resources, and technologies that contribute to the overall efficiency, productivity, and sustainability of agricultural practices. This role is pivotal in ensuring that advancements and best practices are communicated and implemented across various stages of the agriculture value chain, including production, processing, distribution, and marketing.

Smallholder farmer(s): Small-scale farmers are households whose "food security is dependent on their ability to produce sufficient amounts of food crops in their fields for their own consumption." Individuals who reside in rural parts of Malawi and are involved in subsistence agriculture make up the majority of the most impoverished people in the country. Small-scale farmers make up the majority of these individuals (FAO, 2019). They plant maize and other crops that are dependent on rainfall during the growing season.

Food Security: Assuring that vulnerable people have access to available supplies and "ensuring that all individuals at all times possess both physical and economic access to the essential food they require" are both key components of the concept of food security, according to the Food and Agriculture Organisation of the United Nations (FAO) in 2019.

1.11. Thesis Layout

This thesis is structured into five chapters as follows:

- Chapter One: This chapter provides an introduction to the study. It outlines the background of the study, the problem statement, research objectives, significance, and scope. Essentially, it establishes the context of the research and motivates the need for assessing the effectiveness of extension services in the groundnut value chain.
- Chapter Two: The chapter presents a review of relevant literature on agricultural extension and its interplay in the groundnut value chain development. It explores theoretical concepts that inform the study, past research findings, and key challenges affecting agricultural extension services in the groundnut value chain.
- Chapter Three: This chapter discusses research methodology, including the study design, data collection methods, sampling techniques, and data analysis approaches. It explains how data will be gathered and analysed to address the research questions and objectives.
- Chapter Four: The chapter presents the results emanating from analysis of the collected data on the research objectives. It also discusses the implications of these results.
- Chapter Five: This is the final substantive chapter, and it concludes by summarizing key findings on each of the objectives. It draws conclusions and policy recommendations to improve the role of extension service in groundnut value chain.

1.12. Chapter Summary

This chapter outlined the agricultural context in Malawi, focusing on the groundnut value chain and the importance of extension services in improving productivity and market access. It identified gaps in extension service delivery and presented the study's problem statement, objectives, methodology overview, and limitations. Key concepts were defined, and the chapter structure was introduced.

The next chapter reviews relevant literature on agricultural extension services and value chain development, providing the theoretical foundation for this study.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter provides a critical review of literature pertinent to assessing the effectiveness of agricultural extension services within the groundnut value chain in Malawi. It begins by defining agricultural extension services, tracing their evolution, and highlighting the significance in improving agricultural productivity and rural livelihoods. The review then considers the role of extension services in supporting agricultural value chains, with particular attention to activities beyond production, such as post-harvest handling, value addition, and market access.

The chapter further explores the groundnut value chain, discussing its economic importance, the unique challenges it faces, and relevant policy frameworks in Malawi and the wider Sub-Saharan African context. It also examines the capacity of extension workers and the obstacles that limit their effectiveness in providing value chain-oriented services.

The chapter concludes by identifying gaps in existing research, which provide the rationale for this study, and outlines the conceptual framework that guides the investigation.

2.2. Theoretical Literature: Agricultural Extension Services and Value Chain Concepts

This sub-section discusses the definition and evolution of extension service delivery. It also discusses the general role that extension services play in agricultural development. It further discusses the concept of value chains and the role that extension services can play in order to support their development.

2.2.1. Definition and Role of Agricultural Extension Services

Agricultural extension services are at the centre of agricultural development. Basically, they entail organised systems of education and support that aim to facilitate the transfer of knowledge, information, and innovations between different stakeholders and farmers with an aim of improving agricultural returns. According to the Food and Agriculture Organization (FAO), agricultural extension is "a system that facilitates access of farmers, their organisations and other market actors to knowledge, information and technologies; facilitates their interaction with partners in research, education, agri-business, and other relevant institutions; and assists them to develop their own technical, organisational, and management skills and practices" (FAO, 2011). This support encompasses a range of processes from the production to consumption stages of the agricultural value chain. Extension services are especially critical in developing countries where smallholder farmers face multiple constraints in accessing formal education, markets, and innovations.

2.2.2. Shifting paradigms in extension service delivery over the years

The evolution of extension services globally has undergone several paradigmatic shifts, influenced by changing development priorities and agricultural policies. Historically, extension services have followed the traditional top-down extension models, focusing on transferring technologies from researchers to farmers (Anderson & Feder, 2007). This model was based on the assumption that farmers are passive recipients of technologies, while agricultural researchers were assumed to know all the answers to agricultural challenges facing farmers. While this approach helped to spread technologies in some regions, especially during the green revolution, it was criticised for not being sensitive to the varying contexts and farmer-specific needs (Rivera & Qamar, 2003).

As a result of these criticisms, agricultural extension models have transitioned from these top-down models towards demand-driven, market-oriented extension approaches. This was reinforced by the promotion of democracy and decentralisation which called for more community participation. According to Davis & Sulaiman (2014), this model involves extension workers engaging with farmers to understand their needs and provide support tailored to specific contexts. Farmers' perceptions and knowledge are, therefore, considered significant in the innovation process. As a result, this model is thought to be more inclusive, sensitive to farmers' local contexts and hence increases the relevance of information and technologies developed.

Additionally, extension services have moved from a researcher-to-farmer knowledge transfer loop to engagement of a wide range of actors. Pluralistic extension services, involving a range of stakeholders like government agencies, NGOs, and the private sector, have been recognised as more effective in fostering collaboration and empowering farmers (Tripp, 2005). These pluralistic approaches are viewed as more flexible and sustainable, especially in resource-constrained environments, as they allow for diversified funding sources, complementary skillsets, and broader outreach.

In Malawi, extension service delivery has undergone reforms reflecting these global trends. The Agricultural Extension Policy (2000) and the National Agriculture Policy (2016) promote decentralised and pluralistic extension systems with emphasis on accountability, collaboration, and farmer participation. Evidence suggests that demand-driven extension, though limited in adoption, improves the relevance of support provided to farmers. Anderson and Feder (2007) and Singh et al. (2011) found that participatory, bottom-up approaches lead to higher adoption of technologies and improved farm productivity, underscoring their effectiveness in enhancing agricultural outcomes.

However, the effectiveness of the implementation of demand-driven, value chain-oriented and pluralistic extension remains constrained by limited funding, inadequate human resources, and weak institutional coordination (Masangano & Mthinda, 2012; Ragasa & Mazunda, 2018; FAO, 2020). Mabaya et al. (2011) observed that despite these policy reforms, Malawi's extension system still struggles to shift fully from production-oriented models to market-oriented and value chain-based services. More recent studies reinforce this finding, showing that extension services in Sub-Saharan Africa continue to prioritise production, with limited emphasis on post-harvest handling, marketing, and value addition (Davis et al., 2014; Becerra-Encinales et al., 2024). Farmers often receive support primarily in agronomic practices, with limited assistance in post-harvest handling, marketing, and value addition. This highlights the need for deeper institutional reform and capacity strengthening for extension workers.

2.2.3. Importance of Extension Services in Agricultural Productivity and Rural Development

Extension services have a well-documented impact on enhancing agricultural productivity, promoting the adoption of innovations, and consequently contributing to rural development. Empirical studies indicate that access to effective extension services significantly increases yields, improves input use efficiency, and supports the adoption of climate-smart agricultural practices (Anderson & Feder, 2007; Davis et al., 2010). These services serve as a bridge between farmers and other agricultural stakeholders, including research institutions, government policy and private traders, enabling knowledge sharing and innovation of agricultural technologies and practices (Swanson & Rajalahti, 2010). Extension agents provide training and support on crop management, soil conservation, pest control, and sustainable farming methods. This helps to build

the capacity of farmers in conducting agricultural activity, which helps to improve yields and build more resilient farming systems.

In the Malawian context, where agriculture is predominantly smallholder-based, extension services are indispensable in overcoming constraints related to knowledge gaps, market access, and resource limitations (Government of Malawi, 2016). They support efforts to increase productivity by introducing farmers to improved seed varieties, fertiliser use, post-harvest handling, and value addition techniques. According to Davis et al. (2010), well-functioning extension systems can significantly contribute to poverty reduction and rural transformation by enhancing the capacity of farmers to produce for both subsistence and markets.

Studies across Africa have shown that farmers with access to extension services are more likely to adopt improved technologies, experience higher yields, and generate increased incomes compared to those without such access (Ragasa & Mazunda, 2018; Akinola et al., 2020). In Malawi, Ragasa et al. (2016) found that participation in extension programs was associated with a 12–16% increase in crop productivity. This illustrates the crucial role of extension in not only enhancing production but also improving food security and livelihoods.

In Malawi, however, while extension workers have made strides in promoting production techniques such as pest management, planting methods, and improved seed varieties, their effectiveness in addressing post-harvest handling, marketing, and value addition remains limited (Ragasa & Mazunda, 2018; Akinbode, 2020). This limitation underscores the need for a value chain-oriented approach to extension, where services support farmers across all stages of agricultural production from input supply to final marketing. Without this holistic view, farmers are unable to convert productivity gains into improved

income and food security (LTS International & Cardno Emerging Markets, 2017).

The full potential of extension services is further undermined by systemic challenges such as underfunding, inadequate staffing, and poor infrastructure (Masangano & Mthinda, 2012). Addressing these constraints and aligning extension efforts with market development and value chain opportunities is essential for realizing the broader development goals outlined in Malawi's National Agriculture Policy and Vision 2063.

2.2.4. Concept of Agricultural Value Chains

With the shifting paradigms in extension service delivery, it is becoming to very important to understand the concept of value chains and the role that extension services can play in order to support their development.

Agricultural value chains refer to the full sequence of activities and actors involved in the production, transformation, and delivery of a product from the farm to the final consumer. Porter (1985) defined a value chain as a series of linked processes and actors that add value to a product at each stage, from input supply, production, and processing to marketing and consumption. In agriculture, value chains include farmers, input suppliers, aggregators, processors, traders, retailers, and supporting institutions (Kaplinsky & Morris, 2001).

In most developing agrarian economies like Malawi, agricultural value chains operate under dual systems combining both formal and informal chains. Informal chains, which are more prevalent, involve smallholder farmers who are not well connected to support services and good marketing information. This results in them selling their produce through local intermediaries or vendors, who often offer exploitative prices due to farmers' limited bargaining power. In contrast, formal value chains involve providing a platform for farmers

to coordinate with various stakeholders in the value chain and include formal agreements with wholesalers, exporters, and supermarkets, usually offering better prices and quality assurance (KIT & IIRR, 2008). Integration of smallholder farmers in these formal value chains remains a challenge. Without structured value chains, smallholder farmers remain vulnerable to exploitation and price fluctuations.

The FAO (2011) emphasises that farmers' involvement in formal structured value chains helps them to reduce business costs, increase sales revenues, enhance their bargaining power to get good prices and consequently improve profitability. However, weak extension services and lack of coordination among value chain actors hinder farmers' realisation of these potential gains (LTS International & Cardno Emerging Markets, 2017). Akinbode (2020) stresses that the role of extension workers is to ensure meaningful coordination between farmers and other value chain participants, and to support farmers by accessing timely information on the needs of the market, effective post-harvest handling practices, and market quality standards. Without strong extension, therefore, the value chain concept remains ineffective.

2.2.5. The Role of Extension Services in Supporting Value Chains

Traditionally, agricultural extension services have focused primarily on increasing on-farm productivity through technology transfer and agronomic training. However, in the modern context of value chain development, extension services are expected to play a much broader role that goes beyond production. The changing orientations of extension service delivery demand a more demand-driven, market-oriented, multi-stakeholder and holistic approach for comprehensive value chain development.

Beyond production, therefore, extension services are also expected to facilitate access to post-harvest technologies, supporting processing and value addition,

and linking farmers to structured markets (FAO, 2011; Akinbode, 2020). Extension workers are also expected to help farmers understand quality standards required for domestic and export markets, promote good agricultural practices (GAP), and advise on handling, sorting, and storage techniques to reduce post-harvest losses and aflatoxin contamination (Waliyar et al., 2015). They also serve as intermediaries, connecting farmers with agribusiness firms, cooperatives, financial institutions, and development agencies. This is expected to help to integrate smallholder farmers into the formal agricultural value chains.

In Malawi, however, extension services have not adequately covered the entire agricultural value chain, as support has been concentrated on the production side (Ragasa & Mazunda, 2018). Extensionists often lack the skills and tools needed to support farmers in post-harvest handling, processing, or marketing. As a result, farmers continue to sell raw produce to middlemen at low prices, missing out on value-added opportunities (Matita et al., 2018).

2.3. Theoretical underpinnings of the study

Several theories and models are used to understand the interaction between agricultural extension service provision and value chain development. This study borrowed perspectives from agricultural extension models, the value chain theory and the adoption of innovations theory.

2.3.1. Agricultural Extension Models

Historically, extension service has followed the traditional top-down extension models focusing on transferring technologies from researchers to farmers (Anderson & Feder, 2007). This model was based on the assumption that farmers are passive recipients of technologies, while researchers were assumed to know all the answers to agricultural challenges facing farmers. While this approach helped to spread of technologies in some regions especially during the

green revolution, it was criticised for not being sensitive to the varying contexts and farmer-specific needs (Rivera & Qamar, 2003).

As a result of these criticisms, agriculture extension models have transitioned from these top-down models towards demand-driven, market-oriented extension approaches. This was reinforced by the promotion of democracy and decentralisation which called for more community participation. According to Davis (2008), this model involves extension workers engaging with farmers to understand their needs and provide tailored support. Farmers perceptions and knowledge are, therefore, considered significant in the innovations process. As a result, this model is thought to be more inclusive, sensitive to farmers' local context and hence increasing the relevance of information and technologies developed. In this context, pluralistic extension services, involving a range of stakeholders like government agencies, NGOs, and the private sector, have been recognized as more effective in fostering collaboration and empowering farmers (Tripp, 2005).

In a study on agricultural extension in Malawi, Mabaya et al. (2011) highlight that this shift towards more demand-oriented extension services has led to increased relevance of services to farmers' needs. They, however, observe that adoption of demand-driven extension remains low, especially in rural areas. Anderson & Feder (2007) also found that participatory approaches have a positive influence on adoption of agricultural technologies, which consequently leads to increased farmer productivity. Similarly, a study by Singh et al. (2011) in India, showed that farmers who participated in demand-driven extension services were better able to integrate new technologies into their farms. This demonstrates the effectiveness of bottom-up approaches in enhancing agricultural productivity.

2.3.2. Value Chain Theory

The value chain concept, proposed by Porter (1985), has been very key in agricultural development. It is used to understand the various processes and actors involved in the transformation of raw agricultural inputs into final products ready for consumption. Kaplinsky and Morris (2001) define a value chain as "the full range of activities that are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use." This concept emphasises the interconnectedness of actors and processes along the various stages of the chain while analysing how much value is added at each stage of the chain.

In the case of groundnuts, the value chain is a series of activities including input supply, production, post-harvest handling, processing, transportation, and market access (Breima et al., 2024). By analysing activities under these various stages, the value chain theory helps streamline bottlenecks and opportunities for improvement experienced at every level. This enables more targeted intervention to enhance the competitiveness of the entire agricultural system.

In most developing agrarian economies like Malawi, agricultural value chains operate under dual systems combining both formal and informal chains. Informal chains, which are more prevalent, involve smallholder farmers who are not well connected to support services and good marketing information. This results in them selling their produce through local intermediaries or vendors, who often offer exploitative prices due to farmers limited bargaining power. In contrast, formal value chains involve providing a platform for farmers to coordinate with various stakeholders in the value chain and include formal agreements with wholesalers, exporters, and supermarkets, usually offering better prices and quality assurance (IIRR and KIT, 2008). Integration of smallholder farmers in these formal value chains remain a challenge. Without

structured value chains, smallholder farmers remain vulnerable to exploitation and price fluctuations.

The FAO (2011) emphasises that farmers' involvement in formal structured value chains helps them to reduce business costs, increase sales revenues, enhance their bargaining power to get good prices and consequently improve profitability. However, weak extension services and lack of coordination among value chain actors hinder farmers' realisation of these potential gains (LTS International & Cardno Emerging Markets, 2017). Akinbode (2020) stresses that the role of extension workers is to ensure meaningful coordination between farmers and other value chain participants, and to support farmers to access timely information on the needs of the market, effective post-harvest handling practices, and market quality standards. Without strong extension, therefore, the value chain concept remains ineffective.

Borrowing from the value chain concept, the study looked at the role played by extension service providers at the various stages of the value chains. By strengthening value chain-based extension approaches, Malawi can improve groundnut productivity, formal market performance, and consequently increase farmer incomes.

2.3.3. Adoption of Innovation Theory

Rogers' Adoption of Innovation Theory is a prominent theory in understanding how farmers take up new technologies. According to Rogers (2003), the process of adopting a technology is not a binary decision of whether one adopts or not but rather a process that can be divided into five main stages: knowledge, persuasion, decision, implementation, and confirmation. During the knowledge stage, farmers are made aware of an innovation; in the persuasion stage, they form an opinion towards it after accessing more information; in the decision stage, they decide to adopt or reject it; in the implementation stage, they try the

technology by putting it into practice; and in the confirmation stage, they evaluate its success based on the results of the trial.

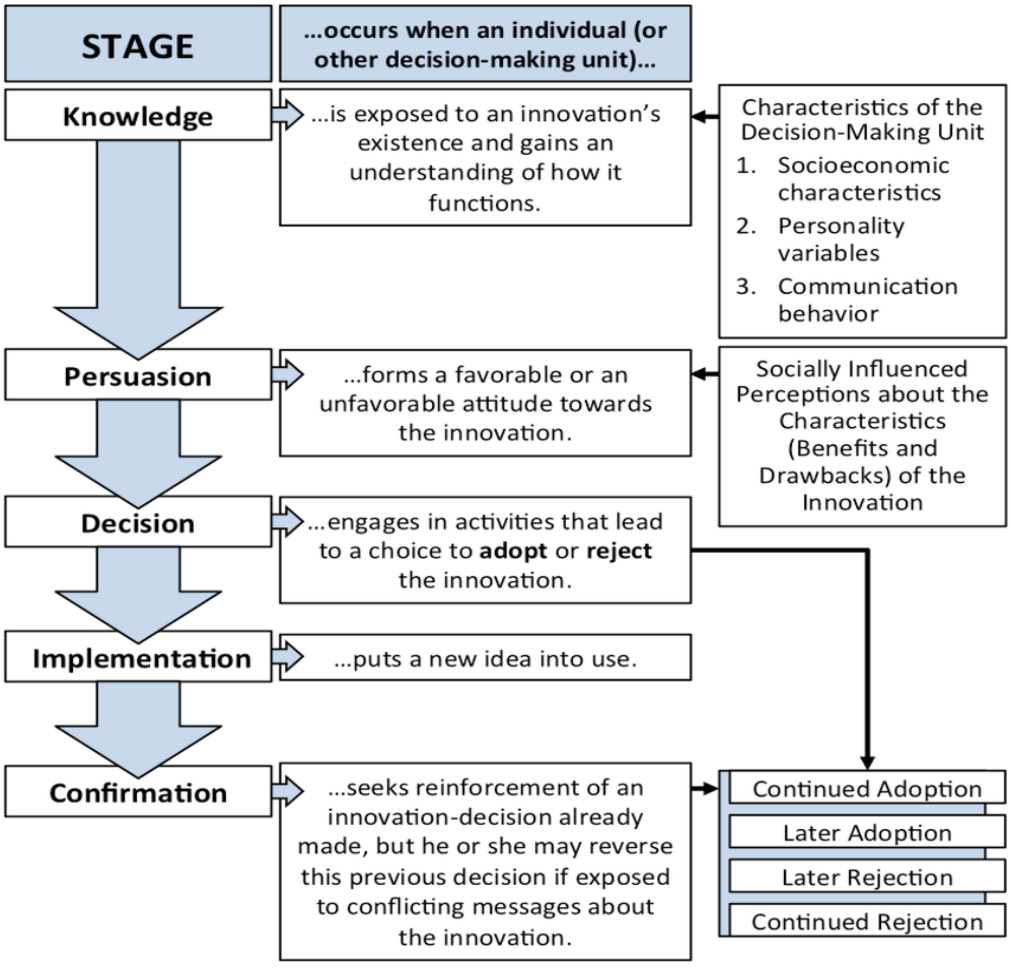


Figure 1: Rogers' Five Stages of the Adoption Process

According to Rogers (2003), farmers also fall into five categories based on the time it takes them to go through the five stages of adoption. These categories include innovators, early adopters, early majority, late majority, and laggards. Among these, innovators and early adopters are the farmers who are more likely to take up innovations and knowledge. Late adopters, on the other hand, take longer to adopt technologies as they usually require more evidence of success before they can implement change (Rogers, 2003). Understanding these

categories is important for extension services because different strategies are needed to reach each group.

