

University of KwaZulu-Natal

**Examining the role and sustainability of the Umbumbulu Agri-Hub as a model to support
smallholder farmers**

by

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ABSTRACT

The purpose of this study was to assess the effectiveness of an Agricultural Farmers Support Center in KwaZulu-Natal's Umbumbulu Town as a model for helping small-scale farmers in rural areas. The mixed-methods approach was adopted to gather and analyse qualitative and quantitative data to gain an in-depth understanding of the Hub's impact. Quantitative data were collected through semi-structured questionnaires which were distributed to 29 smallholder farmers engaged in the Hub's activities. The investigation employed regression modelling to ascertain significant determinants of farm income, including gender, age, type of farming, and the frequency of Hub visits. Qualitative data were collected through semi-structured interviews with the Hub's management and municipal officials representatives, while the quantitative data was collected with the open and closed questionnaire that was administered by the research to the Umbumbulu Agri-Hub registered farmers. The results demonstrated that agricultural extension services are widely supported and that the Umbumbulu Agri-Hub has benefited farmers by serving as a channel for providing extension services to smallholder farmers in rural areas. The results indicated that the Umbumbulu Agri-Hub functions on an open-source small-scale business model designed to address the requirements of resource-limited smallholder farmers. The Hub's offerings, encompassing training, subsidised inputs, technical assistance, and market facilitation, have markedly enhanced agricultural yields and quality for most farmers. Regular visits to the hub correlated positively with increased income levels, which highlighted the significance of active participation in its services.

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LIST OF ACRONYMS

ABET	Adult Basic Education and Training
AH	Agri-hub Unit
AKIS	Agricultural Knowledge and Information System
AMU	Agricultural Management Unity
ATS	Agricultural Technology System
CRDP	Comprehensive Rural Development Programme
DAFF	Department of Agriculture, Forestry, and Fisheries
DARD	Department of Agriculture and Rural Development
FAO	Food and Agriculture Organization
FPSUs	Farmer Production Support Units
GAP	Good Agricultural Practices
INR	Institute of Natural Resource
ISRDS	Integrated Sustainable Development Strategy
KZN	KwaZulu-Natal
MKP	uMkhonto weSizwe party
NAMC	National Agricultural Marketing Council
NGO	Non-governmental Organisations
OLS	Ordinary Least Squares
PESTEL	Political, Economic, Social, Technological, Environmental, and Legal
PTO	Permission to Occupy
PVA	Provincial Value Added
RDF	Rural Development Framework
RUMC	Rural Urban Market Centre
SDGs	Sustainable Development Goals
SMME	Small, Medium, and Micro Enterprise

CHAPTER ONE

INTRODUCTION

1.1 Introduction and Background

South African Development Policy emphasizes promoting economic growth, eradicating poverty, and lowering income inequality. The agricultural industry is one of the main contributing sectors to the country's economy, with the sector expanding by 4.2% and contributing 0.1% to GDP growth, which was 0.6% between the first and second quarters of 2023 of 2023 (Stats SA, 2023). However, the agricultural industry is affected by several variables such as high inflation, rising interest rates, land reform and post-settlement support, a volatile exchange rate, continuous weather concerns, strikes unrest, load-shedding, and access to market (Maponya & Agbugba, 2023).

As a result of the Native Land Act of 1913, blacks were restricted from buying or occupying land, except under the control of a White master, which led to the forced removal of many Black families from their land. Black people were no longer able to provide for their families and were forced to look for work far from their homes. This resulted in socio-economic challenges such as landlessness, poverty, and inequality. Since 1994 when the South African government took the transition to democracy, it took a pro-smallholder agriculture posture and committed to a land reform process for redress. At the same time, South Africa joined the World Trade Organisation (WTO), deregulating all domestic agricultural markets and becoming a signatory to numerous international trade cooperation agreements. This was accomplished by removing the need for marketing boards for agricultural products (Sandrey & Vink, 2007).

Among low-income smallholder households, crop farming is one of the fastest-growing agricultural subsectors with tremendous potential to support poverty reduction (Ningi et al., 2024). Post 1994, the government has aggressively supported the establishment of secondary and tertiary agricultural production infrastructure, which would have assisted those who were previously

impoverished. Due to this, the historically marginalised farmers and producers now play a minor role in the agricultural economy of both the nation and the province. As a result, small and medium-sized farmers are not integrated into the main agricultural value chains. This led to a number of issues that smallholder farmers face, such as market accessibility, production inputs, infrastructure development, and extension services. In order to address this challenge, the Rural Agricultural Policy for eThekweni was drafted and adopted by the eThekweni Municipality in 2004 in response to its Rural Development Framework (RDF) Plan. The strategy specified in the 2003 Rural Spatial Framework Plan recommends establishing Rural Agricultural Services and Marketing Hubs within rural nodes, in order to make agricultural services easily accessible. Furthermore, collaborations between non-profit organisations, public and private sector institutions, as well as rural farmers need to be fostered (Institute of Natural Resources, 2004).

Umbumbulu became the site of the eThekweni Municipality's inaugural Rural Agricultural Services and Marketing Hub. This now has six agri-hubs in the rural areas of eThekweni Municipality, namely, the Newlands-Mashu Permaculture Centre -East Zone hub, Inchanga – North zone hub, Northdene Agro-Ecology hub (Head office), Scorpio Place in Mariannridge – Central zone hub, Umbumbulu – South zone hub, and Hambanathi Agro-Ecology Hub.

The KwaZulu-Natal (KZN) Provincial Growth Development Plan (2019), Strategic Objectives 1.1(b)(i) Interventions, also calls for support towards the establishment of agri-hubs that add value and agro-processing facilities. The KZN Executive Council resolved to support the establishment of agri-hubs in the province (Lekgotla Resolution 6.20 of 2019). In the State of the Province Addresses of 4 March 2020 and 26 February 2021, The Hon. Premier announced the commitment of the KZN Government to implement the Agri-Hubs Programme in the 2020/21 financial year and beyond. Furthermore, KZN Department of Agriculture and Rural Development MEC, Hon Sithole-Moloi, in her Budget Policy Speech for 2021/22, confirmed the commitment of the Department to implement agri-hubs in the province (Govender, 2021).