The Adoption of Innovation Theory (Rogers, 2003) was key to this study because it helps to explain how farmers engage with new technologies and the role that extension services can play, especially in the groundnut value chain. It also provided a framework to explore the challenges faced by various farmers in the adoption processes. Some of the barriers include limited awareness, past experiences, cost of adoption and some socioeconomic attributes (Shiferaw et al., 2014). This underscores the need for tailored awareness campaigns, demonstration, and economic support to enhance farmer participation in improved agricultural value chains.

2.4. Overview of Groundnut Value Chain

This subsection discusses the status of the groundnut value chain in Malawi. It discusses the importance of groundnuts, the structure of the value chain, challenges and opportunities that exist.

2.4.1. Significance of the Groundnut Value Chain

Groundnuts (*Arachis hypogaea* L), also known as peanuts, are an economically and nutritionally significant crop in Sub-Saharan Africa (SSA). They serve as both a subsistence food and a cash crop for smallholder farmers. Nutritionally, groundnuts are a rich source of protein, healthy fats, vitamins, and minerals, making them a crucial component of household diets, especially in rural communities (Witcombe & Tiemann, 2022). The crop also contributes to soil fertility through nitrogen fixation, offering ecological benefits when integrated into crop rotations.

In Malawi, groundnuts rank among the most important leguminous crops. They are cultivated primarily by smallholder farmers, with significant production

concentrated in the Central and Northern regions, including Kasungu and Mzimba districts (Matita et al., 2022). In terms of export potential, groundnuts were historically a leading foreign exchange earner until the late 1980s, but their contribution has since declined due to quality control issues and weak value chain integration (Matita et al., 2018).

2.4.2. Structure and Actors in the Groundnut Value Chain

The groundnut value chain in Malawi and much of SSA involves several interdependent actors: input suppliers (seed companies and agro-dealers), farmers, aggregators or vendors, processors, exporters, and consumers. Supporting institutions include extension agents, research organisations, NGOs, and policy-making bodies.

Two distinct marketing systems characterise Malawi's groundnut value chain: traditional and value chain-oriented systems (KIT & IIRR, 2008). In the traditional system, smallholder farmers operate independently and sell their produce to local vendors or middlemen, often at low prices and without quality checks. In contrast, the value chain system entails closer coordination between farmers and other stakeholders, including processors and exporters, with shared quality and market information. However, the traditional system remains dominant due to weak institutional frameworks and limited access to support services (World Bank, 2020).

2.4.3. Challenges Specific to the Groundnut Value Chain

The groundnut value chain in Malawi and SSA is constrained by multiple production and post-production challenges. A major concern is aflatoxin contamination, a toxic compound produced by fungi in improperly stored nuts, which significantly limits export potential and poses public health risks (Waliyar et al., 2015; FAO, 2019). Limited farmer awareness, inadequate

drying and storage practices, and weak regulatory enforcement exacerbate this problem.

Post-harvest losses are another significant barrier, resulting from rudimentary handling, poor infrastructure, and lack of access to value-adding technologies (Ariong et al., 2023). In addition, fluctuating farm-gate prices and limited market access discourage smallholder farmers' participation in high-quality markets. Farmers often rely on informal markets where they receive low and unpredictable returns, a condition worsened by poor coordination and limited bargaining power (Salonga et al., 2024).

2.4.4. Existing Policies and Strategies Affecting Groundnut Production and Marketing

The Government of Malawi has developed several strategies aimed at enhancing agricultural commercialisation and food security, including the National Agriculture Policy (2016), the National Export Strategy II (2021), and the Malawi Vision 2063. These frameworks emphasise value addition, diversification, and the need for structured markets.

However, critics argue that groundnuts remain marginalised compared to staple crops like maize, which benefit from large-scale subsidy programs (Ragasa & Mazunda, 2018). Furthermore, implementation gaps, limited public investment in extension, and inadequate support for research and development have hindered the growth of the groundnut sub-sector.

Lessons from countries like Senegal and Nigeria, where public-private partnerships and contract farming have boosted groundnut productivity and export competitiveness, suggest that Malawi could strengthen its policy environment by fostering collaborative models and investing in quality control systems (Mishra et al., 2024; KIT & IIRR, 2008).

2.5. Empirical Literature

This subsection builds on the theoretical literature on the role that extension services play in the groundnut value chain to highlight some the challenges faced in delivering these services and the gap that exists in the literature.

2.5.1. Challenges in Extension Service Delivery

Agricultural extension services in Malawi and much of Sub-Saharan Africa face persistent institutional, operational, and structural challenges that limit their ability to support smallholder farmers effectively across the agricultural value chain. These challenges are particularly pronounced in value chain development efforts for crops like groundnuts, where market-oriented production, processing, and marketing are key to unlocking economic value (Mishra et al., 2024; KIT & IIRR, 2008).

2.5.1.1. Institutional and Resource Constraints

A foundational barrier to effective extension service delivery is the chronic under-resourcing of public extension systems. In Malawi, high farmer-to-extension worker ratios, limited mobility due to inadequate transport, poor remuneration, and outdated materials continue to undermine service delivery (Masangano & Mthinda, 2012). These constraints reduce the frequency, quality, and coverage of extension activities, especially in remote and underserved areas such as parts of Mzimba.

Moreover, the extension system faces qualitative limitations. Many frontline extension workers have not received continuous professional development, leading to outdated technical knowledge and insufficient exposure to emerging technologies. Consequently, while they may competently advise on basic agronomic practices like planting or pest control, their effectiveness in

supporting post-production stages (such as storage, processing, and marketing) is limited.

2.5.1.2. Limited Capacity in Value Chain-Oriented Services

A significant gap lies in the capacity of extension workers to support value chain-based agricultural development. Traditionally, extension has focused narrowly on production, with little emphasis on post-harvest handling, value addition, market access, or business development. A study by LTS International & Cardno Emerging Markets (2017) in Malawi confirmed that most extension officers lack sufficient training in agribusiness development, quality standards, and structured marketing systems. This skills gap hinders farmers' ability to diversify income, reduce losses, and access profitable markets, undermining the goals of agricultural commercialisation (Akinbode, 2020).

2.5.1.3. Systemic and Policy-Level Barriers

Beyond individual capacity issues, systemic challenges such as policy incoherence, fragmented coordination, and weak monitoring frameworks continue to hamper the effectiveness of extension systems. While Malawi has embraced a pluralistic model involving government agencies, NGOs, and private actors, integration among these providers remains weak. The result is duplication of efforts, inefficiencies, and uneven coverage (Ragasa & Mazunda, 2018). Furthermore, despite calls for value chain-sensitive services, most extension programs remain focused on primary production, offering limited support for post-harvest and marketing activities (Davis et al., 2010; Becerra-Encinales et al., 2024).

2.5.1.4. Equity Considerations: Gender, Geography, and Socio-Economic Status

Access to and the impact of extension services are not uniform across demographics. Gender dynamics, for example, limit women's participation in extension programs despite their key role in groundnut production. Cultural norms, limited mobility, and time burdens constrain their interaction with extension agents (Raidimi & Kabiti, 2019). Similarly, farmers in geographically remote areas, particularly in Mzimba, face accessibility barriers due to poor infrastructure and logistical limitations (FAO, 2021). Socio-economic status also affects extension uptake, as better-off or more literate farmers are generally more capable of benefiting from and act on extension messages (Ragasa & Mazunda, 2018).

2.5.2. Gaps in Current Literature on Groundnut-Specific Extension Services

While there is widespread recognition of the importance of agricultural extension services in enhancing productivity and rural livelihoods, a substantial gap exists in the literature when it comes to understanding how these services function within specific crop value chains—particularly for groundnuts. Most studies on agricultural extension focus broadly on general service delivery, agronomic practices, and adoption of technologies (Anderson & Feder, 2007; Davis & Sulaiman, 2014). Few explore the specific needs of value chains beyond production, such as post-harvest management, value addition, and structured market access.

Groundnuts, as a legume with high economic and nutritional value, present unique challenges and opportunities. The literature highlights persistent problems such as aflatoxin contamination, poor post-harvest handling, and reliance on informal markets (FAO, 2011; KIT & IIRR, 2008; Mishra et al.,

2024), yet little empirical evidence exists on the role of extension workers in helping farmers overcome these challenges. Furthermore, research that explicitly links extension service quality and structure to groundnut value chain outcomes remains scarce in Malawi and across Sub-Saharan Africa (Mabaya et al., 2011; Akinbode, 2020).

Seemingly, there is no adequate study that provides insight into the capacity of extension workers to deliver services tailored to the different stages of the groundnut value chain in Malawi, or their ability to collaborate effectively with non-state actors such as NGOs and private companies. This lack of data makes it difficult to design extension interventions that are comprehensive, market-oriented, and inclusive of key stakeholders.

This study aims to fill this gap by examining the effectiveness of extension services in integrating smallholder farmers into the groundnut value chain and identifying key interventions to improve value chain participation.

2.6. Conceptual Framework

This study is built on the recognition that Malawi's groundnut value chain remains underdeveloped due to weak linkages among actors, particularly between farmers and higher-value markets. The conceptual framework (Figure 2) illustrates the triangular relationship between groundnut farmers, extension services, and value chain actors, emphasising the role of extension services as an intermediary enabler:

- Groundnut Farmers are at the core of production but face constraints in meeting market standards due to limited access to knowledge, inputs, and technologies. Their ability to improve yields and product quality is contingent upon the support they receive.

- Extension Services, offered by government and NGOs, act as a mediating variable that connects farmers to the wider value chain. Extensionists provide technical knowledge (e.g., agronomic practices, post-harvest handling), market intelligence (e.g., quality specifications, pricing trends), and facilitate collective marketing arrangements. They also help farmers organise into groups that can engage more effectively with buyers.
- Value Chain Actors such as input suppliers, aggregators, processors, exporters, and consumers are the demand drivers of the system. Their requirements in terms of product quality, volume, and timing shape production expectations. However, due to lack of direct access and coordination, most farmers interact only with informal middlemen, who often pay low prices.

The bidirectional arrows in the framework depict interdependence:

- Extension services support farmers by building their capacity to meet market requirements.
- Farmers' responsiveness to this training influences their ability to engage effectively with value chain actors.
- Meanwhile, feedback from markets and value chain actors, including quality specifications and pricing signals, inform the focus and direction of extension services.

Ultimately, these interactions are expected to yield the following perceived outcomes:

- Increased groundnut productivity and quality
- Enhanced farmer incomes
- Improved market access and competitiveness
- Strengthened farmer-market linkages

This model reflects contemporary thinking in agricultural innovation systems, where extension is no longer just a transmitter of information but a facilitator of linkages and innovation within agri-food systems (Klerkx & Leeuwis, 2009). It aligns with the integrated approach to rural advisory services, emphasizing collaboration among stakeholders to ensure inclusive and market-oriented development (Christoplos, 2010).

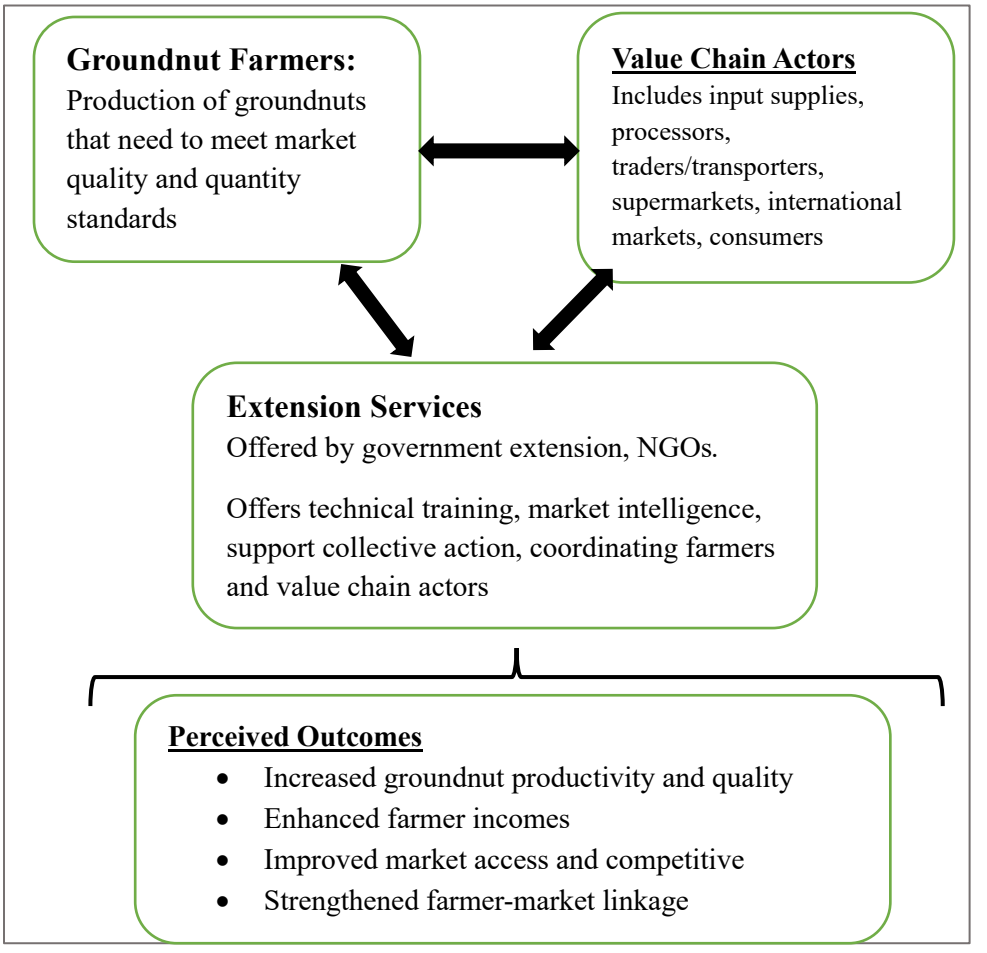


Figure 2: Conceptual Framework

2.7. Chapter Summary

This chapter has provided a comprehensive review of literature related to the effectiveness of agricultural extension services within the context of the groundnut value chain in Malawi. It began by defining agricultural extension services and tracing their historical evolution from top-down technology transfer models to more participatory, demand-driven, and pluralistic approaches. The chapter underscored the vital role that extension services play in enhancing agricultural productivity, promoting rural development, and facilitating farmer participation in structured value chains.

The review highlighted how extension services contribute not only to production but also to post-harvest handling, value addition, and market integration, which are functions critical to the performance of agricultural value chains. Despite this potential, the literature reveals significant challenges in service delivery, particularly in Malawi and similar developing countries. These include institutional limitations, resource constraints, lack of coordination among stakeholders, and the limited capacity of extension workers in value chain development.

Special attention was given to the groundnut crop due to its economic and nutritional significance, particularly in Malawi. The groundnut value chain faces unique challenges such as aflatoxin contamination, weak market access, and poorly developed post-harvest systems. Yet, there is a clear gap in research concerning how extension services address these challenges specifically within the groundnut sector. Most extension systems remain focused on production, offering limited support in downstream value chain functions.

The chapter concluded by identifying critical knowledge gaps and justifying the relevance of the study in Kasungu and Mzimba districts. These gaps form the foundation for the study's empirical investigation, which aims to assess the effectiveness of extension services across the groundnut value chain.

The next chapter presents the research methodology used to explore these issues. It outlines the study design, sampling procedures, data collection instruments, and analysis techniques employed to gather and interpret evidence from farmers, extension workers, and other value chain stakeholders.

CHAPTER THREE

METHODOLOGY

3.1.Introduction

This chapter details the research design and methodologies employed in the study. The primary objective of the study, as stated in Chapter One, is to assess how effective agricultural extension services are in the groundnut value chain for improving food security in Kasungu and Mzimba, Malawi. The chapter specifically addresses the research design, scope, sampling strategy, data collection methods, and data analysis techniques, as well as introducing the research tools and explaining the procedures for data collection and analysis.

3.2.Research Philosophy

The research adopted a pragmatist research philosophy. This philosophical standpoint emphasises practical applications and using multiple methods to address real-world problems (Morgan, 2024). It is particularly suited for this study because it allows flexibility and allows the integration of quantitative and qualitative approaches to generate insights. The rationale for choosing a pragmatist approach stems from the study's objective to assess the efficacy of agricultural extension services in enhancing food security which requires a holistic perspective.

3.2.1. Epistemology

From an epistemological standpoint, the study embraces a pluralistic view of knowledge, consistent with pragmatism. It acknowledges that knowledge can be derived from both objective measurements (quantitative data) and subjective interpretations of experiences (qualitative data). The use of quantitative

methods (surveys) provided numerical data for statistical analysis and generalizations, while qualitative methods (interviews, focus groups) offered in-depth insights into the lived experiences and perspectives of participants (Adedoyin, 2020; Donkoh & Mensah, 2023). This dual approach recognizes that a complete understanding of the efficacy of agricultural extension services requires both measurable outcomes and an understanding of the human element.

3.2.2. Ontology

The ontological position of this study is rooted in a pragmatic perspective, acknowledging a reality that is both objective and subjectively interpreted (Trochim, 2007; Jain, 2021). It assumes that there are objective facts about the efficacy of agricultural extension services (e.g., quantifiable changes in food security indicators), but also that these services are experienced and understood differently by various stakeholders (farmers, extension workers). This allows the research to investigate both the measurable impacts and the perceived benefits and challenges, recognizing the social construction of reality alongside its empirical aspects.

3.2.3. Axiology

Axiology, the study of values, is transparent in this research. The pragmatist approach acknowledges the researcher's values and how they influence the research process, particularly in problem selection and interpretation. The study's focus on enhancing food security through agricultural extension services demonstrates an underlying value placed on community well-being and agricultural development (Creswell, 2019). The mixed-methods approach allows for the inclusion of diverse perspectives, ensuring that the values and experiences of the participants are considered, contributing to a more ethically informed and relevant outcome.

3.3. Research Approach

In order to align with the pragmatic research philosophy, the study adopted an abductive research approach. This approach integrates the attributes of both deductive and inductive reasoning, which allows the study to manoeuvre between application of theory and empirical evidence to develop a comprehensive understanding of the research problem (Saunders et al., 2019).

The deductive component is reflected in the use of existing frameworks, such as the Agricultural Innovation Systems (AIS) and value chain approaches, to guide the development of research questions and the quantitative analysis of extension service outcomes. On the other hand, the inductive component involved the use of explorative qualitative methods to understand experiences and perceptions of farmers and extension workers regarding extension service delivery.

By integrating these approaches, the study can both apply existing theories and generate new insights from field data. This makes the abductive approach particularly suitable for examining the effectiveness of agricultural extension services, as it supports a flexible and context-sensitive analysis consistent with the principles of pragmatism.

3.4. Research Design

The study utilised a concurrent mixed-methods research approach, integrating both qualitative and quantitative methodologies for data collection and analysis. This choice was made to leverage the strengths of both methods, thereby enriching the research process and providing a more comprehensive understanding of the research questions and objectives (Creswell and Clark, 2018).

Qualitative research offers a valuable way to discover ideas and delve deeper into a problem using informal and non-data-gathering methodologies. It

provides in-depth insights into participants' lived experiences, perspectives, and social contexts. Incorporating a quantitative component, on the other hand, helped ensure the study's objectivity and generalisability (Frechette et al., 2020). Quantitative methods provide breadth and allow for the collection of numerical data on a larger scale, enabling generalisations and statistical analyses through surveys (Trochim, 2007).

The concurrent use of both methods allowed for triangulation of findings, where quantitative results were complemented and explained by qualitative insights, while qualitative findings were further supported by quantitative evidence. This integration enhanced the validity and depth of the study by combining statistical analysis with contextual understanding.

3.5.Study Area

The study took place in the rural communities of Kasungu and Mzimba districts of Malawi which have a combined total of 4300 smallholder farmers growing groundnuts according to the Malawi Government statistics. Out of the 4300 farmers, the study purposively sampled at least 366 farmers for the study in the districts of Kasungu and Mzimba. The sample frame was restricted to groundnut growers in Kasungu Extension Planning Areas (EPAs) of Chipala, Kaluluma, and Mzimba EPAs of Emfeni and Luwelezi. These were selected because they are prominent producers of groundnuts.

3.6.Sampling of Study Participants

Since the study engaged both qualitative and quantitative data collection, the sampling was also done in two categories. This includes sampling of farmers to be engaged in a survey and key informants for in-depth interviews.