The study undertaken by Gilmore and Chasomeris (2015) indicated that Umbumbulu's small-scale farmers were benefiting from the services rendered by the Umbumbulu Agri-Hub. Therefore, this study wanted to analyse the impact and sustainability of Umbumbulu Agri-hub as a model to assist smallholder farmers in determining whether there have been any notable changes, such as improvements, declines, or stagnations years after Gilmore and Chasomeris's (2015) study. The study also focused on how the model could be enhanced in order to be more resourceful and to enable the Department of Agriculture in KZN to implement agri-hubs successfully in line with a Cabinet's resolution that calls for the implementation of the agri-hubs in the province (Provincial Planning Committee, 2019). This chapter provides an overview of the study and discusses the research aim, questions, objectives, research methodology roadmap, structure of the dissertation, and the limitations thereof.

1.2 Problem statement and rationale of the study

Post 1994, the South African government has not aggressively supported the development of secondary and tertiary agricultural production infrastructure that supports previously disadvantaged people. As a result, the participation of previously disadvantaged black South African producers and farming communities in the agricultural economy of the country and the province is marginal (Aliber & Hall, 2012). By creating a platform or infrastructure such as Agri-Hubs, Department of Agriculture and Rural Development (DARD) hopes to address the aforementioned issues and allow the producers to participate inclusively in the agricultural value chains, where previously underprivileged producers would function similarly to their White counterparts without facing discrimination. The transformative goal of agri-hubs is to generate a significant number of job opportunities (Provincial Planning Committee, 2019).

The study is crucial, as it would enable the Department of Agriculture in KZN and eThekweni municipality to successfully implement agri-hubs in line with the Cabinet's resolution (Provincial Planning Committee, 2019) and the Rural Agricultural Policy of eThekweni that calls for the expansion to other rural areas (Institute of Natural Resource, 2004). The Umbumbulu Agri-Hub could serve as a model for similar initiatives in other regions if the study proved to be successful. Understanding the causes of the model's successes or failures can make it easier to replicate or

adapt it to different contexts, bringing its benefits to a broader range of smallholder farmers. The study's findings may provide development groups and policymakers with helpful strategies for supporting smallholder farmers. Highlighting the benefits and drawbacks of the Agri-Hub in this study may influence the creation and implementation of agricultural support programmes.

1.3 Aim of the study

The purpose of this study was to assess the Umbumbulu Agri-Hub's sustainability and role as a model for smallholder farmer support.

1.4 Research questions

The study answered the following questions:

1. Is the Umbumbulu Agri-Hub model functioning optimally?
2. What is the impact of the Umbumbulu Agri-Hub on the income levels of the smallholder farmers in the eThekweni region?
3. What is the impact of the Umbumbulu Agri-Hub on the productivity and the yield of crops?
4. Is the Umbumbulu Agri-Hub model sustainable?

1.5 Research objectives

The study sought to:

1. Evaluate the model's institutional setup and assess the degree to which it tackles the needs of small-scale farmers.
2. Examine the impact of the Umbumbulu Agri-Hub on the income levels of the smallholder farmers in the eThekweni region.
3. Assess the impact of the Umbumbulu Agri-Hub on the productivity and the yield of crops.
4. Assess the sustainability of the Umbumbulu Agri-Hub Model.

1.6 Research methodology

This study reviewed literature on smallholder farmers, the agricultural extension support service, and the South African agricultural sector. The literature was gathered primarily from academic

books and journals, laws and policies, case studies, and online sources. To gather information from farmers, Hub management, and government officials involved in the Umbumbulu Agri-Hub, questionnaires and semi-structured interviews were used. Farmers were provided with questionnaires with closed-ended and open-ended questions. A combination of semi-structured and unstructured interviews was conducted with government officials and the Hub's staff. The Hub's operation registrations and finance records provided statistical data sets that were gathered using quantitative methods.

1.7 An overview of the Umbumbulu Agri-Hub

This section introduces Umbumbulu Agri-Hub, including the catchment region, Agri-Hub location, the beneficiaries that it serves, and the services that it offers.

1.7.1 Location

Umbumbulu Agri-Hub is situated within Umbumbulu Town (street number 10 300002), in the far southwestern region of the eThekweni Municipality of KZN, 20km west of Amanzimtoti. The Hub is situated alongside the office of the KZN Department of Agriculture, Department of Education, and Department of Home Affairs, and within close proximity from the Ziphatheleni Community Centre. The farmers use the land in the informal settlement, which is under tribal authority, where they have a permit to occupy the land. Figure 1.1 shows the location of the Umbumbulu Agri-Hub.



Figure 1.1: Umbumbulu Agri-Hub location

Source: Google Maps, 2024

1.7.2 Population demography

According to Stats SA (2024), eThekweni is the KwaZulu-Natal province's major metropolis and the third-largest city in the country, with a population of 4 239 901, where 48.9% of the population is male and 51.1% are female. This population is primarily composed of the youth, with the age group of 15-34, making up 72.2% of the total population. The number of households is 1 122 738, with an average size of 3.8. About 32% of the population did not attend school. The densest populations are found in eThekweni's centre and northern regions, with 89.2% of the population dwelling in formal dwellings, while 8.9% and 1.7% dwell in informal dwellings and traditional dwellings, respectively (Stats SA, 2024). Umbumbulu falls under traditional dwellings, where the land belongs to the tribal authorities.

1.7.3 Economic activities

The economy of Umbumbulu has a greater focus on agricultural activities, with people farming on the smaller portion of the land, which ranges from half a hectare to 22 hectares of land. The small-scale farmers at Umbumbulu have a core focus on farming vegetables. There is a limited private sector involvement in the area, where sugarcane and timber are the main produce. Sugarcane is supplied to the Illovo Mill in Sazele by about 160 local growers, whose fields typically span from 0.5 to 1.5 hectares (Institute of Natural Resources, 2004) and 355 woodlot owners, with farms varying in size from 0.1 to two hectares being represented in this group. Serving Umkomaas and the SAPPI Saiccor Mill, the aggregate size of these woodlots is 295 hectares. The SAPPI small grower project was primarily responsible for their establishment (LIMA, 2008).