3.6.1. Quantitative Sampling and sample size for participants (farmers)

Sampling is a procedure utilised in statistical analysis whereby a specified representative number of observations are extracted from a wider population. Sampling is essential in research methodology, as it is crucial for ensuring the validity and generalisability of study results. This approach is utilised in quantitative research with probability sampling methods to ensure the representativeness of the sampled group, hence enabling the generalisation of findings to the broader community. Effective sampling approaches reduce biases and errors that would arise from examining the full population, so rendering the research process more manageable and economical. The sampling process from a broader population is contingent upon the analysis type and may encompass simple random sampling, systematic sampling, or stratified sampling. Consequently, comprehending and applying suitable sampling techniques are crucial for producing dependable research outcomes with practical significance.

The sample size for interviewing farmers from a known population of 4,300 farmers in Kasungu and Mzimba was determined using Slovin's Formula. This formula calculates the sample size (n) with the known population size (N) and the permissible error value (e) by substituting the values of N and e into the equation:

$n = N \div (1 + Ne^2)$.

$N = 4300$, $e = 5\%$, $n = ?$

Then,

$$n = \frac{N}{1 + (N * e^2)}$$

$$n = \frac{4300}{1 + (4300 * 0.05^2)}$$

$$n = 365.96$$

The sample for the farmers is therefore 366 farmers.

3.6.2. Sampling for key informants for qualitative data collection

Qualitative research utilises intentional or purposive selection methods to choose participants with diverse and substantial viewpoints pertinent to the study's aims. This study involved 14 key informants to aid in the collection of extensive data about the investigated issue. This research involved interviewing Agriculture Business Officers and District Agriculture and Natural Resources Directors (DAENR) at the district level, while Agriculture Extension Development Coordinators (AEDCs) and Agricultural Extension Development Officers (AEDOs) were selected at the extension planning area (EPA) using non-probability sampling with a purposive technique.

The utilisation of a purposive sampling technique was suitable for selecting the key informants in this study, as it does not assert representativeness and these informants possess knowledge and information regarding the groundnut value chains in their respective locales. The aforementioned purposive sampling aligns with Campbell et al. (2020), who elucidate that non-probability sampling employing purposive methods does not adhere to probability theory, fails to guarantee representativeness, and selects samples for a specific goal. The distribution of key informants for the interviews is summarised in Table 1.

Table 1: Distribution of key informants for the interviews

District	**ABO**	**DAENR**	**EPA**	**AEDC**	**AEDOs**	**Section**
Kasungu	1	1	Chipala	1	1	Khuza
					1	Chipala West
			Kaluluma	1	1	Kaluluma Central
Mzimba	1	1	Luwerezi	2	3	Luwerezi
Total	2	2		4	6	**14**

3.7. Data Gathering Methods and Procedure

The data required to address the questions of this study had both qualitative and quantitative elements. In socioeconomic research, qualitative and quantitative methods cannot function independently; therefore, analytical processes for both have been employed in this study. Qualitative and quantitative methods are not mutually exclusive. Consequently, in this study, the approaches are both complementary and parallel, as each encompasses different aspects of the research process, collectively addressing the practical applications utilised by researchers (Shrestha & Giri, 2021). The comprehensive elucidation of cognitive processes is integrated with descriptive statistics for enhanced clarity (Loeb et al., 2017).

3.7.1. Qualitative data collection

Common data collection methods employed in qualitative research include interviews, focus group discussions, observations, document analysis, and archival records. These instruments are utilised to gather rich and detailed information about the phenomenon under study, offering insights into its complexities and contextual nuances. Analysing qualitative data allows us to explore ideas and further explain quantitative results (Ahmad et al., 2019).

In the case of this study, semi-structured in-depth interviews were conducted with purposively selected key informants using an interview guide (Annex 6). This included a representation of extension workers at the community, district and national levels. These provided insights into the state of extension service delivery, their level of knowledge in delivering value chain-related support and the challenges and opportunities that exist.

Semi-structured farmer interviews also gathered some qualitative data on farmers' perceptions of the state of extension services, their effectiveness, and the challenges encountered. Semi-structured interviews are a form of qualitative

research method where the interviewer has a set of predetermined open-ended questions but maintains the flexibility to explore additional topics and delve deeper into responses. This type of interview combines elements of both structured and unstructured approaches, allowing for a balance between standardisation and flexibility (Mashuri et al., 2016).

3.7.2. Quantitative data collection

Quantitative data is measurable numerical data that researchers collect by asking closed-ended or multiple-choice questions using surveys, polls, questionnaires, and other standardised methods (Kabir & Muhammad, 2016). This type of data is used to quantify responses, enabling the generation of statistics such as percentages, frequencies, and averages that support objective comparisons and trend analysis. The tool also included some open-ended questionnaires to capture farmers' explanations on various aspects.

The farmer survey data were collected through a semi-structured questionnaire (See Annex 5), which comprised closed-ended and some open-ended questions designed to assess the following aspects:

- Farmers' level of knowledge of the groundnut value chain, including their awareness of value chain stages, key actors, and training received;
- Agronomic practices such as seed selection, planting methods, pest and disease control, and post-harvest handling;
- Access to extension services, including the frequency of extension visits, sources of information, and adequacy of the messages received;
- Marketing practices, such as how and where groundnuts are sold, price awareness, and challenges in accessing markets;
- Food security indicators, including availability of groundnuts for household consumption and the contribution of income from groundnut sales to food purchases.

The quantitative survey was administered to a sample of 366 farmers across the Kaluluma and Chipala EPAs in Kasungu District, and Luwelezi EPA in Mzimba District. Responses were recorded and later coded into SPSS for statistical analysis, including descriptive statistics and frequency distributions to examine patterns and trends aligned with the study's objectives. Table 2 below presents the distribution of sample respondents.

Table 2: Distribution of Sample Respondents

	EPA	**Section**	**Sampled participants**	**Data collection tool**	**Methods**
Kasungu	Chipala	Khuza	60	Survey (Questionnaire)	One-on-one interviews
		Chipala west	79		
	Kaluluma	Kaluluma Central	82		
Mzimba	Emfeni	Emfeni	52		
		Njebe	44		
	Luwerezi	Luwerezi	49		
Total			366		

3.8.Data Analysis Method

The analysis of data is a critical component of any scientific research process, as it enables the identification of patterns, relationships, and trends within the collected data. In this study, both qualitative and quantitative data were analysed to provide a comprehensive understanding of the research problem.

The study adopted a mixed-methods approach, integrating qualitative and quantitative analytical techniques to address the research objectives (Creswell & Plano Clark, 2018). In socio-economic research, these approaches are complementary rather than mutually exclusive, allowing for a more robust and holistic analysis (Johnson & Onwuegbuzie, 2004). Quantitative analysis facilitated the identification of measurable trends and relationships, while

qualitative analysis provided deeper insights into participants' experiences and contextual factors.

The integration of these analytical approaches allowed for comprehensive interpretation of the data, ensuring that both numerical patterns and contextual explanations were incorporated into the findings (Saunders et al., 2019).

3.8.1. Qualitative data analysis

Qualitative data obtained through key informant interviews (KIIs) were transcribed and analyzed using ATLAS.ti. A thematic coding approach was used to identify patterns and categories aligned with the research objectives. Codes were grouped into categories such as *"extension capacity," "training gaps," "challenges faced,"* and *"perceived outcomes."* These categories were then synthesized into broader themes corresponding to the study's objectives.

The use of ATLAS.ti allowed for systematic management of codes, creation of networks between themes, and extraction of supporting quotations, ensuring analytical rigour and transparency in interpretation.

3.8.1.1. Analytic process in ATLAS.ti

The coding process was conducted using **ATLAS.ti 25** to ensure a systematic and rigorous analysis of the qualitative data. The following steps were undertaken:

1. **Project Setup**: I began by creating a new project in ATLAS.ti (Alifeyo Nyasulu_M_DEV Project) and importing 14 transcribed interview documents into the project workspace. Each document was assigned to a relevant participant group (i.e. Kasungu and Mzimba) to support comparative analysis later.
2. **Open Coding**: I engaged in line-by-line reading of the transcripts and applied open coding to segments of text that represented significant

ideas, perceptions, or patterns. These codes were largely descriptive and grounded in the data (data-driven), capturing the essence of participants' responses without imposing preconceived categories.

3. **Code Management**: As codes began to accumulate, I reviewed and refined them for clarity, consistency, and relevance. ATLAS.ti's Code Manager was used to merge overlapping codes, rename codes for clarity, and organise them into emerging categories.
4. **Axial Coding / Categorisation**: Using the Code Groups features, I grouped related codes into categories and linked them to broader conceptual themes. At this stage, I also began relating the codes to the research questions and theoretical framework to ensure conceptual coherence.
5. **Memoing and Annotation**: I wrote analytic memos alongside the coding process to document my thoughts, emerging insights, and justifications for coding decisions. ATLAS.ti's Memo tool enabled me to reflect critically on the developing analysis and to track interpretive decisions.
6. **Quotation Retrieval**: Finally, ATLAS.ti's Quotation Manager allowed for easy retrieval of relevant excerpts from the data to support the themes discussed in the findings chapter. These quotations were used to illustrate key points and ensure the voices of participants were authentically represented

The flexibility and depth of thematic analysis made it particularly suitable for exploring the rich and contextual interactions within this study. To enhance methodological rigour, ATLAS.ti Version 25 software was used for data organisation and retrieval, ensuring a structured and transparent approach to analysis (Braun & Clarke, 2006; Friese, 2019). This tool helped manage the complexity of the dataset, maintaining the reliability and validity of the research findings.

By adhering to these robust analytical standards, the study successfully identified themes that provided valuable insights into the efficacy of agricultural extension services in the groundnuts value chain in Kasungu and Mzimba districts of Malawi

3.8.2. Quantitative data analysis

Quantitative data collected using a structure questionnaire administered to smallholder farmers were coded and analysed using IBM SPSS Statistics Version 23. Descriptive statistics such as frequencies, means, and percentages were computed to summarise key variables such as farmers' responses on access to extension services, knowledge levels, and production outcomes such as yield and income.

Cross-tabulations were also used to explore relationships across districts and Extension Planning Areas (EPAs). The analysis produced tabular outputs that facilitated comparison of responses across different locations and variables. These results were subsequently interpreted to identify patterns, trends, and differences in extension service delivery and outcomes.

The findings from the quantitative analysis were further triangulated with qualitative results and later discussed in relation to existing literature to determine areas of convergence and divergence with previous studies.

3.9. Ensuring Rigour

In order to ensure the quality and integrity of the study, appropriate measures were taken to address both qualitative trustworthiness and quantitative validity and reliability, consistent with the mixed-methods design adopted.

For the qualitative component, the study ensured trustworthiness through credibility, dependability, confirmability, and transferability (Lincoln & Guba,

1985). Credibility was enhanced through the use of multiple data collection methods, including interviews and focus group discussions, allowing for triangulation and deeper engagement with participants. Dependability was achieved by applying consistent data collection procedures and maintaining clear documentation of the research process. Confirmability was ensured by minimising researcher bias through careful interpretation and cross-verification of findings from different sources. Documentation of the research process also ensured that the results can be reproduced and confirmed. Transferability was supported by providing sufficient contextual detail about the study setting, enabling readers to assess the applicability of the findings to similar contexts (Shenton, 2004). Together, these measures strengthened confidence in the qualitative results.

For the quantitative component, the study ensured the validity and reliability of the data collected. Validity was achieved by aligning the data collection instruments with the research objectives and clearly communicating the purpose of the study to respondents to ensure accurate responses (Nusbaum et al., 2017). Reliability, defined as the consistency of measurement, was enhanced through the use of structured questionnaires and standardised data collection procedures. The in-person administration of questionnaires further allowed for clarification of questions, improving response accuracy and consistency (Mack et al., 2011).

Overall, triangulation of data from qualitative and quantitative methods helped to ensure robust findings. By integrating data from multiple sources and methods, the study was able to validate results and reduce bias, thereby strengthening the overall credibility and reliability of the research (Donkoh & Mensah, 2023).

3.10. Ethical Considerations

In conducting this study, the researcher meticulously upheld ethical guidelines, emphasising informed consent and participant anonymity. The procedure entailed delivering thorough elucidations to all participants/respondents regarding the research's nature and the planned use of its findings, a practice termed "informed consent" (Resnik, 2018), while adhering to the UNISA secrecy requirements. Those engaged were granted the autonomy to determine their involvement and could withdraw at any point before or during interviews, questionnaire administration, and focus group discussions without the obligation to justify. All individuals voluntarily accepted to participate, and none were withdrawn at any stage of the research procedure.

The guarantee of anonymity, privacy, and confidentiality was crucial in ensuring participants' commitment to non-withdrawal. Multiple measures were utilised to maintain this assurance. Significantly, the identities of participants have not been associated with the information they provided, particularly on sensitive data that could jeopardise their character, integrity, or personal safety (Israel and Hay, 2006).

The researcher proactively sought ethical permission from UNISA, specifically from the Department of Development Studies, to reinforce the study's ethical underpinning. This step not only conformed to optimal ethical principles but also recognised the researcher's dedication to maintaining the highest standards of ethical conduct during the study endeavour.

To reinforce this, the researcher ensured that Mzimba signed the consent forms at the Agriculture Department in Kasungu District to ensure that data collection adhered to local regulations. In addition, the data collectors signed confidentiality agreements alongside the principal researcher.

The ethical considerations in this study included informed consent, participant anonymity through meticulous data management, and securing specific

authorisation for the use of recording devices. The guarantee of anonymity and privacy bolstered the participants' faith in the research process, seen in their continued engagement without any withdrawals. By obtaining ethical clearance from the institutional review board, the researcher ensured compliance with ethical principles and standards, so augmenting the study's legitimacy and integrity. The careful focus on ethical considerations not only protected the participants' well-being and rights but also enhanced the overall integrity and reliability of the research findings.

3.11. Chapter Summary

This chapter has outlined the methodological approach used to investigate the effectiveness of agricultural extension services in the groundnut value chain in Malawi, focusing on Kasungu and Mzimba districts. The study adopted a mixed-methods research design, combining both quantitative and qualitative approaches to provide a comprehensive and context-rich understanding of the research objectives. This design was guided by a pragmatist research philosophy, allowing for methodological flexibility and triangulation of data.

Quantitative data were collected through structured surveys administered to 366 groundnut farmers, capturing numeric information on extension access, productivity, marketing, and food security outcomes. Qualitative data were gathered through key informant interviews with 36 extension personnel and selected focus group discussions with farmers. These tools allowed the study to explore both measurable outcomes and lived experiences.

Data were analyzed using SPSS for quantitative analysis and ATLAS.ti for thematic coding of qualitative responses. Ethical standards such as informed consent, confidentiality, and voluntary participation were observed throughout the study.

The chapter concluded by emphasising that the chosen methodology supports a rigorous, inclusive, and evidence-based assessment of extension service delivery across the value chain. The next chapter presents the research findings in relation to the study objectives.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1.Introduction

This chapter presents the study's results and discusses them in relation to the research objectives. A mixed-methods approach was employed, integrating both quantitative and qualitative data to provide a comprehensive understanding of the efficacy of agricultural extension services in the groundnut value chain. The chapter begins with the socio-economic profile of respondents and then presents findings corresponding to each objective. For each objective, quantitative findings will be presented first, followed by qualitative results and finally the convergence between both qualitative and quantitative results.

4.2. Demographic and Socio-economic Characteristics of Respondents

In order to establish the context, the study explored the socioeconomic characteristics of the farmers, detailing participants' age, gender, marital status, education and landholding sizes in Kasungu and Mzimba districts. These play a crucial role in determining how farmers engage with extension services and how they participate in agricultural production in general.

4.2.1. Age of the participants

The results of the study, as shown in Table 3 below, indicate that the majority of the farmers in the study area belong to the productive age demographic. The average age of farmers was 38 years and 43 years in Kasungu and Mzimba, respectively. This implies that age is not a significant constraint in groundnut production in both areas as most farmers are within the productive age range of between 15 and 64 (World Bank, 2022).

Table 3: Age of participants

Districts	Number of respondents	Minimum age (Years)	Maximum age (Years)	Average age (Years)
Kasungu	221	22	65	38
Mzimba	145	21	61	43

These results seem to present a positive outlook as younger and middle-aged farmers are thought to be more likely to take up innovations and knowledge (Doss and Morris, 2001; Chamberlin & Sumberg, 2021). Farmers in the sample, therefore, were expected to meaningfully engage and benefit from a responsive extension service.

4.2.2. Household Gender

The results as shown in Figure 3 below, depict a fair distribution by gender, with males being only slightly more than females, as they constitute 55.3 percent and 44.7 percent, respectively. These results resonate with evidence that suggests that gender dynamics in commercially viable crops like groundnuts are not pronounced in the production stage but rather in economic activities such as marketing, value addition and trading (Ge et al., 2023 and Quisumbing & Doss, 2021). This is why value chain development needs to be engendered.

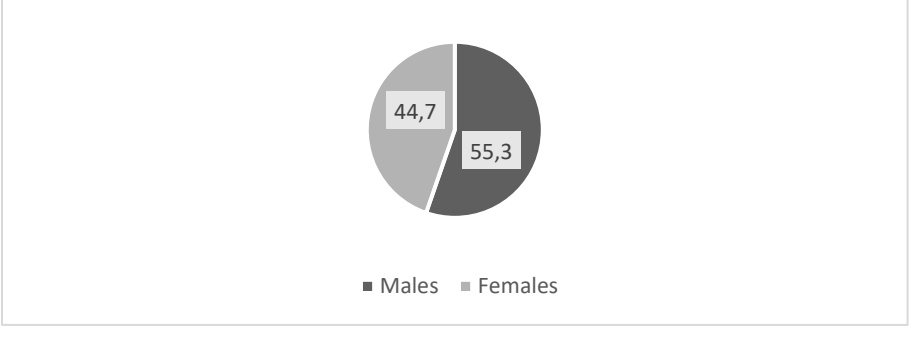


Figure 3: Gender Distribution among farmers

4.2.3. Marital Status of respondents

As shown in Table 4 below, the study findings reveal that the majority of farmers in the study areas are married. The results show that 92.8 percent and 88.2 percent of farmers in Kasungu and Mzimba districts, respectively, were married. This indicates a higher proportion of married farmers compared to those who were divorced, single, or widowed. While marital status does not necessarily indicate productive age, this observation complements the results from Table 2, which show that most respondents are in the age bracket associated with active household farming activities.

Table 4: Marital Status of the farmer respondents

District	Status	N	Percentage
Kasungu	Single	2	1.2
	Married	205	92.8
	Widowed	13	6.0
	Divorced	1	0
Mzimba	Single	3	2.0
	Married	128	88.2
	Widowed	9	5.9
	Divorced	5	3.9

Marriage is often linked to increased concern for household welfare and food security, which in turn is associated with increased participation in agricultural programs and engagement with extension services (Zheng et al., 2023). This is likely because married farmers have the motivation to improve their livelihoods through increased production. However, in other cases, marriage has prevented farmers (especially women) from effectively engaging with extension services as a result of household duties and social norms (Adebayo & Worth, 2023).

4.2.4. Education of the respondents

The level of education of farmers is an important factor that influences farmers' engagement with extension service, as it represents their capacity to comprehend and take-up new technologies. According to Masanja et al., 2023, educated farmers tend to be more progressive in adopting technologies and are sometimes preferred points of contact for agricultural extension works within the agricultural industry. The level of education of farmers, therefore, has an impact on what extension methods are used and how information is packaged. Tables 5 and 6 depict the educational backgrounds of the sampled farmers.

Table 5: Years spent in school by the farmer respondents

Districts	Sample (n)	Minimum (years)	Maximum (years)	Mean
Kasungu	221	0	14	7.94
Mzimba	145	2	12	8.12

Table 6: Highest education level of farmer respondents

District	Qualification	N	Percentage
Kasungu	Diploma	2	1%
	MSCE	11	5%
	JCE	40	18%
	PSLC	93	42%
	NONE	75	34%
Mzimba	Diploma	1	0
	MSCE	11	8%
	JCE	38	26%
	PSLC	42	29%
	NONE	53	37%

The results suggest low education levels among farmers both districts. The average years of schooling are 7.94 and 8.12 years for Kasungu and Mzimba, respectively. In Kasungu and Mzimba, 76 percent and 66 percent of the sampled farmers, respectively, only attended Primary School or no formal education at all. This implies that less farmers have exposure to secondary and tertiary education which potentially implies that farmers depend on extension workers to understand the demands of the groundnut value chain.

Interestingly, however, despite the low levels of education, key informant interviews revealed that this did not affect farmers' access to and utilisation of extension services because delivery is customised accordingly, as remarked by an extension worker from Kasungu:

> *"The majority of the farmers we work with have a low level of education. We just make sure our approach is simplistic and practical using methods like demonstrations and delivered in the local language"*- Key Informant Interview, Extension Worker, Kasungu.