1.7.4 Agricultural support

According to the Institute of Natural Resources (2004) assessment, there is a lack of agricultural support services in the eThekweni Municipality. The agricultural extension service is provided to the Umbumbulu farmers by the KZN Department of Agriculture regional office which is located at Umbumbulu alongside the Umbumbulu Agri-Hub. The Department of Social Development and Department of Health play a role in assisting the community agricultural projects within the area. Several non-governmental organisations (NGOs) which are active in the region were also listed by the Institute of Natural Resource (2004) to include Embo Masakhane, the National Productivity Institute, LIMA Rural Development Foundation, and the Greater Durban Community Foundation.

1.7.5 Umbumbulu Agri-Hub

Established in 2021 by the eThekweni Municipality, the Umbumbulu Agri-Hub supports smallholder farmers with agricultural extension services to enhance infrastructure, boost small-scale farming, promote rural development, and create jobs (eThekweni Municipality, 2022).

1.7.6 Services offered

The Umbumbulu Agri-Hub mainly operates with vegetable farmers by offering training and mentorship, which includes both practical and capacity building. As the farmer graduates from subsistence to semi-commercial, the Agri-Hub also offers enterprise development support. The Hub also provides discounted input supplies such as seeds, seedlings, and compost to its farmers, with the seedlings being produced in the Hub as they have the nursery. The Agri-Hub also assists the farmers by providing tools and farming equipment and the marketing of products on behalf of growers at the Hub and to other markets. The Hub transports produce through a value chain of cleaning, grading, packing, and chilling. An electronic software system has been developed to track produce orders from the marketplaces and estimate the amount of food being produced.

1.7.7 Beneficiaries of the organisation

The beneficiaries of the Umbumbulu Agri-Hub are the smallholder farmers that are located in the Umbumbulu area. The Hub currently has 50 farmers who are registered on the database and are positioned in a 10 km radius of Umbumbulu Agri-Hub.

1.7.8 Ownership arrangement

Every grower group is an independent, formally or unofficially, organised entity. The majority of the latter are set up as formal, registered cooperatives. Tribal customs maintain the farmers' entitlement to possess all the land which they use, which is common tribal land. The area where the agricultural centre is located, along with its assets, is owned by the Municipality. This is because when the town was initially established in 1992, all properties within it belonged to the Department of Area Affairs.

1.7.9 Infrastructure

The Agri-Hub was built as an experimental project using a container modular frame as a temporary structure and measured around 600 square meters. Three recycled containers are grouped nearly

under one roof to form this structure. The containers hold an open area for product grading, weighing, and washing in addition to office space, restrooms, boardrooms, and refrigeration capabilities. The container building is situated outside of parking spaces and a display garden. Figure 1.2 presents the Umbumbulu Agri-Hub plan.