4.2.5. Landholding sizes

The study also explored the landholding sizes by the sampled farmers. This is because the size of landholdings significantly influences farmers' capacity to adopt innovations and benefit from agricultural value chains (Abdulai & Huffman, 2014). Farmers with higher landholding sizes are more likely to take up new innovations than those with smaller farms because of economies of scale, access to resources, and the ability to allocate a piece of land to test technologies before fully adopting.

The results in Figure 4 show that, on average, most farmers own small to medium-sized farms, with 2 acres being the most common in Kasungu (both Kaluluma and Chipala) and 1 acre in Mzimba (Luwelezi) as shown in Figure 4. This emphasises the need for extension services to support tailored initiatives,

such as collective action or input support, in order to ensure smallholder farmers are effectively integrated in the groundnut market.

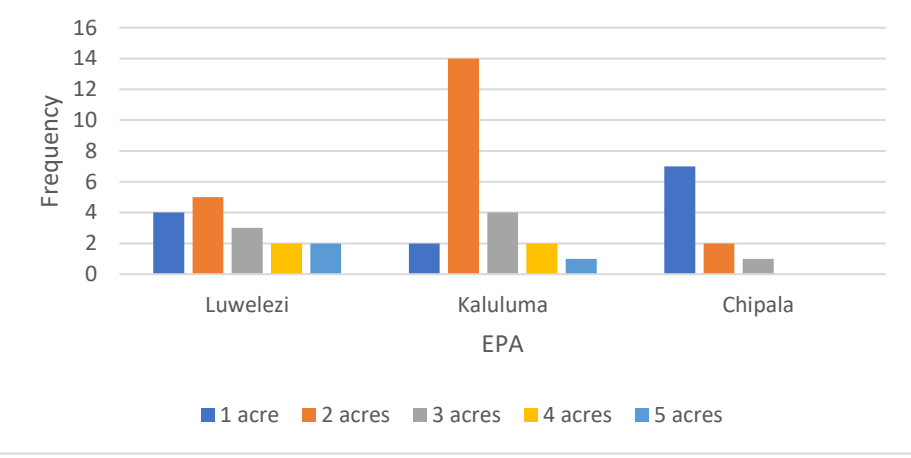


Figure 4: Landholding size distribution in Kasungu and Mzimba

4.3. Objective 1: Level of knowledge and Capacity of extension workers in the agricultural value chain

In achieving the first objective, the study assessed the capacity of extension workers in delivering extension services in the groundnut value chain. This is because the quality of services is directly linked to the level of capacity of extension workers. To evaluate capacity, the study collected both qualitative and quantitative data through key informant interviews and was analysed to assess the level of education, experience, knowledge and specialised training in value chains by extension workers.

4.3.1. Quantitative Results

This section presents findings on measurable or quantifiable indicators of the capacity of extension workers. This includes their education levels, years of experience, and level of knowledge of value chains.

4.3.1.1. Level of education of extension workers

The study examined the educational qualifications of extension workers through key informant interviews, as their expertise plays a crucial role in the transfer and promotion of agricultural technologies. Hamasalih & Layeeq (2023) emphasize that more educated extension workers are likely to be more skilled and knowledgeable in promoting innovative technologies than their less educated counterparts.

The findings from the key informant interviews on their highest education qualification, as shown in Table 7, indicate that most extension workers possess a diploma-level education (41 percent) or certificate (44 percent) while only 14 percent of the extension workers possess a Bachelor's degree or higher. Notably, the results show that higher-level officers (Such as District Agricultural Development Office (DADO) and ADD officials) are more likely to hold degrees while frontline officers like AEDOs usually possess certificates or diplomas.

Table 7: Highest education level of extension staff

Qualification	DAES (1)	ADD (2)	DADO (2)	AEDC (4)	AEDO (27)	Total (36)	%
PhD	0	0	0	0	0	0	0%
MSc	1	0	0	0	0	1	3%
BSc	0	2	1	0	1	4	11%
Diploma	0	0	1	3	10	14	41%
Certificate	0	0	0	1	14	15	44%
MSCE	0	0	0	0	2	2	1%

These disparities in the level of education may affect the quality and depth of support provided at different levels. Less educated extension workers often excel at engaging with farmers at the grassroots since they are more familiar with the contexts, but they may be limited in terms of understanding complex concepts such as value chain linkages, value addition and quality standards in the groundnut value chain (Hamasalih & Layeeq, 2023). On the other hand, more educated extension workers usually work in high strategic government offices and have a better understanding of more technical concepts. For instance, KIIs with DAES and ADD officials reported that they adequately understand the value chain concept and have been involved in the development of related training manuals and policy documents.

These results, therefore, suggest the need for professional development for frontline extension workers to equip them with more specialised knowledge of value chains. This enables the transfer of skills between the more educated and the lower-tier extension workers. Aremu et al. (2019) and FAO (2020) both argue that continuous training enhances extension workers' capacity to effectively support farmers.

4.3.1.2. Experience of extension workers in value chain-oriented extension

Extension workers' experience working in the groundnut value chain is key as it affects their understanding and dissemination of relevant information. Extension workers at different levels were asked about the number of years of experience and the activities they have been involved in. Results from the key informant interviews reveal that high-level government workers possessed more relevant experience that would expose them to value-chain-oriented extension services than the frontline extension workers, which may affect service delivery. Table 8 presents a summary of experiences for extension workers at different levels.

Table 8: Experiences of extension workers at different levels

Extension worker	Experience
DAES Staff	With 10 years of experience, 4-6 years of which is in agribusiness and value chain activities. They are directly involved in value chain manual development and minimum price setting
ADD Staff (Mzuzu & Kasungu)	4-5 years of experience in agribusiness and value chain activities. Have conducted trainings in agribusiness management and collaborated in training manuals
RDP Officials	While some have many years of experience (up to 20), they have limited specialised experience in value chain activities. They have worked with organizations like NASFAM and ICRISAT who have given them some training.
AEDCs & AEDOs	Have many years of experience but their work is largely limited to production. They have also worked with some NGOs in production and a little in marketing.

The results resonate with the previous studies that extension workers at higher levels have more exposure with the technical understanding of value chains. They are actively engaged in crafting the understanding of the concept by taking part in developing training manuals ((Davis et al., 2014; FAO, 2020). This, however, creates a knowledge gap between them and frontline extension workers who are focused on production-level support. There is, therefore, need for learning spaces to facilitate skills transfer between the top-level extension officers and frontline workers.

4.3.1.3. Assessment of Extensionists' Knowledge of the Groundnut Value Chain

The study explored extension workers' knowledge on the basic concepts of the value chain. The results show that extension workers only have a basic understanding of the agricultural value chain concept. Results in Table 12 show that 67 percent of the extension workers reported that they were aware of the value chain concept. However, only 10 percent demonstrated a deeper understanding of value chain concepts like value addition or market linkages. This was more pronounced among frontline extension workers who are in close contact with farmers. This presents a substantial gap as it affects the quality of extension delivered on the groundnut value chain as a whole.

Table 9: Knowledge of agricultural value chains by extensionists

Area of awareness	DAES (1)	ADD (2)	DADO (2)	AEDC (4)	AEDO (27)	Total (36)	%
Awareness of the value chain concept	1	2	2	4	20	29	67%
Description of the agricultural value chain	1	2	2	2	1	8	10%
Steps in value chain development and analysis	1	2	1	1	1	6	8%
The important players in agricultural value chain	1	2	1	1	1	6	8%
Training on value chain concept	1	2	1	1	0	5	7%

The results from key informant interviews with extension workers, as shown in Figure 5, further reveal that there is a significant understanding of the production stage of the groundnut value chain, but there is limited understanding of the later stages. At the production stage, the study found that 85 percent of extensionists demonstrated proficiency in basic agronomic practices such as seed selection, row spacing, weeding, and fertiliser application; and 50 percent demonstrated knowledge of conservation agriculture practices such as conservation tillage, crop rotation, and sustainable soil management. The deficiency of knowledge is especially alarming considering the escalating effects of climate change on agriculture in Malawi, as highlighted by Benitez-Alfonso et al. (2023), who contend that adaptation techniques are essential for enhancing crop resilience and farmer productivity.

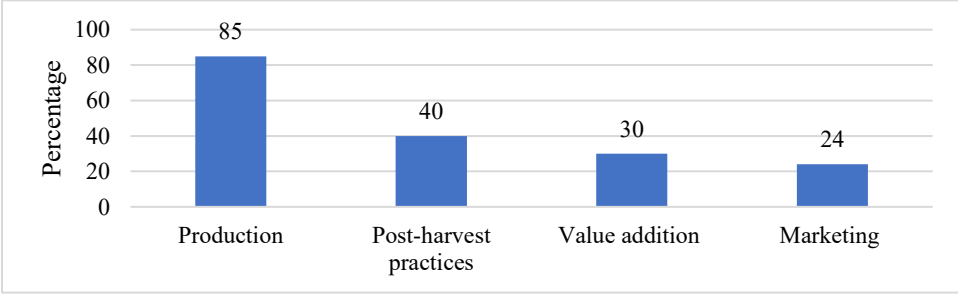


Figure 5: Extension workers' understanding of the various stages of the value chain

Beyond production, the study findings reveal considerable deficiencies in extension workers' understanding of processes such as post-harvest management, value addition, and market access techniques. Merely 40% of the extension workers exhibited knowledge of post-harvest processes, including drying, shelling, and storage methods, designed to mitigate aflatoxin contamination, which is a vital concern for preserving groundnut quality and marketability. The gap is troubling, as aflatoxin contamination can severely restrict market access for groundnut growers, as reported by Bonkoungou et al. (2024).

Similarly, extension workers' awareness of value addition practices in the groundnut value chain is low, with only 30 percent reporting to be aware and capable of advising farmers on processing groundnuts into goods such as oil or peanut butter. This deficiency limits farmers' capacity to diversify their income streams and capitalise on higher-value markets.

Regarding marketing, less than 25% of extension workers were able to furnish precise, current information regarding market trends, prices, or ideas for establishing cooperatives for collective marketing. The absence of market intelligence hinders farmers' ability to efficiently negotiate local and international markets, rendering them susceptible to price volatility. This conclusion aligns with Ma et al. (2024), who contended that extension services in numerous developing nations must intensify their emphasis on market access and commercialisation to improve the integration of smallholder farmers into value chains.

In short, while extension workers demonstrate considerably more knowledge of production practices, there is a need for more capacity building in advanced stages of the value chain such as post-harvest handling, value addition, logistics and marketing. According to Mungai et al. 2024), extension services must incorporate value chain-oriented and market-based guidance to maintain their relevance and utility for farmers in contemporary agricultural systems.

Bridging this knowledge gap necessitates targeted capacity-building interventions, especially for AEDOs who are instrumental in disseminating agricultural knowledge to smallholder farmers. Comprehensive training programs focused on post-harvest management, value addition, and market access are essential to enhancing the capacity of extensionists. Such efforts align with the recommendations of Preeti & Tripathi (2023), who advocate for continuous professional development of extension workers to address the evolving demands of agricultural advisory services.

4.3.2. Qualitative Insights

In-depth interviews with both extension workers and farmers also yielded rich qualitative data that helped to elucidate and substantiate the quantitative results.

4.3.2.1. Capacity gaps among extension workers

When asked about their level of knowledge and understanding on related value-chain-oriented extension, extension workers indicated a general bias towards production-related extension services. This leaves a gap in post-production practices such as marketing, value addition and formal market standards.

These results are echoed in the following quotations from key informants:

> *"While we guide farmers on planting, weeding and other production aspects of groundnut production, when it comes to analyzing market trends and value addition, most of us have not been trained adequately."* – Key Informant Interview, Extension Worker, Kasungu.
>
> *"I have good understanding and experience with groundnut production, but I am not quite certain about the marketing dynamics, especially when it comes to quality requirements for formal and international markets."* –Key Informant Interview, Extension Worker, Mzimba.
>
> *"... Indeed, there is a gap when it comes to the advanced stages of the value chain and our extension workers need to be trained more."* – Key Informant Interview, DADO, Mzimba.

In short, while extension workers demonstrate considerably more knowledge of production practices, there is a need for more capacity building in advanced stages of the value chain such as post-harvest handling, value addition, logistics and marketing. According to Mungai et al. 2024), extension services must incorporate value chain-oriented and market-based guidance to maintain their relevance and utility for farmers in contemporary agricultural systems.

This conclusion aligns with Ma et al. (2024), who contended that extension services in numerous developing nations must intensify their emphasis on market access and commercialisation to improve the integration of smallholder farmers into value chains.

4.3.2.2. Farmers' perspective of extension workers' capacity

Farmers expressed moderate satisfaction with the counsel provided by extension workers, valuing assistance in fundamental production techniques while seeking more sophisticated help, especially on soil fertility enhancement, drought mitigation, post-harvest handling, value-addition and marketing. This is demonstrated in the quotes below:

> *"Extension workers help us a lot with the husbandry practices of groundnut production. In recent years, however, changing weather patterns are a very serious issue, and we would like it if they helped us more in this area. Similarly, in the areas of value addition and accessing food markets."*- Farmer Interview, Kasungu

> *"We usually get advice on planting and spacing, which is helpful. But when it comes to things like storing groundnuts properly, processing them, or knowing where to sell for better prices, the extension workers say they don't have enough information either. We are all just guessing."* **-** Farmer Interview, Mzimba

Farmers' narratives also reveal the gap that exists in the services they receive from extension workers beyond the production stage. There is generally limited support in the areas of marketing, value addition and processing, which consequently limits economic returns realised by farmers.

4.3.3. Convergence of qualitative and quantitative results

Overall, analysis of both quantitative and qualitative results from key informant interviews with extension workers revealed that while most extension workers

in Kasungu and Mzimba districts demonstrated adequate knowledge in basic agronomic practices related to groundnut production, their knowledge and capacity in value chain-oriented extension was significantly limited.

Frontline extension workers reported limited capacity and understanding of the value chain concept as compared to higher-level extension workers. With regards to academic qualifications, most frontline extension workers (AEDOs) held diploma or certificate-level qualifications, with only 14% possessing a bachelor's degree or higher. This limited academic background corresponded with a lack of specialised understanding of advanced stages of the value chain, such as post-harvest handling, value addition, and marketing.

Only 67% of frontline extension workers were aware of the value chain concept, and just 10% could articulate its meaning, with minimal formal training reported. While high-level officers (e.g., DAES, ADD) showed stronger expertise and involvement in value chain-related activities, this knowledge had not been effectively transferred to field-level staff. Consequently, farmers, who primarily rely on AEDOs, also exhibited very low knowledge of value chains. Furthermore, the observed disparity between higher-level and frontline extension workers reflects findings by Davis et al. (2014) and FAO (2020), who highlight uneven capacity distribution within extension systems, often limiting effective knowledge transfer to farmers. However, unlike some studies that report gradual shifts toward pluralistic and market-oriented extension, the findings from this study suggest that such transitions remain weak at the frontline level in Malawi.

Qualitative insights from interviews revealed extension workers' own acknowledgement of their limitations, particularly in market intelligence and quality assurance for formal markets. There was also a clear recognition of the need for targeted capacity-building, peer learning, and continuous professional development focused on value chain development.

The implication is that the current extension system, while effective in improving production practices, is not sufficiently equipped to support farmers' participation in higher-value segments of the groundnut value chain. This directly addresses the research objective by demonstrating that extension workers' capacity is uneven and skewed toward production, thereby constraining broader value chain development outcomes.

The convergence of qualitative and quantitative results, therefore, highlights the need for targeted training programs on post-harvest handling, value addition, and marketing for AEDOs; Peer learning platforms to facilitate skill transfer from DAES and ADD staff to lower-tier workers; and integration of market-based and climate-smart extension modules to improve service relevance. These recommendations align with Mungai et al. (2024), Preeti & Tripathi (2023), and FAO (2020), all of whom emphasise the importance of value chain-oriented extension services to strengthen farmer-market linkages and improve smallholder livelihoods

4.4. Objective 2: Analysing the status of extension services and roles played by extension workers in the study area

To assess the characteristics and nature of extension services in the groundnuts value chain, the study explored sources, accessibility, and content of agricultural information available to farmers. This analysis focused on the roles of various service providers, the interactions between farmers and extension workers, and the perceived adequacy of the information concerning the groundnut value chain. This section, therefore, presents the relevant quantitative and qualitative findings addressing this objective.

4.4.1. Quantitative Results

This section presents quantitative results from an analysis of data collected from a survey with groundnut farmers.

4.4.1.1. Main source of value chain messages

When asked about the main sources of value chain messages, results in Table 10 accentuate the significant role played by government extension workers, as they were identified by most farmers in both districts and EPAs.

Table 10: Sources of value chain messages

DAO	EPA	Govt extension workers	Input suppliers	NGO
Kasungu	Kaluluma	91.3%	8.7%	0%
	Chipala	100.0%	0%	0%
Mzimba	Luwelezi	64.3%	21.4%	14.3%

By district, the results suggest that in Kasungu District, value chain messages are dominated by government extension workers, while Kasungu registered slightly more diversification. In Kasungu, government extension workers accounted for 91.3% and 100% of the messages received by farmers in Kaluluma and Chipala, respectively. Overall, government extension agents provided 93.9% of extension messages in Kasungu, compared to 6.1% from input suppliers. In Luwelezi EPA in Mzimba District, on the other hand, government extension agents are the main source for 64.3% of farmers, but input suppliers and NGOs also contribute 21.4% and 14.3%, respectively. This diversity signals more collaboration between farmers, extension workers, private traders and NGOs in delivering more comprehensive extension services (Aregaw et al., 2023; Ma et al., 2024).

However, even in Mzimba where there was more diversity, farmers still highlighted that extension workers play a key facilitative role in farmers'

interactions with other players. This strong relationship between farmers and extension workers, therefore, is very important and needs to be leveraged in value chain development.

4.4.1.2. Content Adequacy of Extension Messages to support needs of farmers

The study further asked if they considered the messages they received from extension service providers adequate. Results, as shown in Table 11, reveal that despite high access to extension services, many farmers expressed concerns regarding the adequacy of the information provided, particularly concerning the groundnut value chain. The farmers required more detailed knowledge on topics such as post-harvest management, market opportunities, and value-addition strategies.

Table 11: Are these messages adequate?

DAO	EPA	No	Yes
Kasungu	Kaluluma	91.3%	8.7%
	Chipala	70.0%	30.0%
Mzimba	Luwelezi	78.6%	21.4%

This gap between information accessibility and content sufficiency underscores the limitations of current extension services in meeting the specific needs of farmers for improved market engagement and value chain participation. These findings align with Mungai et al. (2024), who emphasise the importance of tailoring extension content to address farmers' practical challenges in value chain management. Strengthened collaboration among government agencies, NGOs, and private sector actors is also key in overcoming these challenges.

4.4.1.3. Frequency of extension visits/contact

The frequency of extension visits is key to the effectiveness of agricultural extension services, since consistent interaction facilitates absorption and effective engagement among farmers. The findings in Table 12 indicate a low frequency of extension worker visits in the various Extension Planning Areas (EPAs) in the Kasungu and Mzimba districts, diverging from the recommended biweekly visitation schedule.

Table 12: Frequency of visits

DAO	EPA	Weekly	Every Fortnight	Monthly	Every 2 months	Upon being called	Rarely (every 3 months and above)	Never
Kasungu	Kaluluma	8.7%	0%	30.4%	26.1%	0%	13.0%	21.7%
	Chipala	0%	20.0%	10.0%	0%	0%	50.0%	20.0%
Mzimba	Luwelezi	0%	21.4%	28.6%	14.3%	14.3%	21.4%	0%

In Kaluluma in Kasungu, the most common frequency of visits by extension workers was monthly (30.4 percent) but 21.7 percent of farmers were never visited. The situation was worse in Chipala where about 50.0 percent of the farmers reported having been visited only once in three months and 20 percent had never been visited. In Luwelezi EPA (Mzimba), on the other hand, the frequency of visits varied, with 21.4 percent reporting fortnightly visits while 28.6 percent were visited monthly. About 21.4 percent reported being visited once every three months, while 14.3 percent were only visited upon being called upon.

The predominant frequency of extension visits across all EPAs is monthly (25.5%), whereas a significant percentage of respondents indicate infrequent visits (23.4%) or none (14.9%). The inconsistency in visit frequency suggests that the extension program is failing to effectively reach all farmers as intended.

This can be attributed to high farmer-to-extension worker ratios, resource limitations such as transportation, and logistical obstacles in traversing extensive geographic regions. This affects the quality of extension service provided to farmers and its effectiveness (Ma et al., 2024).