UMBUMBULU AGRICULTURAL HUB

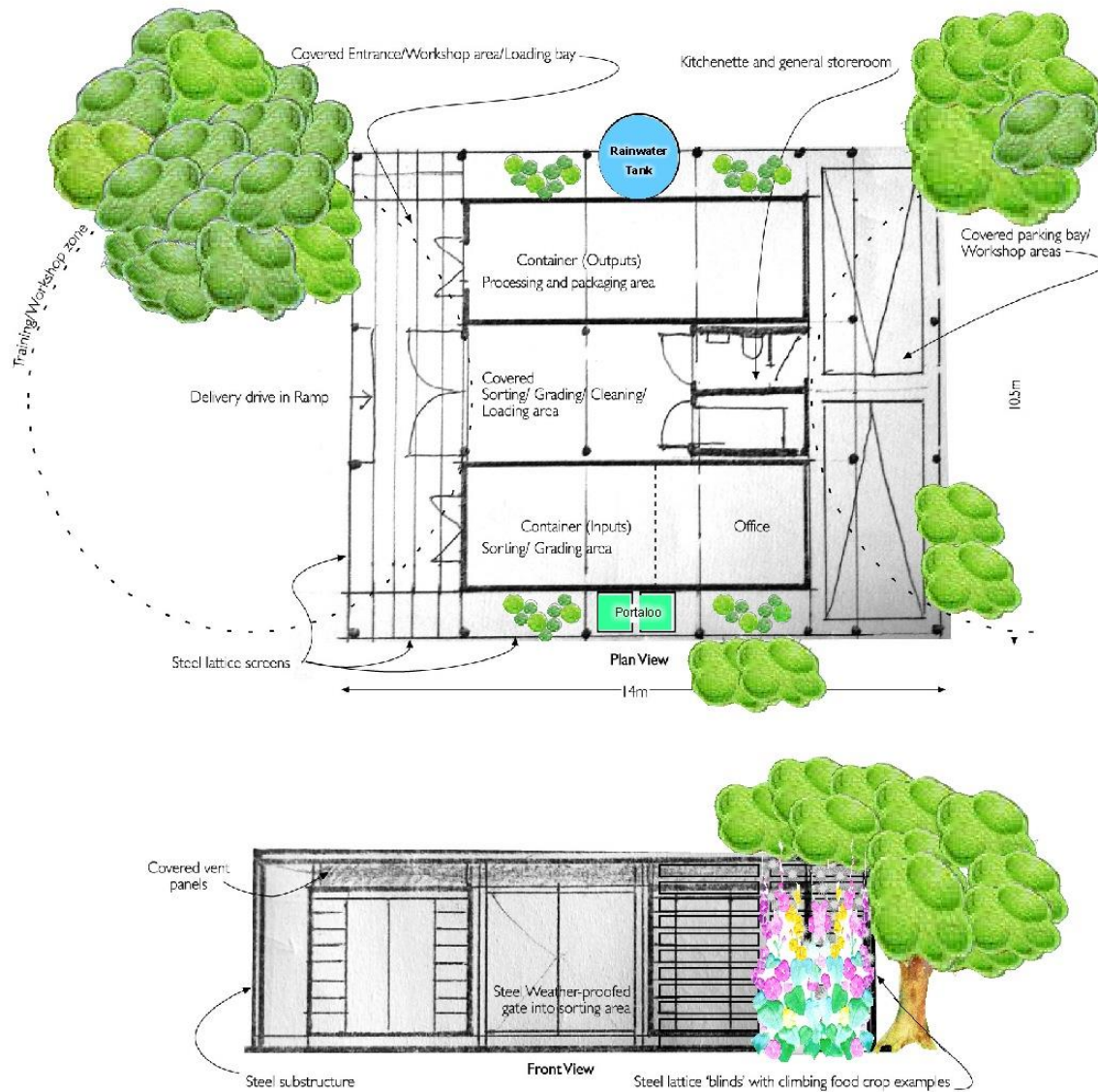


Figure 1.2: Umbumbulu Agri-Hub plan

Source: Newland Mashu, 2006

1.7.10 Markets and partnerships

The Hub has established several business connections with a number of marketplaces, such as the Fair Food Market, Buller Park Market, Tropical Nursery, and Mother Earth (Umbumbulu Agricultural Hub Progress Reports, 2011-2013). Additionally, the Hub launched an organic veggie box programme, where boxes containing a selection of fresh veggies are sent to a network of individuals and agents throughout Durban, and the Hub covers the cost of transportation (Newland Mashu, 2011).

1.8 Study limits

The survey's participation was restricted by cost, time, and distance because some of the farmers were situated in sparsely populated areas that were hard to get to.

The results from this study cannot be generalised, as the study focused on a specific number of smallholder farmers. Only 29 questionnaires were received from the farmers who attended the training yet the total number of farmers in the database that is serviced by the Umbumbulu Agri-Hub is 50.

Due to the time constraint his study did not take into consideration economic and environmental variables, such as market swings and climate change that could affect the Agri-Hub's success or failure.

The limited time available to conduct the research restricted its focus and prevented an examination of all the factors that could contribute to the success or failure of the model. For instance, conducting a skills audit of the officials working on the project to ensure that they are suitable for the job was not possible.

1.10 Dissertation chapter structure

The dissertation is made up of six chapters which are ordered as follows:

Chapter One: Introduction

The introduction provided a synopsis of the topic. It outlined the components of the study, including a brief overview of the research approach used, case study area, research problem, research objectives with related questions, and the study's overview.

Chapter Two: Literature review

This chapter explains the theoretical foundations of the research and elaborates several key concepts and theories that helped the study to achieve its objectives. Furthermore, a brief overview of the legal and policy context, and other aspects influencing agricultural development are also discussed.

Chapter Three: Research methodology

Chapter Three discusses the research methodology and the data collection methods that were employed in the study. The chapters also present the STATA version 18 software program and the model of ordinary least square (OLS) regression that was used to achieve the objectives.

Chapter Four: Presentation of qualitative results

This chapter presents and interprets the qualitative data that was collected from the participants of the study, comprising the Umbumbulu Agri-Hub management and staff.

Chapter Five: Presentation of quantitative results

This chapter presents and interprets the quantitative data that was collected from the respondents of the study.

Chapter Six: Discussion of findings

Chapter six provides a summary and discussion of the findings from the study. The chapters also makes conclusions and puts forward recommendations, highlighting areas for improvement in the model of the Agri-Hub.

1.11 Conclusion

In this chapter, the author provide background information on the study by examining the role and sustainability of Umbumbulu Agri-Hub. It highlighted significant issues reported in the literature that are relevant to small-scale farmers and their ability to obtain agricultural consulting services in the sector. It also presented the aim, objectives, justification of the study, and an overview of the research methodology employed. The next chapter reviews extant literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter two reviews the literature on agriculture, agricultural extension support that is provided to smallholder farmers, the challenges faced by the smallholder farmers, and the Agri-Hub's strategy to address the challenges at the national and provincial levels. This chapter examines Umbumbulu's smallholder farmers, with a focus on the Umbumbulu Agri-Hub's role within eThekweni Municipality and its alignment with policies, legislation, and strategies affecting extension support and agricultural development in South Africa.

Chapter two also examines the agricultural industry in South Africa, the state of agriculture in KZN, the role of agriculture in the province's economy, and the definition and challenges of smallholder farmers. It also explores agricultural extension services, the Agri-Hub concept, feasibility studies, beneficiaries of the Umbumbulu Agri-Hub, agricultural service centres, and relevant policies, legislation, and strategies affecting agricultural development in South Africa and the eThekweni Municipality, and concludes with key insights.

2.2 Agricultural sector in South Africa

According to the literature on rural development, agriculture is the most efficient way to alleviate poverty in rural areas. In the majority of emerging nations, farming and related industries provide for the majority of jobs in rural areas (Machethe, 2004). The nature of the agricultural industry in South Africa is dualistic (Mkhabela, 2018) it is characterised by a coexistence of two distinct sectors: a well-developed, capital-intensive commercial farming sector and a largely under-resourced, labour-intensive subsistence or smallholder farming sector. The National Development Plan prioritises smallholder farming in order to provide household food security, foster rural economic growth, generate jobs, and lower poverty (NPC, 2011). The agriculture sector is vital in rural areas since it creates job opportunities and encourages the efficient use of the available natural resources. Commercial agricultural production is dominated by a few large-scale farmers and a sizable number of smallholder farmers who provide the market with disproportionately small

amounts of agricultural products. Vink and Kirsten (2003) and Khapayi and Celliers (2016) states that the majority of commercial farmers are White farmers, having benefitted greatly from apartheid government subsidies, with substantial land ownership and automation that produce significant agricultural produce for markets in South Africa and abroad. On the other hand, smallholder farmers are primarily black and are farming in the homeland areas with small hectares or plots to work on (Chikazunga & Paradza, 2013). According to Aliber and Hart (2009), there are about 39 982 White farmers utilising 87% of all agricultural land to produce about 95% of the nation's agricultural output. Nearly 4 000 000 Black farmers make up the smallholder sector, cultivating 13% of South Africa's agricultural land, primarily in their former homelands.

Since the democratically elected government took office in 1994, there has been a great deal of interest in the growth of the rural agriculture sector (Thamaga-Chitja & Morojele, 2014). The government's main objective, according to South Africa's National Development Plan, is to improve smallholder farmers' capacities (Pienaar, 2013). The government wants to create jobs and generate income for households by streamlining support services for smallholder farmers in order to meet the targets for food security. According to the National Development Plan, increasing irrigated agriculture, cultivating unproductive land in rural areas, and providing enough extension and consulting services are ways that the smallholder farming sector may strengthen the rural economy (Pienaar, 2013; Mvelase, 2016).

2.3 The state of agriculture in KwaZulu-Natal

According to the National Empowerment Fund (2011), KZN has over 6.5 million hectares under cultivation, of which about 18% are arable. Fruit cultivation and sugar manufacturing are ideally suited to the coastal regions, as subtropical fruits thrive in the province's northern regions. A mere 7% of South Africa's citrus fruit is produced in KZN. While some maize is cultivated in the northern parts of the province, vegetables also thrive in these regions. The province is home to a wide variety of cattle, as well as nuts like pecan and macadamia. The Midlands is home to a large number of dairy cattle, while beef production is primarily done further north (National Empowerment Fund, 2011).

There are several challenges facing the agricultural industry in South Africa, which threaten food security and livelihoods of the households. The significance of household food production was emphasised in the “ANC resolution on rural development, land reform, and agrarian change, which was adopted at its 52nd National Conference in Polokwane in 2007” (Aliber & Hall, 2012: 594).

The Department of Agriculture, Forestry and Fisheries, clarified its objectives by dividing the sector into subsistence, smallholder, and commercial farmers in the foreword to its 2010/11 strategic plan (DAFF, 2021: 2).

This has led to the Department implementing various programmes to support and boost the agricultural industry in KZN. The industry in the province has since grown to be incredibly prolific, as it is renowned for its specialised skills in a variety of farming operations. Approximately 6.5 million ha. of land in KZN is appropriate for farming, of which 82% is for extensive animal production and the remaining 18% is arable land (TIKZN, 2023).

2.4 Role of agriculture in uplifting the economy of KwaZulu-Natal

Agriculture is believed to have significant potential for development and could eventually reach its full capacity if the vast amount of land and other resources in the common regions are effectively utilised (KZN DARD, 2002). Despite the perception that agriculture only contributes a minimal amount to rural people's income, it continues to be a vital means of subsistence in these areas, supplementing incomes from towns, cities, and commercial farms further north. Figure 2.1 highlights the Provincial Value Added (PVA) at the current price's contribution by the agriculture industry from 2013 to 2022.

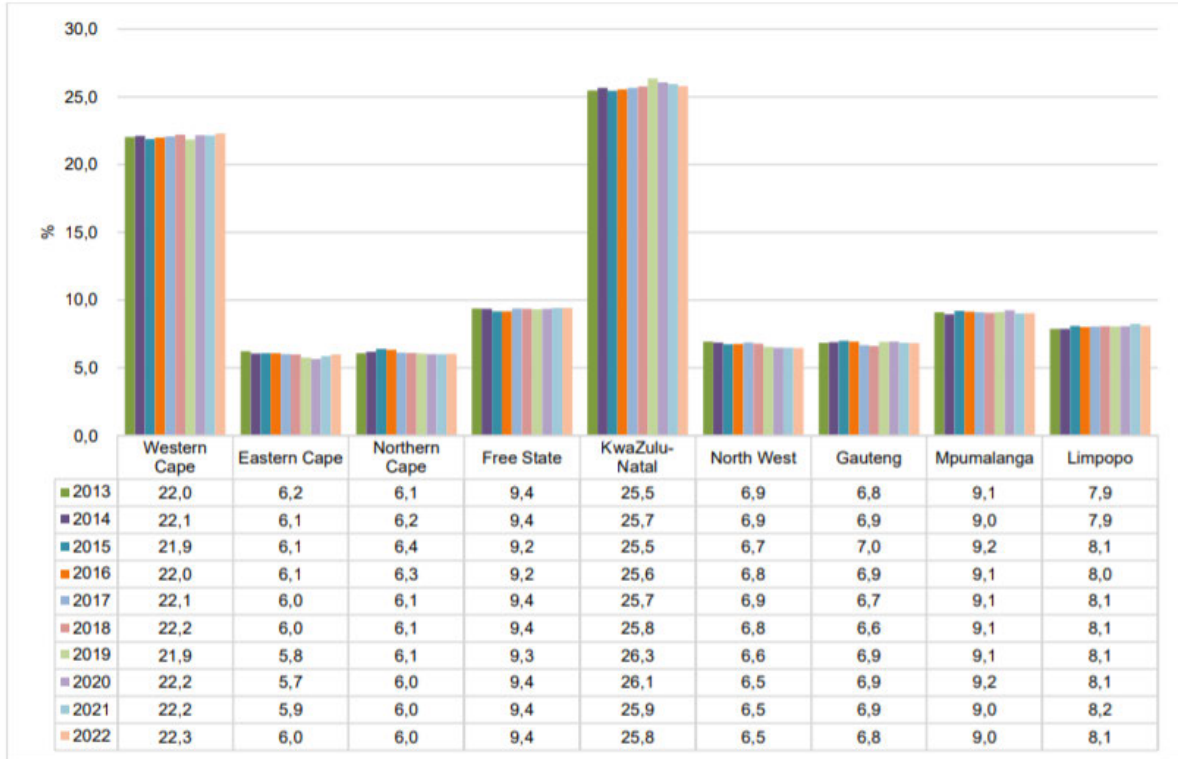


Figure 2.1: Agriculture industry contribution by province

Source: Author (created using data from Stats SA, 2022)

The largest contributors to the agricultural industry from 2013 to 2022 were the KZN, Western Cape, Free State, and Mpumalanga provinces. KZN has constantly maintained a contribution of over 25%, reaching a peak of 26.3% in 2019 and gradually decreasing in 2021 and 2022 respectively. scholars have attributed this to economic factors such as COVID-19, the July unrest, and the KZN floods which have had a negative impact on the agricultural sector of KZN and the economy of the country overall. Stats SA (2024) states that 935 000 people were employed in agriculture in Q2 in 2024, which shows an increase from 896 000 people that were employed in Q1.