Rectifying these inconsistencies in extension visit frequency is essential for enhancing the efficacy of agricultural extension services in both Kasungu and Mzimba districts. There is a need for an increased number of extension workers, enhanced logistical assistance, sufficient motivation and supporting complementary farmer-to-farmer extension approaches.

4.4.1.4. Quality of service from farmers' perspective

Besides the frequency of service, the study also asked farmers to rate the quality of extension services received from government extension workers. Table 13 demonstrates that a significant proportion of respondents indicated satisfaction with the services provided by government extension workers. In Kaluluma EPA, 91.4% of respondents expressed satisfaction with the support received, while in Luwelezi EPA, the figure was 92.9%. The elevated satisfaction indicates that government extension workers in these regions are seen as dependable providers of agricultural information because of their consistent presence and regular engagement with the farming community, as suggested by Kassem et al. (2021) and Birner et al. (2009).

The situation in Chipala EPA is mixed, where half of the farmers reported being neutral and dissatisfied with extension services. This is because of the infrequent visits and uneven service delivery.

Table 13: Satisfaction with number of visits

DAO	EPA	Neutral	Not satisfied	Satisfied	Somehow satisfied	Very satisfied
Kasungu	Kaluluma	4.3%	4.3%	60.9%	4.3%	26.2%
	Chipala	30.0%	20.0%	40.0%	0%	10.0%
Mzimba	Luwelezi	0%	7.1%	28.6%	14.3%	50.0%

4.4.2. Qualitative Results

Individual interviews from farmers and key informant interviews with extension workers across Kasungu and Mzimba revealed the significant role played by government extension workers and the quality of extension services delivered. The qualitative insights largely align with quantitative results and illustrate the bias towards production support and highlight the limited post-production knowledge, and a growing demand for market-oriented extension services.

4.4.2.1. Farmer main source of extension services

Qualitative narratives from farmers highlight the significance of extension workers in extension service delivery. This can be encapsulated in the following quotes by farmers:

> *"Extension workers live closer to our communities. All these other players first go through the extension worker who helps in mobilising us and makes sure that our interests are being protected. This is why they are very important to us."*- Farmer Interview, Mzimba.

> *"We mainly rely on extension workers here. I do not know of any NGO working in the area delivering extension service"* Farmer Interview, Mzimba.

> *"When new organisations want to work with us or train us, they come with the extension workers. Sometimes they just train the extension workers, and they are the ones that come and train us*" - Farmer Interview, Kasungu

As observed, government extension workers are a key player in delivering extension services to farmers. This is because they have built trust and posed as a consistent and readily available source of support to farmers. While farmers displayed reliance on government extension workers, however, they lamented inadequate contact with them because of a high extension worker-to-farmer ratio. This is demonstrated in the following quote:

> *"Sometimes we go a month or more without seeing anyone. And when they come, it is just general advice that doesn't help us much with selling or improving our groundnuts."* - Farmer Interview, Kasungu

This is also echoed in the following observation by an extension worker:

> *"We would like to reach more farmers and a little more frequently, especially during the growing season but it is very difficult because the//re is a lot of farmers under my watch"*- Key Informant Interview, AEDO, Mzimba.

4.4.2.2. Adequacy and quality of extension services

When asked if they are satisfied with the extension services received, farmers' narratives showed the adequacy and quality of extension services is highly affected by the limited number of extension workers and the general bias towards production-related support. The quotes below show farmers perspective on this:

> *"Most of the information we received from extension workers pertained to production practices. Less effort is put on finding formal markets and value addition."* Farmer Interview, Mzimba

> "*Extension officers try to give us the best they can, especially helping us with how to grow different crops. But we are many of us, and it becomes a challenge."* Farmer Interview, Mzimba

This is also confirmed by the following sentiments by extension workers:

> *"As extension workers, we try out best to reach as many farmers as we can but it is a very big area with many farmers. It would be good if we partnered with more NGOs to increase outreach"*- Key Informant Interview, Extension Worker, Kasungu.
>
> *"We want to learn about value chains and markets because these are the questions farmers now ask. But we need training and materials to guide us."* - AEDO, Mzimba North

This production-centric knowledge orientation reflects historical patterns in Malawi's extension system, which prioritized food security over commercialization. The transitioning policy stance, therefore, calls for a shift towards more value-chain and commercialisation-oriented extension services.

4.4.3. Convergence of qualitative and quantitative results

Both quantitative and qualitative results show that government extension workers are the dominant source of agricultural information, particularly in Kasungu, where over 90% of farmers rely solely on them. While this reflects strong institutional presence, it also exposes limited participation of NGOs and private actors, especially in delivering value chain-related extension services.

Furthermore, despite broad access, many farmers reported that extension messages were inadequate, especially on post-harvest handling, value addition, and marketing. This limits the ability of farmers to benefit from improved productivity. Extension visits were also found to be infrequent and inconsistent, with some farmers not being visited at all.

Still, in areas where extension workers were more present, such as Kaluluma and Luwelezi, farmer satisfaction was relatively high, suggesting that regular contact improves perceptions of service quality. This finding is consistent with existing literature, which shows that frequent interaction between extension agents and farmers enhances trust, knowledge uptake, and overall effectiveness of extension services (Anderson & Feder, 2007; Kassem et al., 2021). Overall, the results show that while extension systems are functional, they remain production-focused and under-resourced for value chain support. Improving visit frequency, content relevance, and multi-stakeholder coordination is essential to strengthen their impact on groundnut value chain development.

To strengthen the role of extension services in groundnut value chain development, there is a pressing need to transition from a production-centric model to a more holistic, value chain-oriented approach. This aligns with the growing emphasis in the literature on pluralistic and market-oriented extension systems that integrate multiple actors to support farmers beyond production (Christoplos, 2010; Davis et al., 2014). This requires enhancing the relevance of extension content, improving visit frequency, and fostering collaboration with NGOs and private sector actors. Equipping extension workers with practical skills in post-harvest handling, marketing, and value addition, alongside better logistical support, would enable them to provide more comprehensive support to farmers. The way forward lies in repositioning extension services as facilitators across the entire value chain, not just at the production level, to ensure smallholder farmers fully benefit from productivity gains and improved market participation.

4.5. Objective 3: Perceived effectiveness of extension services in supporting farmers in the groundnut value chain

The study explored the effectiveness of extension services in achieving various performance outcomes including productivity, marketing, value addition, household incomes and food security. This was assessed through engagements with farmers and triangulated with key informant interviews and hence collected both qualitative and quantitative data.

4.5.1. Quantitative Results

Extension services are expected to help improve the performance of the groundnuts value chain and consequently improve the living standards of farmers. Farmers were, therefore, asked about the changes in the groundnuts production that they have experienced that can be associated with the training by extension workers. Table 14 shows the results of the changes perceived by farmers after engaging with extension workers.

Table 14: Changes in smallholder farmers' performance after training by extension workers

		Positive changes				
DAO	**EPA**	**Business orientation**	**G/nutYield**	**Agronomic practices**	**Market scouting skills**	**Other**
Kasungu	Kaluluma	21.0%	33.9%	37.1%	8.1%	0.0%
	Chipala	11.1%	33.3%	50.0%	5.6%	0.0%
Mzimba	Luwelezi	18.2%	18.2%	29.5%	22.7%	11.4%

Note: "Other Areas" include post-harvest handling and value addition.

4.5.1.1. Improvements in Agronomic Practices and Yield

The results indicate that agronomic practices were the most commonly reported improvement in both Kasungu and Mzimba, with 50% in Chipala, 37.1% of respondents in Kaluluma and 29.9% in Luwelezi noting the positive change. These practices included better land preparation, plant spacing, pest control and planting time.

4.5.1.2. Income and economic resilience of farmers

According to results in Table 14, another significant area of progress highlighted in the statistics is the increased business orientation among smallholder farmers, with 21.0% of respondents in Kaluluma and 18.2% in Luwelezi reporting positive change. The gains in yield have resulted in increased marketable surplus and consequently increased household incomes for farmers. Farmers have used these incomes to meet other household needs, including school fees, buying groceries and other food costs over the year.

4.5.1.3. Marketing and value chain participation

The results in Table 14 reveal that enhancements in market scouting or research abilities are infrequent, with merely 8.1% of respondents in Kaluluma and 5.6% in Chipala reporting progress in this domain. Luwelezi performs more favourably, as 22.7% of farmers indicate improved market scouting abilities. This corresponds to earlier results that Luwelezi has private players such as Pyxus who are engaged in groundnut marketing. These results emphasise the eminent challenge of limited access to good markets that farmers face. This, in turn, reduces the potential revenues earned as farmers end up selling their produce to middlemen at exploitatively low prices.

These results align with findings by Becerra-Encinales et al. (2024), who contend that numerous extension systems prioritise production at the expense of market integration and value chain advancement. Enhancing marketing abilities is essential for empowering farmers to sell their produce at competitive

prices and optimise profits from excess groundnut output. Furthermore, there is a need for good coordination with private players that offer market opportunities to farmers, as observed in Luwelezi EPA in Mzimba.

4.5.2. Qualitative Results

This sub-section presents the narratives from individual interviews with farmers and key informant interviews with extension workers on the perceived outcomes of extension services in the groundnut value chain.

4.5.2.1. Enhanced agronomic practices and output

Qualitative results align with the observations from quantitative data that extension services have exposed farmers to better farming practices. This is portrayed in a quote by a farmer from Kasungu:

> *"Previously, many of us did not really know good planting practices for groundnuts, but extension workers have been trying to help us. Recently, we have been trying the double rows planting style on the demonstration plots and it showing potential for increased output"* Farmer Interview, Kasungu.

Consequently, extension service is seen to have a positive impact on the yield of groundnuts in the area. According to results from key informant interviews in Kasungu, average groundnut yields rose from 800 kg per hectare prior to the intervention to 960 kg/ha subsequently, indicating a 20% enhancement. In Mzimba, yields increased from 750 kg/ha to 862 kg/ha, representing an approximate 15% rise. This was also echoed in farmer interviews that extension services have helped them realise more yields as they are able to use good seeds and practice good husbandry practices. A farmer from Mzimba is quoted:

> *"In the past, I used to get no more than 5 bags from my piece of land, but this year, for example, I harvested 10 bags. I know it's because the*

extension worker and Pyxus helped us in seed selection and recommended planting." Farmer interview, Mzimba.

4.5.2.2. Increased incomes among farmers

Below are some excerpts from farmer interviews on the perceived effect of extension services on yield:

> *"With better yields, I can get more extra bags of groundnuts that I can sell and use the money to pay my child's school fees and purchase maize during the lean season when my maize is finished."*- Farmer interview, Kasungu.

> *"Now I do not have to wait for my husband to buy soap or sugar every time. There is a portion of the groundnuts that I can sell and tackle those things myself"*- Female farmer, Mzimba.

These results show that regardless of weaknesses in the marketing channels, increases in yields led to increased sales and incomes. Therefore, extension efforts to improve production and agribusiness skills need to be sustained and enhanced.

4.5.2.3. Persistent Marketing challenges

Qualitative data aligns with quantitative data above that farmers continue to face challenges on the marketing side. They sell most of their surplus output to vendors at exploitative prices, which affects economic returns. One farmer said:

> *"Although the yields are better now, where to sell our surplus is the problem. The vendors come and offer MK500/kg, and we accept sometimes because we do not have better alternatives and we are sometimes desperate."* - Farmer, Chipala EPA, Kasungu

Extension workers also acknowledged this challenge:

> *"To be honest, there is indeed more focus on production than the marketing side. There is a need for us to enhance our efforts in collective*

marketing and linking farmers to reliable off-takers." - AEDO, Luwelezi EPA, Mzimba

4.5.2.4. Post-Harvest Management and Value Addition

Like earlier results, Table 18 reveals a significant gap in post-harvest handling and value addition. Both extension workers and farmers acknowledged that there is generally low understanding of good storage practices and processing. This is portrayed in the following quotations:

> *"The other year, some of my groundnuts got mouldy probably because I didn't dry them properly or how I stored them. I lost money because I sold them for very cheap*." - Farmer, Chipala EPA, Kasungu.
>
> *"Some of the good markets measure the amount of moisture and aflatoxin in the groundnuts, but we do not have the expertise to adequately prepare for these."* - Farmer, Luwelezi EPA, Mzimba.
>
> *"Sometimes we wish we could train farmers on shelling machines, drying machines and processing, but we lack the necessary skills and materials."* - AEDO, Chipala EPA

Post-harvest losses, especially due to inadequate storage and handling, can substantially diminish the benefits obtained from enhanced production (Ariong et al., 2023). Amadu & McNamara, 2024) emphasise that effective post-harvest management is essential for converting greater output into enhanced food security and economic benefits. Value addition, such as converting groundnuts into flour or oil, can substantially enhance farmers' incomes by enabling access to more profitable markets. There is, therefore, a need to widen the range of extension services to encompass value addition and market linkage training, which would enable smallholder farmers in these areas to extract greater value from their groundnut crop, thereby improving their resistance to market changes and price volatility.

4.5.2.5. Food security and Nutrition

Farmers associated the increased productivity and incomes with better food availability, accessibility and affordability. Farmers indicated that they retained some groundnuts for use at home which provided a good and cost-effective source of protein in their diet. It is consumed raw, roasted, cooked and in sauces. One farmer noted that:

> *"Now I do not need to buy groundnuts for relish or my child's porridge anymore because I harvest enough groundnuts."* Farmer interview, Kasungu.

The increased income from the sale of surplus groundnuts also means farming households can afford to buy other foodstuffs needed to ensure food security and dietary diversity in the household.

> *"When my maize finished in February, I just sold one bag of groundnuts and went to purchase some more maize. At least it was able to push me as I waited for harvest."* Farmer survey, Mzimba.

This evidence shows that groundnuts play a dual role in ensuring food security as a source of food itself and as a source of income to buy other types of food. Witcombe & Tiemann (2022) refer to these as nutritional access and economic access to food respectively. As observed, the changes are more a result of increased yields and productivity than extension messages related to utilisation and nutrition.

Despite these improvements, farmers still acknowledged that while groundnuts have a positive contribution towards food availability, food insecurity remains a challenge, especially in the lean months. Some farmers reported that they sometimes sell their groundnuts early to meet household needs and still face challenges during lean months. In addition, farmers reported that extension messages on utilisation of output remain limited. This is substantiated in the following quotations:

> *"Sometimes we sell too soon because we need cash. Also, we sometimes sell more than we should. Later we run out of food and we need to buy again, but prices have gone up."*- Farmer, Chipala EPA.
>
> *"While extension workers help us in production, there is little that is done after we harvest."*- Female farmer, Luwelezi EPA.

As productivity is being enhanced, there is also a need for extension services regarding the utilisation of groundnut output and nutrition to ensure that the gains indeed result in positive household outcomes.

4.5.3. Convergence of quantitative and qualitative results

The analysis of both quantitative and qualitative data reveals that extension services have made notable contributions to improved groundnut production, particularly in areas of agronomic practices, seed selection, and productivity. Many farmers reported increased yields and growing confidence in farming techniques due to regular support from extension workers and private partners. These findings are consistent with existing literature, which highlights the positive role of extension services in enhancing farm productivity and farmer welfare (Anderson & Feder, 2007; Davis et al., 2014).

However, both data strands reveal that the effectiveness of extension services is uneven across the value chain. While production outcomes are strong, there is limited impact on marketing, post-harvest handling, and value addition, as reflected in low reported improvements in market scouting skills and persistent reliance on middlemen. This aligns with studies such as Becerra-Encinales et al. (2024), which argue that extension systems often prioritise production at the expense of market integration. At the same time, the findings diverge from literature that suggests growing integration of value chain approaches in extension, indicating that such transitions remain limited in practice within the study areas.

The implication is that although extension services are effective in raising productivity, their contribution to sustained income growth and food security is constrained by weak support in downstream value chain activities. This directly addresses the research objective by demonstrating that extension services improve immediate production outcomes but have limited effectiveness in enabling farmers to fully capture value from their produce. Strengthening extension systems will therefore require a shift toward more holistic, market-oriented, and post-harvest-focused service delivery to ensure that productivity gains translate into long-term livelihood improvements.

4.6. Objective 4: Challenges Faced by farmers and extension workers in the groundnut value chain

This section examines the key challenges farmers and extension workers face within the groundnut value chain in Kasungu and Mzimba districts. These highlight the weaknesses and deficiencies that exist in the extension system in meeting farmers' needs, hence identifying areas for improvement. Quantitative results from a farmer survey highlight the challenges faced by groundnut farmers while qualitative results focus on findings from key informant interviews with extension workers on the challenges that they face in delivering servicers to on groundnut value chains.

4.6.1. Quantitative findings: Challenges faced by groundnut farmers

Farmers in the groundnuts value chain are faced with a number of challenges that affect their operations and how they benefit from it. With the promotion of demand-oriented extension, extension service providers are expected to respond to these challenges and needs of farmers. Table 19 presents a summary of responses from farmers when asked about the challenges that they face in. The results reveal systemic issues encountered in the agricultural sector, such as climate variability, limited access to and high cost of inputs, post-harvest losses and weak market linkages.

Table 15: Main challenges of groundnut farmers

	Kasungu		Mzimba
	Kaluluma	**Chipala**	**Luwelezi**
Unreliable rainfall	24.50%	27.80%	25.00%
Unreliable markets	22.30%	16.70%	10.70%
Unavailability of quality seed	22.30%	11.10%	19.60%
Low yield	19.10%	13.90%	12.50%
Post-harvest deterioration	5.30%	11.10%	16.10%
limited access to extension services	3.20%	11.10%	3.60%
High input costs	3.20%	8.30%	12.50%

4.6.1.1. Climate variability

The results suggest most prominent problem facing farmers is the unreliability of rainfall, as it was reported by 24.5% of farmers in Kaluluma; 27.8% in Chipala and 25.0% in Luwerezi in Mzimba. This aligns with the recent incidences of extreme weather conditions such as dry spells, heavy rains and cyclones which negatively affect agricultural production. This has created demand for extension workers to provide guidance on farmers' decisions regarding crop varieties to grow, timing of husbandry practices and mitigating practices. This corresponds with the earlier finding that farmers think there is a gap in offering climate-related extension messages.

4.6.1.2. Limited access to Quality Inputs

Farmers also identified the lack of quality inputs, such as seeds, as another major obstacle for 22.3% of farmers in Kaluluma and 11.1% in Chipala in Kasungu and 19.6% in Luwelezi in Kasungu. This, Liu et al. (2023) noted, is related to the problems of availability and affordability of quality inputs. This also aligns with the results that some farmers identified high cost of inputs as a

prominent problem among them. This affects the effectiveness of extension services as farmers can only utilise information on innovations that they can access and afford. This underscores the need for tailored support to help farmers access inputs and offer cheaper input alternatives to resource-poor farmers.

4.6.1.3. Marketing Challenges

The lack of reliable markets has also been identified as a key challenge, especially in Kasungu. It was considered the main challenge by 22.3% of farmers in Kaluluma, 16.7% in Chipala in Kasungu and 10.7% in Luwelezi in Mzimba. This identifies a gap in extension services at the marketing stage of the value chain. This aligns with the earlier findings that extension messages usually focus on production rather than the advanced stages and that most extension workers do not have adequate capacity to deliver market-related information. Caaisho (2024) and Mwajombe (2023) observe that extension services often prioritise production over market integration, a systemic issue that limits the support extension workers can offer in a value chain-oriented system. This, therefore, calls for continued professional training for extension workers to build their capacity in this domain.

4.6.1.4. Post-harvest losses and quality deterioration

Another concern among groundnut farmers is post-harvest deterioration. It was considered the main challenge by 16.1% of farmers in Luwelezi in Mzimba, and 11.1% in Chipala and 5.3% in Kaluluma in Kasungu. This is because of the reported lack of adequate extension services in post-harvest handling practices such as drying, storage and consequently aflatoxin control. This is why aflatoxin remains a significant challenge in the groundnut value chain in Malawi, affecting participation in formal and external markets (Bonkoungou et al., 2024). This calls for capacity building among extension workers in groundnut post-harvest handling practices that help to preserve quality to ensure farmers access high-value markets.

4.4.2 Qualitative Results: Challenges Faced by Extension workers in the groundnut value chain

Qualitative data from key informant interviews with extension workers, when asked about the challenges that they face in delivering services, reveal systemic issues that affect the effectiveness of extension services. These include inadequacy of resources, low capacity of extension workers in some areas and administrative challenges. Figure 6 below is a synopsis of extension workers' narratives highlighting the frequency of the challenges identified.

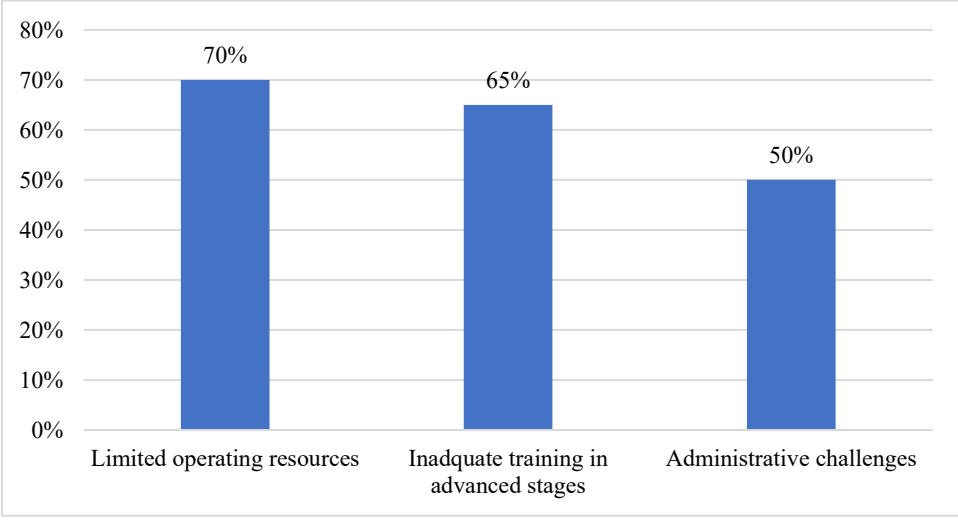


Figure 6: Challenges facing extension workers

4.6.1.5. Inadequate operating resources

The results as shown in Figure 6 reveal that 70% of extensionists reported facing significant resource constraints, particularly in transportation and market access. This, in turn, leads to diminished morale as extension workers do not have adequate enabling resources. One extension worker from Chipala in Kasungu remarked:

> "*I want to help farmers as much as I can, but sometimes motivation is low because I have no reliable means of transport and inadequate resources and inputs to use in engaging with farmers.*

Similarly, one farmer said "*Alangizi athu amayesetsa ntchito koma timawamvetsa chifukwa amagwira ntchito yambiri koma ndikukumana ndi alimi ambiri chonsecho kumayenda pa njinga kapena pansi kumene"* (The extensionists try to do their work to their best but we understand their challenge as they have to meet many of us with vast distances all by bicycles or sometimes by foot). This is in line with what Masangano & Mthinda (2012) in their report on *Pluralistic Extension System in Malawi* also found and apart from transport constraints, they also found that lack of financial incentives and funding to the extension staff to carry out the work also contributes heavily to the inefficiencies in extension delivery in the country.

4.6.1.6. Limited training in post-harvest handling and marketing for extension workers

The results further reveal that 65% indicated inadequate training in post-harvest management and market-related skills. This signals a mismatch between extension service provision and the needs of the people as post-harvest deterioration and limited access to reliable markets were identified as prominent problems among farmers.

> *"Our training has mostly focused on crop husbandry practices and modern technologies. However, now things are changing as agriculture is becoming more commercial hence the need for us to deliver more market-related messages"* Key Informant Interview, Extension worker, Mzimba

> *"Our extension officers help us a lot when it comes to production, but when we have harvested and want to sell, we are usually on our own. Sometimes we hear about market opportunities too late and we do not know how to exploit them"* Farmer Interview, Kasungu

The study has hence established a strategic challenge of weak extension service delivery in advanced stages of the groundnut value chain. This calls for

increased investment in the capacity building of extension workers; and good coordination with specialized actors such as processors and more formal market players.

4.6.1.7. Administrative inefficiencies

The study results also reveal the existence of administrative challenges that were cited by 50 percent of the extension workers as some of the main challenges in delivering extension service in the groundnut value chain. Some of these include inadequate staffing, delayed response time and delayed or non-disbursement of some funds. One extension worker from Kasungu noted that:

> *"We need to have some coordination in the agricultural offices at the different levels. Sometimes, I can identify a problem in the field and submit it to a higher office but it takes a long time to be responded to"* Key Informant interview, Extension Worker, Kasungu.

These findings align with Aregaw et al. (2023) and Mungai et al. (2024) that postulate that frontline extension workers are significantly affected by the institutional and capacity support they receive.

4.6.2. Opportunities in the extension system and the delivery of services

Despite the challenges, a recurring theme from interviews with extension workers was opportunities to enhance the effectiveness of extension services by leveraging partnerships with non-governmental organisations (NGOs), private sector actors, and government initiatives. These partnerships could help address the training, resource, and administrative challenges faced by extensionists.

For instance, many NGOs in Malawi focus on agricultural development and capacity building. Collaborating with them could provide extensionists with access to training in specialised areas, such as value addition and climate-smart agriculture. Further, the private sector actors, particularly in agribusiness, could be engaged to provide extensionists with access to market linkages, financial

resources, and advanced agricultural technology to improve service delivery. Companies involved in groundnut processing and marketing could partner with extension services to enhance value addition and improve farmers' access to profitable markets. As one extension worker noted:

> *"At the moment we already work with some NGOs from time to time to promote some technologies. I believe they can be even more helpful if we could get more support in the areas of value addition and market access"*

These private sector stakeholders could help leverage digital tools such as mobile apps and SMS-based platforms, which could provide extensionists and farmers with real-time access to market information, weather forecasts, and best practices in groundnut production and marketing. Digital platforms can also help overcome the challenge of reaching remote farming communities.

Lastly, existing government initiatives, such as the Farmer Input Subsidy Program (FISP) and public-private partnership programs, can be tapped to improve resource availability and streamline administrative processes. Extensionists could benefit from greater involvement in these initiatives, particularly in the dissemination of market information and access to financial tools for farmers. Thus, by exploring these partnerships, the efficiency and reach of extension services can be significantly improved, ultimately benefiting groundnut farmers and enhancing food security in Kasungu and Mzimba districts.

4.6.3. Convergence of Qualitative and quantitative results

The convergence of quantitative and qualitative findings reveals that the challenges affecting the groundnut value chain are systemic and mutually reinforcing, affecting both farmers and extension workers. Quantitative evidence highlights climate variability, limited access to quality inputs, unreliable markets, and post-harvest losses as key constraints faced by farmers, while qualitative findings show that extension workers are similarly constrained by inadequate resources, limited training in market-oriented services, and administrative inefficiencies. This alignment underscores a structural mismatch between farmer needs and the current capacity of extension systems to deliver value chain-oriented support.

These findings are consistent with existing literature, which emphasises that extension systems in many developing countries are constrained by institutional weaknesses, limited resources, and a continued bias toward production-focused advisory services (Aregaw et al., 2023; Mungai et al., 2024). However, while policy frameworks advocate for demand-driven and pluralistic extension models, the findings from this study suggest that implementation remains limited at the operational level, particularly in addressing post-harvest, market, and climate-related challenges.

The implication is that the effectiveness of extension services is not only a function of technical knowledge but also of institutional capacity, coordination, and resource availability. This directly addresses the research objective by demonstrating that both farmer- and system-level constraints jointly limit the performance of the groundnut value chain. Addressing these challenges will therefore require a holistic approach that strengthens extension worker capacity, improves resource allocation, and enhances collaboration with private sector

and development partners to deliver more responsive, market-oriented, and climate-smart extension services.

4.7. Chapter Summary

This chapter presented the findings of the study, structured around the four research objectives. It began by profiling the socio-economic characteristics of farmers such as age, education, and landholding sizes. Findings on the first objective revealed that while extension workers are knowledgeable in production practices, their knowledge capacity in post-harvest handling, value addition, and marketing is limited. This gap was mirrored by low farmer knowledge of value chain concepts. Regarding the second objective, the study found that extension service delivery remains largely government-led and production-focused, with minimal engagement from NGOs or private actors. The third objective showed that extension services contributed to improved agronomic practices and yields, though broader benefits such as food security and market participation remained constrained. The final objective identified challenges such as limited training, inadequate resources, and weak market linkages, but also highlighted opportunities for improvement through partnerships and digital tools.

These results underscore the need to transition from production-oriented extension to a more holistic, value chain-based service delivery model.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the key conclusions of the study and offers practical recommendations based on the findings. The study sought to assess the efficacy of agricultural extension services in the groundnut value chain in Kasungu and Mzimba districts of Malawi. The research was motivated by the persistent gap between policy aspirations for value chain-oriented and pluralistic extension systems and the actual support received by farmers, particularly beyond the production stage. Although policy frameworks such as the National Agriculture Policy (NAP), National Agricultural Extension and Advisory Services Strategy (NAEASS), and Malawi Vision 2063 advocate for market-oriented and demand-driven extension systems, evidence suggests that extension delivery remains largely production-focused.

Using a concurrent mixed-methods design, the study combined quantitative surveys with farmers and qualitative interviews with extension workers and key stakeholders to examine the knowledge and capacity of extension workers, the current status and roles of extension services, the perceived effectiveness of extension support, and the key challenges and opportunities affecting service delivery in the groundnut value chain. The chapter revisits each research objective and demonstrates how the findings addressed the corresponding research questions and the broader research problem.

The study was guided by the following specific objectives:

1. To assess the level of knowledge and skills possessed by extension workers engaged in the groundnut value chain in Kasungu and Mzimba districts.

2. To analyse the current status of extension services and the roles played by extension workers across different stages of the groundnut value chain.
3. To evaluate the perceived effectiveness of extension services in supporting the groundnut value chain in Kasungu and Mzimba.
4. To explore key challenges and opportunities influencing the effectiveness of extension services in promoting food security through the groundnut value chain.

5.2. Conclusions on achievement of study objectives

5.2.1 Objective 1: To assess the level of knowledge and skills among extension workers in the groundnut value chain

The findings sufficiently addressed the first research objective and corresponding research question by establishing that extension workers possess adequate knowledge in production-related aspects of the groundnut value chain, particularly in agronomic practices such as land preparation, planting, spacing, pest control, and crop management. However, the study revealed significant knowledge gaps in post-harvest handling, aflatoxin management, value addition, processing, and market-oriented extension. Qualitative findings further showed that extension workers at higher administrative levels demonstrated broader conceptual understanding of value chain-oriented extension compared to frontline workers at AEDO level.

These findings suggest that the extension system in the study areas remains largely production-oriented despite policy shifts toward value chain and market-driven approaches. Consequently, while extension workers are able to support productivity improvements, they are less equipped to support farmers in downstream activities that determine market participation and income generation. The study therefore concludes that uneven technical capacity

among extension workers limits the effectiveness of extension services across the broader groundnut value chain and highlights the need for targeted professional development and knowledge-sharing mechanisms within the extension system.

5.2.2 Objective 2: To examine the current status and roles played by extension workers in the groundnut value chain

The second objective was achieved through both farmer surveys and qualitative interviews with extension personnel. The findings revealed that government extension workers remain the primary source of agricultural information and support among farmers in both Kasungu and Mzimba districts. However, the role of extension workers is still largely confined to production support, with limited involvement in post-harvest handling, value addition, aggregation, processing, and marketing activities.

The study further found that although policies advocate for pluralistic extension approaches involving NGOs, private sector actors, and farmer organisations, implementation at community level remains weak. Limited collaboration among actors, inadequate staffing, and infrequent farmer contact reduce the effectiveness and outreach of extension services. Nevertheless, areas with relatively frequent extension contact reported higher farmer satisfaction, suggesting that accessibility and regular interaction positively influence perceptions of service quality.

The study therefore concludes that while extension services are operational and valued by farmers, their current structure and mandate are insufficiently aligned to support holistic value chain development. This demonstrates that the extension system has not yet fully transitioned from a traditional production-focused model to a comprehensive market-oriented and value chain facilitation role.

5.2.3 Objective 3: To evaluate the perceived effectiveness of extension services in improving groundnut production and food security

The findings addressing the third objective indicate that farmers generally perceive extension services positively, particularly regarding improvements in agronomic practices, productivity, and awareness of modern farming techniques. Farmers reported adopting improved planting methods, better seed selection, and improved crop management practices due to extension support. The study further established that extension services contributed to measurable increases in groundnut yields within the study areas.

However, despite these positive production outcomes, the findings revealed limited effectiveness of extension services beyond the production stage. Farmers expressed dissatisfaction with inadequate support in market access, post-harvest management, value addition, storage, and price negotiation. As a result, improvements in productivity did not always translate into sustained income gains or stronger market participation.

The study therefore concludes that extension services in the study areas are effective in improving production-related outcomes but remain insufficiently equipped to support broader commercialisation and food security objectives within the groundnut value chain. This implies that productivity gains alone are inadequate without complementary support in downstream value chain activities..

5.2.4 Objective 4: To identify key challenges and opportunities affecting the effectiveness of extension service delivery in the groundnut value chain

The fourth objective was successfully addressed through the integration of quantitative and qualitative findings. The study identified several interrelated challenges affecting both farmers and extension workers. Farmers faced constraints such as unreliable rainfall, limited access to quality seed and affordable inputs, post-harvest losses, and unreliable markets. At the same time,

extension workers reported inadequate transport, insufficient operational resources, limited training in value chain-oriented services, weak coordination structures, and administrative inefficiencies.

These findings demonstrate that the effectiveness of extension services is influenced not only by technical capacity but also by broader institutional and systemic factors. The study also identified several opportunities for improving extension delivery, including collaboration with NGOs, private sector actors, digital extension platforms, and government support programmes. Such partnerships were viewed as critical in improving resource mobilisation, market access, specialised training, and dissemination of market information.

The study therefore concludes that while significant structural and operational challenges constrain the effectiveness of extension services, there are also strong opportunities for reforming and strengthening the extension system through institutional collaboration, capacity building, and integration of digital and market-oriented approaches.

5.3. Recommendations

Based on the above conclusions, the study makes the following recommendations:

i. **Broaden the Scope of Extension Services Beyond Production**

   Redesign extension services to support the entire value chain, including post-harvest handling, value addition, storage, and marketing. This shift will enable farmers to fully benefit from commercial agriculture.

ii. **Strengthen Capacity Building for Extension Workers**

   Introduce regular, specialised training programs for extension workers, especially at the frontline level (e.g., AEDOs), on value chain development, market linkages, and aflatoxin management.

iii. Improve Resource Allocation

Ensure adequate financial and material support to address staffing shortages, mobility challenges, and lack of updated training materials. Improved resourcing will enable more effective and timely service delivery.

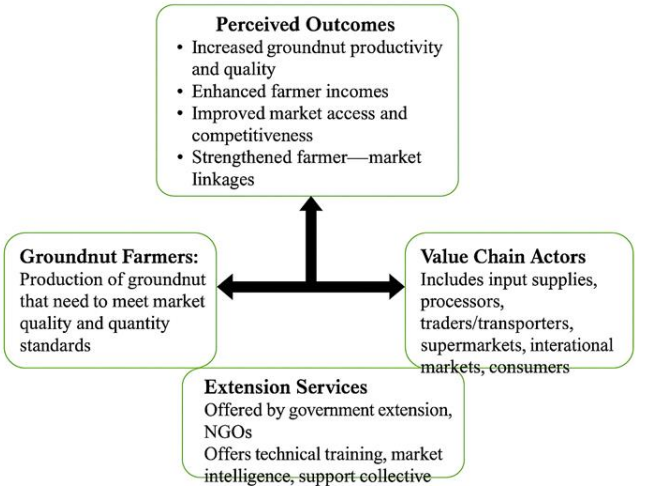
iv. Foster Multi-Stakeholder Collaboration

Encourage collaboration among government agencies, NGOs, private sector actors (e.g., Pyxus, Total Land Care), and farmer groups to provide diversified and specialised extension services.

v. Promote Market Linkages and Collective Marketing

Support the formation of farmer groups and cooperatives to enhance collective marketing, price negotiation, and access to formal markets. Extension officers should facilitate training on market intelligence and compliance with quality standards.

Based on this study, therefore, here is the recommended framework for assessing the efficacy of agricultural extension services in the groundnuts value chain in Kasungu and Mzimba districts of Malawi:



This framework was developed based on field data (Author's own, 2025).

This framework illustrates the dynamic interaction among groundnut farmers, extension services, and value chain actors, all converging to achieve the perceived outcomes of improved productivity, incomes, market access, and farmer–market linkages. Groundnut farmers, positioned at the core of production, are expected to produce groundnuts that meet defined quality and quantity standards. This production capacity is significantly shaped by the extension services they receive from government agencies and other players which provide technical training, market intelligence, and facilitate collective action such as cooperative formation. These services are critical in equipping farmers with the knowledge and skills needed for efficient production and engagement with markets.

The relationship between farmers and value chain actors such as input suppliers, processors, traders, and consumers is mediated by these extension services, which serve as both enablers and facilitators of trust and transaction. Value chain actors influence demand and market standards, while also providing opportunities for commercialization. Stronger farmer–market linkages fostered through extension efforts result in enhanced productivity, improved market access, and ultimately increased farmer incomes. Thus, the efficacy of agricultural extension is not assessed in isolation but through its integrative function across production and market systems, ensuring that farmers are well-prepared to meet and benefit from value chain demands.

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APPENDICES

Appendix 1: Consent to Participate in the Study

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature.....Date.....

Researcher's Name & Surname **ALIFEYO MJUMA NYASULU**

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392, UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
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Researcher's signature:

Date...30 September 2023

Appendix 2: Participant information sheet

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PARTICIPANT INFORMATION SHEET

30 September 2023

Research title: ASSESSING EFFICACY OF AGRICULTURAL EXTENSION SERVISES IN THE GROUNDNUT VALUE CHAIN FOR ENHANCING FOOD SECURITY IN KASUNGU AND MZIMBA DISTRICTS OF MALAWI

Dear Prospective Participant

My name is Alifeyo Mjuma Nyasulu and I am doing research with DR R.D Kamara, External Postgraduate Supervisor in the Department of Arts towards a MA, in development studies at the University of South Africa. We are inviting you to participate in a study titled: **ASSESSING EFFICACY OF AGRICULTURAL EXTENSION SERVISES IN THE GROUNDNUT VALUE CHAIN FOR ENHANCING FOOD SECURITY IN KASUNGU AND MZIMBA DISTRICTS OF MALAWI**

WHAT IS THE PURPOSE OF THE STUDY?

The present study aims to gather significant data that may enhance the understanding of the agriculture value chain in Malawi, particularly regarding the role played by extension services in supporting this process. This study aims to make a scholarly contribution to the existing knowledge on the relationship between extensionists' support provided to smallholder farmers and its impact on enhancing the capabilities of smallholders within the groundnut value chain. The goal is to foster food security, facilitate market access, and increase incomes for smallholder farmers. Hence, the results obtained from this research will make a valuable contribution to the current pool of knowledge regarding strategies for improving the skills and abilities of agricultural extension personnel to effectively assist in the development of the groundnut value chain.

WHY BEING AM I INVITED TO PARTICIPATE?

You have been selected to participate in this programme due to your involvement in the agricultural districts of Kasungu and Mzimba, which are recognized as favorable regions for groundnut cultivation in Malawi. Your extensive experience as a farmer and extension staff member within the groundnut value chain further strengthens your suitability for this opportunity. The roster of farmers was provided by four Agriculture Extension Development Officers across two districts. The selection of these farmer organisations and individual farmers was based on their involvement in groundnut farming, as well as the presence of farm business schools in their respective areas, which are significant to the study. I received a comprehensive list of extension staff members from the Chief Agriculture Officers.

The study focuses on the farmer groups, extension professionals, and individual farmers involved in groundnut production within the specified locations.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The research methodology employed in this study encompasses the use of questionnaires and semi-structured interviews. The questionnaire will consist of both open-ended and closed-ended questions, which will undergo verification, rating, and evaluation. Open-ended inquiries provide participants the opportunity to furnish more detailed insights on their experiences, ideas, beliefs, facts, and attitudes pertaining to the groundnuts value chain, as well as the help rendered by extensionists to foster the development of said value chain. This will be crucial in evaluating the level of knowledge possessed by extension professionals and assessing the utilization of information by farmers.

The crucial aspect, however, lies in assessing the extensionists' ability to effectively facilitate the development of the groundnuts value chain. Closed-ended questions provide participants with a predetermined set of response options from which they can choose. The interview will be conducted, using a pre-established set of questions or subjects for discourse. However, the conversation will have the flexibility to develop organically in response to the participant's input. The duration of the interviews is estimated to be around 15 minutes, while the questionnaires are expected to take approximately 20 minutes to complete.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392, UNISA 0003 South Africa
www.unisa.ac.za

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

No payments or incentives will be received for participants of the study at any point.

ARE THEIR ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

This study will not have any discomfort to the participant since it doesn't involve any physical testing. We do not see any negative consequences participating in this study. If any problems, do arise we will speak to the participant and make sure he/she understands what is going on and feels comfortable to continue in the study. The identity of the participant will not be revealed to anyone and any information that we get from the study will be kept private.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorder anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research *[this measure refers to confidentiality]* OR your name will not be recorded anywhere and no one will be able to connect you to the answers you give *[this measure refers to anonymity]*. Your answers will be given a code number, or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings *[this measure refers to confidentiality]*.