2.5 Definition of smallholder farmers in South Africa

Academics and researchers have attempted to characterise South African smallholder farmers using various approaches. NAMC (2020) defined smallholder farmers as “farmers who

intentionally engage in farming activities at various operational levels with the goal of household consumption and markets, suggesting that farming is a source of revenue and food security.” In smallholder farming, rural farmers produce for their own consumption and to take their products to market. This allows them to generate revenue for other needs and improve asset development. Carlson, Ncube, and Fanadzo (2021) define smallholder farmers as individuals who produce food for both market sales and household consumption, using their farm operations to make a living for their families. Smallholder farmers engage in unsustainable marketing practices, as they sell their produce to other community members, often during payday. According to Simelani (2017), smallholder farming is where rural farmers apply traditional knowledge to their farming practices. The farmers require access to comprehensive support such as financial, technical, and managerial instruments to grow their businesses and eventually become commercial farmers.

Various and comprehensive methods for classifying small-scale farmers have been put forth. These include considering a livelihood strategy (Pienaar, 2013) and a multi-characteristic approach (Hayward-Butt & Ortmann, 1994) used by rural poor, which leads them into farming. A livelihood strategy for the rural poor can be developed by combining various indicators present in agriculturally engaged households to determine whether the household is oriented toward commercial or subsistence farming (Department of Agriculture, Forestry and Fisheries, 2016; Pienaar, 2013). Examining the indicators that have a farming or production focus, market orientation, family-to-hired-labour ratio, land holding size, location (rural versus urban), farming systems (technology, irrigation versus dryland), capital intensity, mechanisation levels, and the proportion of farming income that contributes toward total household income, are all part of the multi-characteristic approach (Cousins, 2010; Calcaterre, 2013). The National Department of Agriculture, Forestry, and Fisheries (DAFF) developed a guideline that is presented in Table 2.1, to classify farmers in order to assist policy and interventions that aim to reduce poverty, inequality, and unemployment.

Table 2.1: Farmers classification

CATEGORIES	Subsistence	Smallholder		Commercial
Indicators/ Characteristics	Subsistence- oriented smallholder	Market-oriented smallholders/informal (loose) value chains	Market-oriented smallholders/ formal (tight) value chains	Small-scale commercial farmers
Objective of production	Household consumption	Household consumption + Chas income	Cash income + some home consumption	Profit
Proportion of marketed output	None or insignificant	50% or >	75% or >	100%
Contribution to household income	Reduces expenditure on food	Variable – from small to significant	Significant	Very significant
Labour	Family	Family + some hired	Family + significant numbers hired	Hired
Mechanisation	Very low	low	Medium to high	High
Capital intensity	Very low	low	Medium to high	High
Access to finance	Absent	Some	Significant	Very significant
Example	Indigent producers/ with backyard plots or homestead gardens, and/or small herds/ flocks	Smallholders who sell surplus livestock or fresh produce to bakkie traders, hawkers, neighbours or others nearby	Smallholders who are in a commodity-linked supply chain such as sugarcane or cotton	Able to farm independently. May be in a supply chain, or not by choice

Source: DAFF (2016:4)

Kirsten and van Zyl (1998) disputed the notion that a smallholder farmer's land size should be the determining factor in their classification. They argued that a high-value crop can be produced commercially on a small plot of land, such as one hectare, while low-quality land distributed across 500 hectares may yield low outputs. Kirsten and van Zyl (1998: 555) defined smallholder farmers as “a small farmer whose scale of operation is too limited to attract the necessary services required to significantly increase their productivity.” Kirsten (2011) suggested financial metrics, including gross farm income, and an annual farm income of less than R500 000.

There is no standard definition of smallholder, the term is generally used in the South African context for producers who are black and distinct from the dominant (and predominantly white) large-scale commercial sector. No clear distinctions can be drawn between categories such as smallholder, small-scale, subsistence, communal, or emergent (Chisasa & Makina, 2012:772).

Smallholder farmers are categorised by Pienaar and Traub (2015) through the use of terms like small, small-scale, family, subsistence, emergent, and smallholder. From the aforementioned definitions, this study defines smallholder farmers as farmers who produce food for their own consumption and sell the surplus products to generate extra income.

2.6 Challenges faced by smallholder farmers in rural areas

In recent decades, South Africa's food and agriculture industries have grown increasingly centralized, with fewer and larger farms (Heijden & Vink, 2013). This resulted in an increased demand, where farmers have been compelled to produce more. This has propelled several challenges for the agricultural industry in KZN. As the population grows and consumer spending power becomes constrained, large retailers have gained greater dominance in the food value chain, strengthening their negotiating position over suppliers and producers (Andersson et al., 2013). This has spurred a great challenge to farmers as they struggle to enter into formal markets. Retailers have taken advantage of the perishability of the agricultural product and bargain for lower prices and a larger quantity of produce. Smallholder farmers that frequently have access to less than two hectares of land with limited access to infrastructure, inputs, and markets, are amongst the most disadvantaged individuals in this system.

Smallholder farmers need to operate in a constantly expanding and multi-faceted environment where the flow of money is regulated by banks, insurance companies, retailers, millers, and dealers. Smallholder farmers in developing nations have several challenges that limit their expansion, including transportation costs and market access (Gausi et al., 2004). Smallholder farmers need external support from the government and other stakeholders, particularly for agricultural activities such as marketing. The smallholder farmers in South Africa frequently lose their produce due to poor quality, spoilage, and competing markets. The primary reason for this is

the complex nature of the variety of institutional and technological issues that impact market access for smallholder and emerging farmers. Smallholder and developing farmers lack organisations that support and serve them, while the marketing infrastructure is underdeveloped (Magingxa & Kamara, 2003). Most smallholder farmers cannot afford the necessities which they need to carry out their farming operations. A lack of finances for operations, capital goods purchases, and working capital requirements have probably been the major challenge facing the majority of South African smallholder farmers. In addition, due to their historical location in underdeveloped areas of South Africa, smallholder farmers have limited or no access to markets and infrastructure (Lapar, Holloway & Ehui, 2003). These factors have a negative impact on the participation of emerging and smallholders in the formal market.

According to Adekunle (2013), Insufficient development of physical resources for housing, roads, irrigation, water supply, and transportation is a serious issue, since it affects the transportation of farm inputs to markets, as well as farm products. Transportation is one of the major challenges faced by smallholder farmers. Farmers struggle to have their supplies delivered and to transport the final produce from the farm to the market. This results in a loss, as farmers cannot buy the production input in bulk. This can give the farmers the power to negotiate lower prices when purchasing goods, although they may end up selling at lower prices as well, since they cannot access the right market due to the quantities involved. Additionally, buyers come to the farmers to collect the produce and use that to negotiate prices. Mkhwanazi (2009) states that the majority of smallholder produce is either wasted after harvest or sold at incredibly low prices. Given the volatility of pricing, a large number of farmers would take any offer made by buyers if they had the chance to participate in the formal market, as they find it difficult to sell their goods at major marketplaces. The majority of small-scale farmers are low-income earners, hence they do not have the money for fencing. The challenges faced by smallholder farmers in securing loans and inputs, worsen the negative effects on the expansion of the output market (Adekunle, 2013).

The results of an investigation carried out by Vittuari and Segre (2009) that examined the obstacles that prevented subsistence farmers from becoming commercial farmers are:

- Inadequate investment in human (training and skill development) and physical capital (machines and equipment).
- The issue of land ownership and the lack of a well-defined investment strategy that significantly hinder the government's capacity to offer farmers support and incentive programmes. The South African legislation forbids local governments from investing in traditional communities' community land in the KZN Province.
- Credit availability is excessively restricted and comes with exorbitant interest rates.
- Government policies fail to promote innovation and change, but they place emphasis on supporting production.
- The lack of influence of the farmer's associations and co-operatives on agricultural-related legislation and policies is due to their underdevelopment.
- The smallholder farmers rely heavily on manual labour, and with production being too diversified, this results in production remaining low.

2.7 Agricultural extension services in South Africa

The South African government has demonstrated its commitment to offering farmers substantial support through agricultural extension services. Rural areas receive government support regarding the provision of facilities to boost the degree of community involvement in farming, which contributes to improving livelihoods by ensuring food security at a household level. The success in boosting agricultural activities that contribute to their livelihoods depends on increasing the productivity of rural agriculture and providing related agricultural extension services.

Extension services have been used in many ways and over time. Rivera and Schram (1987) summarise these as:

1. Commodity focus approach: This is the extension that is designed to facilitate the production of a specific crop.
2. Community development extension: This method connected extension initiatives with elements of general community development.

3. Technical innovation-centered approach: This extension is mainly designed in terms of technology transfer by an external organisation.
4. Training and Visit System: The farmer-focused approach is an organisational strategy that considers the needs, capabilities, and limitations of the farmer when providing extension services, such as routine farm visits, guidance, and training. The approach takes care of both cash crop farming and food security.

The Extension officers play a crucial role in providing extension services to farmers (Mbatha, 2024). Farmers view agricultural extension as a series of set communication tools that are necessary to help them to overcome difficult situations and make a positive difference in their lives. According to Koyenikan (2009), the function of the extension officer is to provide technical guidance and develop creative farming techniques to farmers, in order to improve production and their standard of living. In South Africa, agricultural extension officers are government representatives who work closely with farmers to help them to obtain agricultural extension services, including relevant knowledge and skills for boosting agricultural output (Makapela, 2015). Agricultural extension officers' responsibilities include sharing information on agriculture and knowledge, offering technical support, and helping farmers establish connections with other economic players (Swanson, 2006). Most rural farmers have limited access to extension services, which makes it more difficult for them to adapt to the rapidly advancing technologies. Therefore, extension agents play a critical role in supporting rural farmers by providing them with information, training, and resources, while also ensuring that all stakeholders in rural agriculture are sufficiently networking (Mbatha, 2024).

The extension officer plays a supportive role with regards to information and technical solutions, as the farmer's knowledge and experience are increasingly recognised as an important resource. The officers and farmers combine their resources to jointly find solutions to regional problems. Extension officers are required to learn new skills in negotiation, dispute resolution, and the development of nascent community organisations since they occasionally mediate in issues that extend beyond the farm (Garforth, 1993; Smith, 1994 cited in Jones & Garforth, 1998). According to Christoplos (2010), the extension role in rural areas has grown to include meeting needs related

to rural livelihoods, such as teaching farmers about home nutrition and the effects of HIV/AIDS, mitigating and adapting to new climate change challenges, and assisting farmers in developing their business management skills. It also connects farmers to markets and other opportunities and provides legal and financial advice.

There is a presumption that local government officials in South Africa have difficulty or struggle to provide rural farmers with appropriate resources and information. The main parties to blame for the poor performance of extension officers in South Africa are the management and extension departments (Makapela, 2015). This is mainly due to the long processes for the implementation of government projects. Government policies contribute directly to the delays in assisting farmers. This conflicts with agriculture being seasonally based, where farmers stand to lose the season while waiting for the finalisation of government processes, mainly administration. There is a disconnect in merging modern and traditional methods of farming when capacitating farmers. Raidimi and Kabiti (2019) reveal that certain agricultural extension officers in South Africa have lower levels of extension work education compared to other industries. This makes it difficult for them to acquire new skills to maintain their competency and strengthen their credentials for advancement. Agricultural extension workers need to be well-trained so they can provide farmers with necessary and useful information.