If relevant, identify who will have access to the data *[transcriber/external coder]* and how these individuals will maintain confidentiality *[e.g. by signing a confidentiality agreement. Please note that confidentiality agreements should be submitted to the Research Ethics Review Committee for consideration]*. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

Your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. Even if *a report of the study may be submitted for publication,* but individual participants will not be identifiable in such a report. It will remain anonymous.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet UNISA RESEARCH FACILITIES for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Information will be destroyed if necessary *[e.g. hard copies will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.*

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No payments or incentives will be received for participating in this study.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the *[identify the relevant ERC],* Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Alifeyo Mjuma Nyasulu on +265999812122 or alifeyo.nyasulu@gmail.com. The findings are accessible for 2024-2027.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact +265999812122 or alifeyo.nyasulu@gmail.com.

Should you have concerns about the way in which the research has been conducted, you may contact Dr Richard Douglas Kamara, dougrichy@gmail.com, +27 72 653 4190 and fax number +27 86 611 2288. Alternatively, contact the research ethics chairperson of the UNISA research committee.

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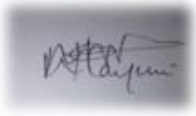
Thank you for taking time to read this information sheet and for participating in this study.
Thank you.



Alifeyo Mjuma Nyasulu (Main Researcher)



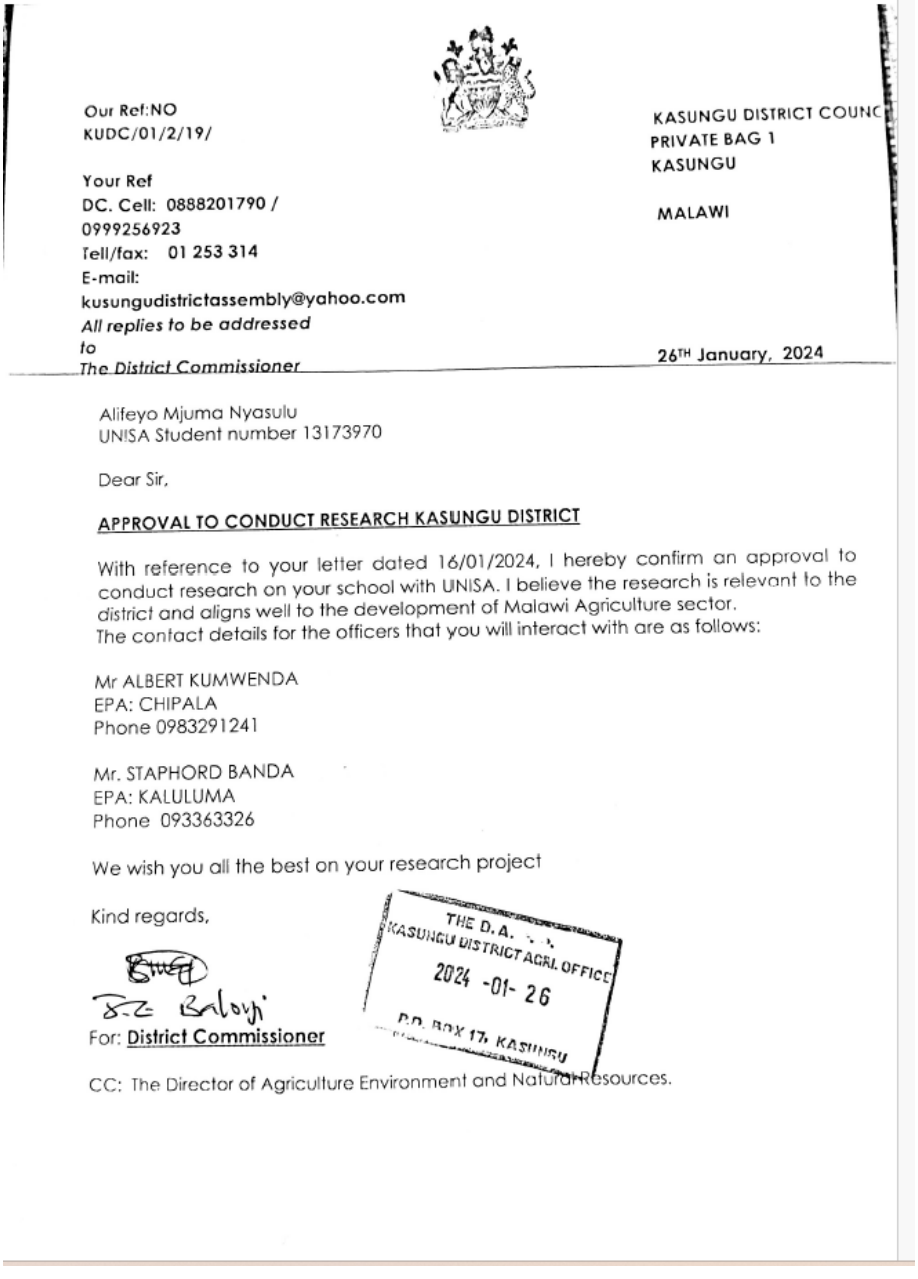
Elijah Kasawala (Data collector and assistant data analyst)



William Mavuni (Data collector)

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Appendix 3: Consent to Study in Kasungu District



Our Ref:NO
KUDC/01/2/19/

Your Ref
DC. Cell: 0888201790 /
0999256923
Tell/fax: 01 253 314
E-mail:
kusungudistrictassembly@yahoo.com
All replies to be addressed
to
The District Commissioner

KASUNGU DISTRICT COUNC
PRIVATE BAG 1
KASUNGU

MALAWI

26TH January, 2024

Alifeyo Mjuma Nyasulu
UNISA Student number 13173970

Dear Sir,

APPROVAL TO CONDUCT RESEARCH KASUNGU DISTRICT

With reference to your letter dated 16/01/2024, I hereby confirm an approval to conduct research on your school with UNISA. I believe the research is relevant to the district and aligns well to the development of Malawi Agriculture sector.
The contact details for the officers that you will interact with are as follows:

Mr ALBERT KUMWENDA
EPA: CHIPALA
Phone 0983291241

Mr. STAPHORD BANDA
EPA: KALULUMA
Phone 093363326

We wish you all the best on your research project

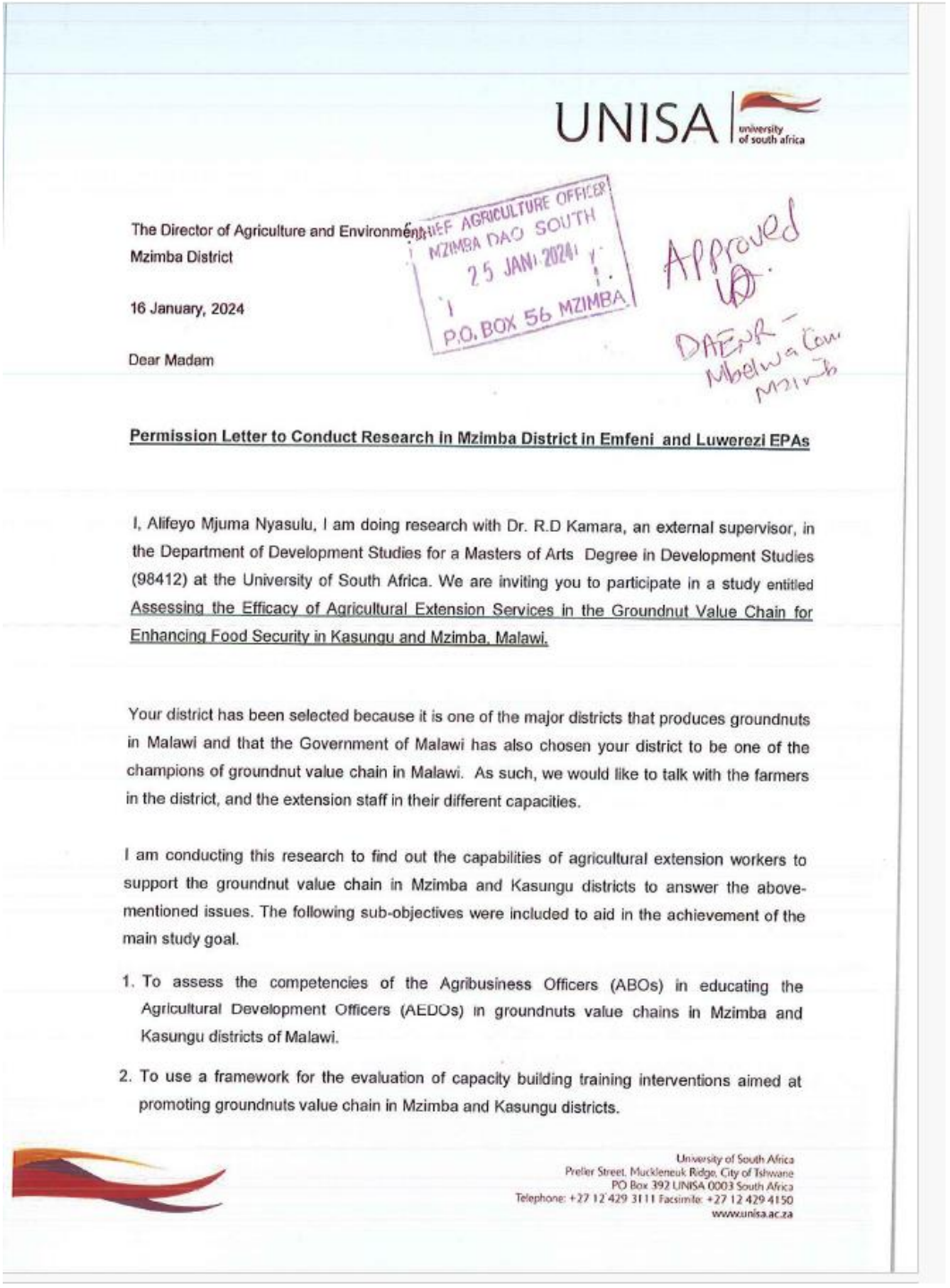
Kind regards,

For: District Commissioner

THE D.A.
KASUNGU DISTRICT AGRIL OFFICE
2024 -01- 26
P.O. BOX 17, KASUNGU

CC: The Director of Agriculture Environment and Natural Resources.

Appendix 4: Consent to Study in Mzimba District



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The Director of Agriculture and Environment
Mzimba District

CHIEF AGRICULTURE OFFICER
MZIMBA DAO SOUTH
25 JAN 2024
P.O. BOX 56 MZIMBA

Approved
DAEnR -
Mbelwa Cou
Mzimba

16 January, 2024

Dear Madam

Permission Letter to Conduct Research in Mzimba District in Emfeni and Luwerezi EPAs

I, Alifeyo Mjuma Nyasulu, I am doing research with Dr. R.D Kamara, an external supervisor, in the Department of Development Studies for a Masters of Arts Degree in Development Studies (98412) at the University of South Africa. We are inviting you to participate in a study entitled Assessing the Efficacy of Agricultural Extension Services in the Groundnut Value Chain for Enhancing Food Security in Kasungu and Mzimba, Malawi.

Your district has been selected because it is one of the major districts that produces groundnuts in Malawi and that the Government of Malawi has also chosen your district to be one of the champions of groundnut value chain in Malawi. As such, we would like to talk with the farmers in the district, and the extension staff in their different capacities.

I am conducting this research to find out the capabilities of agricultural extension workers to support the groundnut value chain in Mzimba and Kasungu districts to answer the above-mentioned issues. The following sub-objectives were included to aid in the achievement of the main study goal.

1. To assess the competencies of the Agribusiness Officers (ABOs) in educating the Agricultural Development Officers (AEDOs) in groundnuts value chains in Mzimba and Kasungu districts of Malawi.
2. To use a framework for the evaluation of capacity building training interventions aimed at promoting groundnuts value chain in Mzimba and Kasungu districts.

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3. To evaluate the training interventions in terms of their ability to build skill capacity for extension staff of Mzimba and Kasungu district in delivery of groundnuts value chains.
4. To establish the skills, knowledge and capabilities of extension staff to support the groundnuts value chain by using the knowledge and nonparametric tests.

The study will entail a mixed method approach which is qualitative and quantitative research method. The research project will collect data using interviews and structured questionnaires, which is made up of closed-ended questions. A questionnaire, knowledge test and key informant interviews using a checklist questionnaire will be used to obtain responses from the participants. The method of sampling will that the research project will employ is the random sampling method. This will be done to afford all the participants in a population an equal opportunity to be sampled to participate in the research project. The proposed research will include both quantitative and qualitative data analysis techniques.

The study targets to contribute to the body of knowledge aimed at understanding the dynamics between the extensionists' support to smallholders' farmers and the ability to improve the capabilities of smallholders in the groundnut value chain, with the aim of promoting food security, market access and incomes among smallholder farmers. Therefore, the findings from this study will contribute to the existing body of knowledge on how to enhance the capacities and capabilities of relevant agricultural extension workers to support the groundnut's value chain.

Potential risks are close to zero because there's human testing. Furthermore, we do not see any risks for your child participating in this study as all participants will be adults.

If you would like to be informed of the final research findings, please contact Alifeyo Mjuma Nyasulu on +265999812122 or alifeyo.nyasulu@gmail.com. The findings are accessible for 2024-2027. Should you have concerns about the way in which the research has been conducted, you may contact Dr Richard Douglas Kamara, dougrichy@gmail.com, +2772 653 4190 and fax number +27 86 611 2288. Alternatively, contact the research ethics chairperson of the UNISA research committee.

Yours sincerely



Alifeyo Mjuma Nyasulu
Researcher

CC: The District Commissioner,
M'mbelwa District Council, Mzimba



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Appendix 5: Questionnaire for Farmers

QUESTIONNAIRE FOR FARMERS

(To be filled by enumerators with selected players along the chain)

Date of interview	
Name of enumerator	

Section A: Demographic characteristics of members

Name.....

Gender 1=male 2= female

Age of member (years) .....

Marital status _____

1= Single 2= Married 3= Divorced 4= Widowed

Highest education level of member (class level) .....

1= No education 2= PSLCE 3= JCE 4= MSCE 5= College

EPA_____DAO_____

T/A_____ GVH_____

GPS_____

Landholding size:

_____

HH type: 1= FHH 2= MHH 3= CHH

Section B: Knowledge of the Groundnut Value Chain

1. Are actively participating in the groundnuts value chain value chain

1= Yes 2= No

2. What motivated you to join the groundnuts value chain?

   1= Ease of growing the crop hence low inputs

   2= High economic returns per unit area

   3= Availability of support services

   4= Readily available market

   5= Other:

_____

3. Do you have access to extension messages regarding g/nuts VC

   1= Yes 2= No

4. Where do you get messages concerning groundnut farming?

   1= Government officials

   2= NGO Staff

   3= Input suppliers

   4= Buyers/Vendors

5. How often do you get visited by government extension officers to give you messages about g/nuts VC

   _____

6. Are you satisfied with the number of times that you are visited by the extension workers?

Very satisfied	Satisfied	Neutral	Somehow satisfied	Not satisfied
1	2	3	4	6

7. In your opinion, who among the service providers above provides better services and why?

   1= Government extension staff

   2= NGOs

3= Commercial companies

4= Seed companies

5= Others: _____

8. Are these messages adequate?

   1= Yes 2= No

9. If no to above (21) what are the areas that you feel you need more training on?

   1= Inputs

   2= Agronomy

   3= Marketing

   4= Contracts

   5= Grading and labelling

   6= Storage

   7= Other: _____

10. Who else in the groundnuts value chain do you interact with and how often (Name the organizations)?

    _____

    _____

11. Have you got access to markets?

    1= Yes 2= No

12. If yes to (21) above, what kind of markets are these?

    1= City/Town markets

    2= Trading centers

3= Weekly markets

4= Vendors

5= Other (Specify)

13. Do you have contracts with other buyers?

    1= Yes 2= No

14. If yes to (16) above, who facilitates these contracts?

    1= Government extension staff

    2= NGOs

    3= Commercial companies

    4= Seed companies

    5= Others: _____

15. Did you access any credit relating to groundnuts last year?

    1= Yes 2= No

16. If yes, where did you get the credit from and what did you use it for?

    1= Finance institutions

    2= Community money lending groups

    3= Individual

    4= Companies (through contract farming)

    5= Others

17. How has your groundnut business improved since you got affiliated with this organisation?

Improved	No change	Retrogressed
1	2	3

18. Give a reason for your answer in 21 above

_____

_____

_____

19. Who provides the extension services in your area? Please list the organizations below.

_____

_____

_____

20. What services do you receive on value chains from organizations including government?

    1= Extension

    2= Input loans

    3= Financial Loans

    4= Trainings

    5= Market services

21. What challenges are you facing in your g/nut enterprise?

    1= Unavailability of quality seed

    2= Unreliable weather condition

    3= Low yields

    4= Unreliable markets

    5= High input costs

    6= Post harvest handling

    7= limited access to extension services

22. Have ever received training on groundnuts value chain?

1= Yes 2= No

23. Who delivered these trainings

    1= Government extension staff

    2= NGOs

    3= Commercial entities

    4= Seed companies

    5= Others: _____

24. What areas did these trainings cover?

    1= Agronomy

    2= Marketing

    3= Post harvest handling

    4= Other: _____

_____

25. Which areas of your farming enterprise have improved since you received these trainings

    1= business orientation

    2= Yield

    3= Agronomic practices

    4= Market scouting skills

    5= Any other:

_____

26. Do you agree that you are satisfied with the extension delivery on groundnuts value chain?

1. Strongly agree	Agree	Don't know	Disagree	Strongly disagree
1	2	3	4	5

Appendix 6: Interview Guide for Key Informants

SEMI-STRUCTURED INTERVIEW GUIDE FOR EXTENSION WORKERS

Study Title: Assessing the Efficacy of Agricultural Extension Services in the Groundnut Value Chain in Kasungu and Mzimba Districts, Malawi

SECTION A: RESPONDENT BACKGROUND

1. Name of Respondent (Optional): _____
2. District & EPA: _____
3. Designation (AEDO, AEDC, etc.): _____
4. Years of experience in extension work: _____
5. Highest educational qualification: _____

OBJECTIVE 1: To Assess the Knowledge and Capacity of Extension Workers in Supporting Groundnut Production and Value Chain Activities

Closed-ended Questions:

1. On a scale of 1–5, how confident are you in your knowledge of the following?
    - Groundnut agronomic practices (land prep, spacing, etc.)
    - Pest and disease management
    - Post-harvest handling

- Value addition techniques
- Market dynamics and trends

2. Have you received formal training in groundnut-specific value chain development?
   - ☐ Yes
   - ☐ No

   If yes, specify type and duration: _____

Open-ended Questions:

3. What areas of the groundnut value chain do you feel most and least equipped to support?
4. What challenges do you face in acquiring or updating knowledge relevant to the value chain (e.g., training, materials, exposure)?
5. How do you typically stay informed on improved groundnut practices and market trends?

OBJECTIVE 2: To Evaluate the Perceived Impact of Extension Services on Groundnut Farmers' Productivity, Income, and Market Access

Closed-ended Questions:

1. In your view, how have your services influenced groundnut farmers in the following areas (tick where applicable):
   - ☐ Yield increase
   - ☐ Adoption of improved varieties
   - ☐ Access to structured markets
   - ☐ Household income
   - ☐ Food security
2. Have you observed any significant behavioural changes in farmers due to your extension efforts?
   - ☐ Yes
   - ☐ No

   If yes, please specify: _____

Open-ended Questions:

3. Can you describe specific examples where your interventions have positively impacted groundnut farmers?

4. What indicators do you use to measure the effectiveness of your extension services?
5. In your view, what limits the broader impact of extension on farmer outcomes?

OBJECTIVE 3: To Explore the Perceptions of Farmers Regarding the Relevance and Adequacy of Extension Services

(*These questions aim to capture how extensionists perceive farmers' feedback and expectations*)

Closed-ended Questions:

1. Do you receive regular feedback from groundnut farmers regarding your services?
    - ☐ Yes
    - ☐ No

    If yes, how frequently?
    - ☐ Weekly
    - ☐ Monthly
    - ☐ Quarterly
2. How would you rate the farmers' satisfaction with your support?
    - ☐ Very satisfied
    - ☐ Satisfied
    - ☐ Neutral
    - ☐ Dissatisfied
    - ☐ Very dissatisfied

Open-ended Questions:

3. What are the most common concerns or expectations raised by farmers regarding extension services?
4. How do you respond when farmers ask for support in areas outside your expertise (e.g., climate resilience, marketing)?
5. In your opinion, what do farmers value most in an extension worker?

OBJECTIVE 4: To Identify Key Challenges and Opportunities for Strengthening the Effectiveness of Extension Services Along the Groundnut Value Chain

Closed-ended Questions:

1. What are the main challenges you face in delivering effective groundnut extension services? (Select all that apply)
    - ☐ Inadequate staffing
    - ☐ Lack of training opportunities
    - ☐ Limited logistical support (transport, materials)
    - ☐ Weak coordination with market actors
    - ☐ Low farmer participation
    - ☐ Others (specify): _____
2. Do you collaborate with any of the following in your extension delivery?
    - ☐ NGOs
    - ☐ Farmer cooperatives
    - ☐ Private buyers/off-takers
    - ☐ Agro-dealers
    - ☐ Research institutions

Open-ended Questions:

3. What opportunities exist for making extension delivery more effective across the groundnut value chain?
4. What forms of support (technical, financial, institutional) do you need to improve your effectiveness?
5. What policy or institutional changes would you recommend to strengthen value chain-oriented extension services?

Appendix 7: UNISA College of Human Sciences Research Ethics Clearance

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

23 May 2024

NHREC Registration # :
Rec-240816-052
CREC Reference # :
13173979_CREC_CHS_2024

Dear Mr Alifeyo Mjuma Nyasulu

Decision:
Ethics Approval from 23 May 2024 to 22 May 2025

Researcher(s): Name: Mr. A. M. Nyasulu
Contact details: 13173979@mylife.unisa.ac.za
Supervisor(s): Name: Dr. R. D. Kamara
Contact details: dougrichy@gmail.com

Title: Assessing the Efficacy of Agriculture Extension Services in the Groundnut Value Chain for Enhancing Food Security in Kasungu and Mzimba Districts of Malawi

Degree Purpose: Masters

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval ***is conditionally granted for one year, subject to ethical approval from the study country's local ethics committee. DATA CANNOT BE COLLECTED UNTIL A FINAL ETHICS CERTIFICATE IS ISSUED BY CREC.***

The ***low-risk application*** *was reviewed by the* College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.

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www.unisa.ac.za

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(22 May 2025).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:
*The reference number **13173979_CREC_CHS_2024** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature:

Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature: PP

Prof ZZ Nkosi
Exécutive Dean: CHS
E-mail: nkosizz@unisa.ac.za
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Appendix 8: Approval by The Malawi National Committee on Research in Social Sciences and Humanities (NCRSH)

NATIONAL COMMISSION FOR SCIENCE & TECHNOLOGY
Lingadzi House
Robert Mugabe Crescent
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+265 1 774 869
Fax: +265 1772 431
Email:directorgeneral@ncst.mw
Website:http://www.ncst.mw

NATIONAL COMMITTEE ON RESEARCH IN THE SOCIAL SCIENCES AND HUMANITIES

Ref No: NCST/RTT/2/6 **18th September 2024**

Mr Alifeyo Mjuma Nyasulu,

University of South Africa,

P.O. Box 392 UNISA 0003,

South Africa.

Email: alifeyo.nyasulu@gmail.com

Dear Mr Nyasulu,

RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR PROTOCOL NO. P.07/24/899: ASSESSING THE EFFICACY OF AGRICULTURE EXTENSION SERVICES IN THE GROUNDNUT VALUE CHAIN FOR ENHANCING FOOD SECURITY KASUNGU AND MZIMBA DISTRICTS

Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from

Committee Address:
Secretariat, National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Lingadzi House, City Centre, P/Bag B303, Capital City, Lilongwe3, Malawi. Telephone Nos: +265 771 550/774 869; E-mail address: ncrsh@ncst.mw

the National Committee on Research in the Social Sciences and Humanities (NCRSH) in a format that is available at the Secretariat. Once the study is finalised, you are required to furnish the Committee and the Commission with a final report of the study. The committee reserves the right to carry out compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Wishing you a successful implementation of your study.

Yours Sincerely,

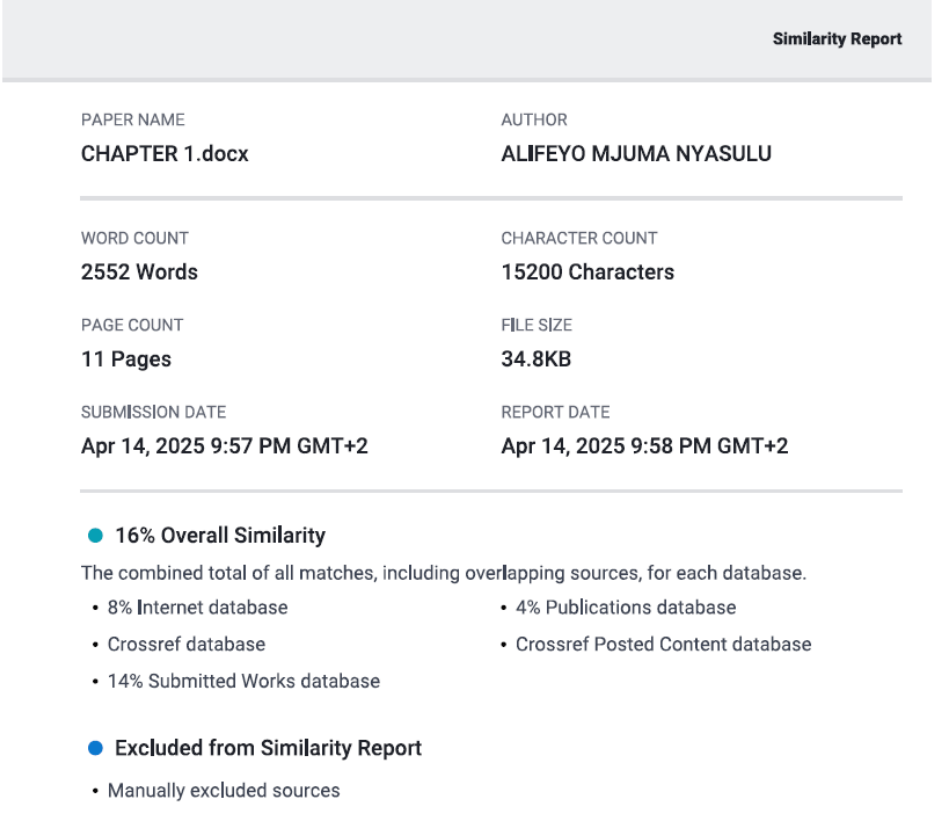


Yalonda .I. Mwanza
NCRSH ADMINISTRATOR
HEALTH, SOCIAL SCIENCES AND HUMANITIES DIVISION

For: CHAIRPERSON OF NCRSH

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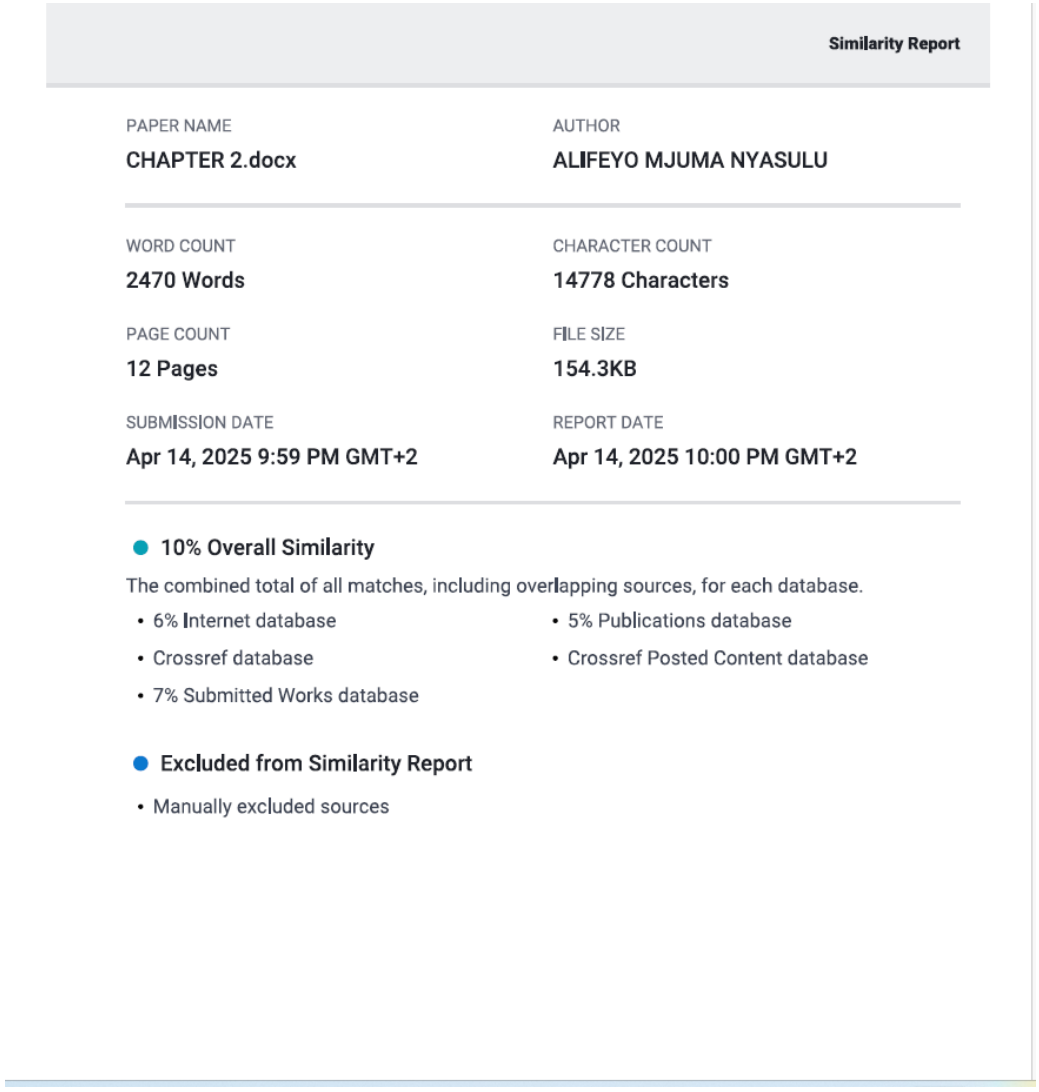
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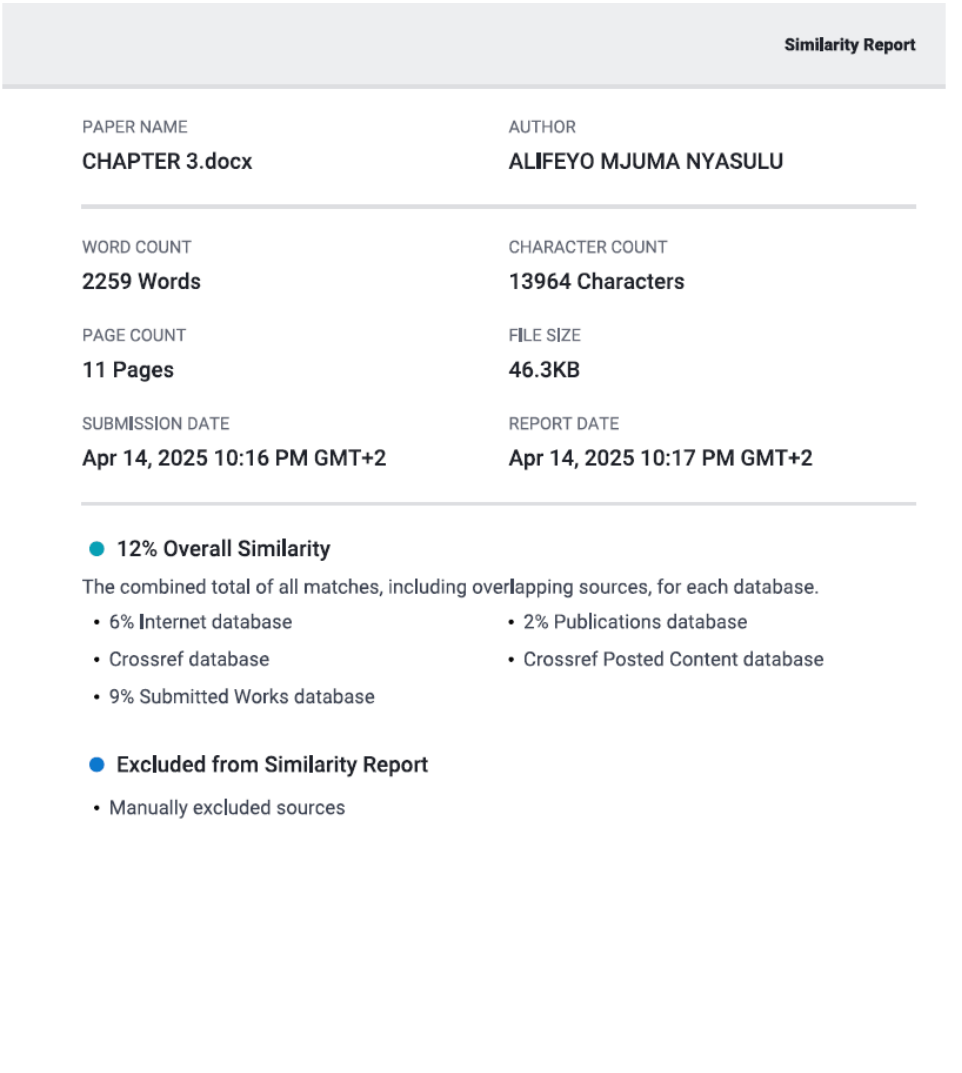
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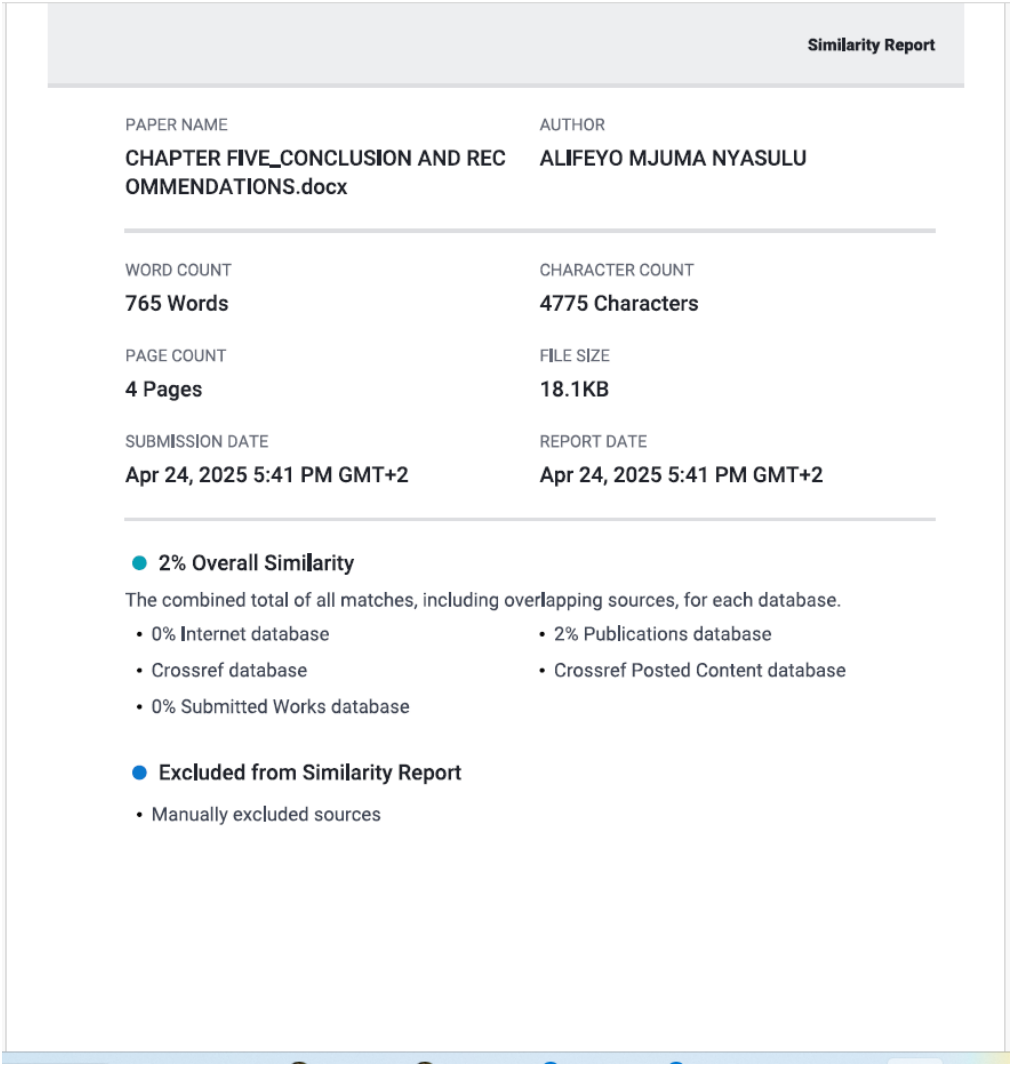
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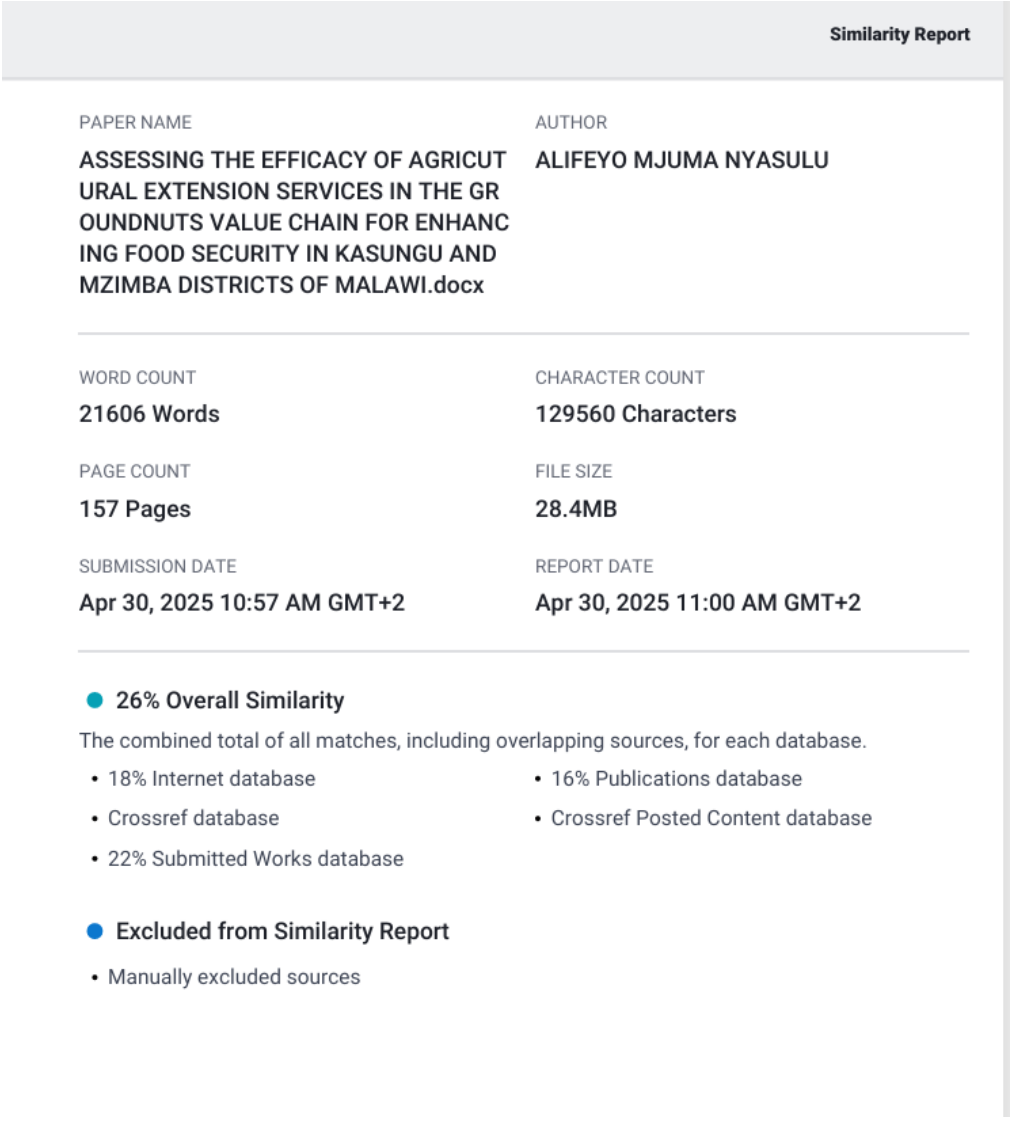
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