Farmers require access to agricultural production services, new technology, and knowledge of input supply, credits, competition, and market prices in order to carry out their separate tasks in rural agriculture. For this reason, the majority of developing nations acknowledge that using agricultural extension services is essential to changing the agriculture industry. South African farmers recognise the importance of agricultural extension services as a way to get information and technical support for increasing the production of their crops and livestock (Mbatha, 2024). Makapela (2015:1), in his study titled “*The Provision of Agricultural Extension Services to Rural Farmers as a Strategy to Improve Agricultural Practices in South Africa*”, revealed that the rural agricultural industry in South Africa is characterised by a high rate of illiteracy and unstable or sustainable agricultural project. The author also revealed that the majority of adult farmers lack

formal education, which makes it challenging for agricultural extension to engage with them and provide meaningful assistance.

Peterson (1997) argued that the environment in which agricultural extension functions is shaped by outside forces, where a defining feature is change. Extension officers need to study and comprehend this context since it affects every area of extension, and will help with the management of extension programmes. According to Swanson (1997), many national agricultural research departments and extension organisations do not regard themselves as a part of the larger complex system. This contributes to a poor working relationship between the two. Swanson (1997) referred to this system as the agricultural technology system (ATS) in the context of agriculture and is made up of the following four parts of the agricultural technology system, each placed inside a broader framework: (i) technology generation, which entails organising, managing, and putting research into practice; (ii) technology transfer, which entails assessing and making new technologies and research user-friendly before distributing them to users; (iii) technology utilisation, which includes user awareness and adoption among users, primarily farmers; and (iv) a policy component, which is related to government policies and strategies (Peterson, 1997).

The cornerstone of the different role-players involved in knowledge systems is the Agricultural Knowledge and Information Systems (AKIS) paradigm, which is illustrated in Figure 2.2. The AKIS model illustrates a relationship among those involved in the extension ecosystem and the necessity of fortifying that relationship, according to Snapp and Pound (2008). This approach centres the farmer at a point where the three nodes of university, research, and extension contribute to the provision of extension services.

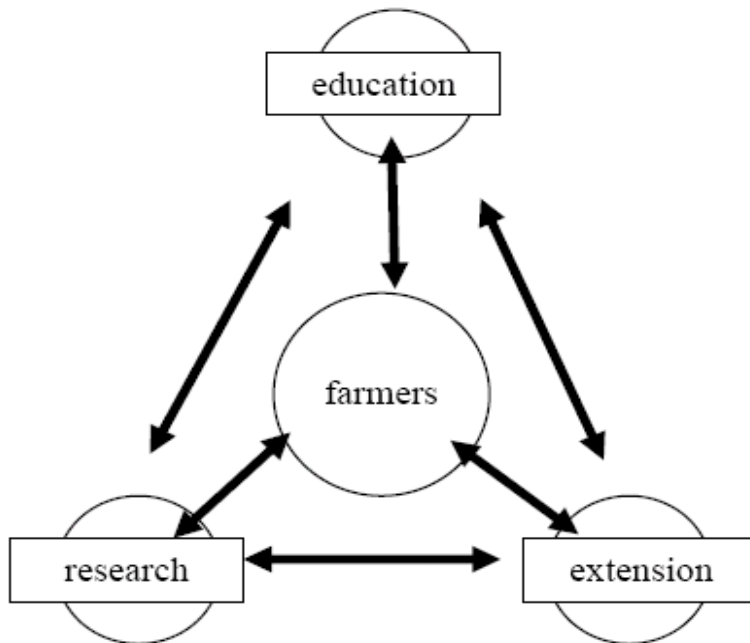


Figure 2.2: A basic Agricultural Knowledge and Information System (AKIS)

Source: FAO (2000: 87).

The model was criticised by Snapp and Pound (2008) for being linear, in that each of the three nodes delivered technology, and that this model did not adequately capture collaborative learning and the encouragement of local innovation. Peterson (1997) added that the system was impacted by external influences that are a part of a metasystem that need to be understood. These factors include but are not limited to, sociocultural differences within communities, political-economic factors governing a country, regional variations in climate and ecology, agricultural and non-agricultural policies and laws, institutional factors, and infrastructure issues.

According to Anderson (2007), the following role players have responsibilities in extension services:

1. Public sector: They typically play a major role in extension and offer free service from a central location.

2. Private sector: They are either "integrated service companies" that provide information with input, serve as government contractors providing free services, or work in product sales and marketing.
3. NGOs: They either hire extension staff directly or through contracts with governmental or private entities.
4. Farm-based organisations: They either hold government contracts or collaborate with farmer members to offer extension services.

2.8 Agri-Hub concept

“An Agri-Hub is an innovative system of agro-production, processing, logistics, marketing, training, and extension services to farmers located in a certain geographic region. As a network, it enables a market-driven combination and integration of various agricultural activities and rural transformation services” Gilmore and Chasomeris (2015:31) stated that the term agricultural hub is often used to describe a wide range of organisations that provide support to agricultural Small, Medium, and Micro Enterprise (SMMEs) and small growers to develop their farming practices, from inception to semi-commercialisation and then full commercialisation.

The DARD (2020) lists the following three related concepts and agri-hubs:

1. Agro-Cluster or Agro-Food: This is described as the concentration of producers in a geographic area such as the number of farmers within an irrigation scheme.
2. Agri-Park: This is a concentration of the agro-cluster and Agri-hub in a particular area.
3. Agri-Value chain: This is defined as the movement of primary products from within a production process to market.

Differing on size and area of focus, agri-hubs can run on many business model types. Currently, the Umbumbulu Agri-Hub uses a small-scale "open source" business model to function as a general-purpose hub (Gilmore & Chasomeris, 2015). The Hub mainly depends on operational funding from the municipality, as it cannot cover its operating costs. The eThekweni Municipality owns both the assets and the land where the Hub is located. Its primary objective is to produce seasonal herbs and vegetables for local markets. Among the services offered by the Umbumbulu

Agri-Hub are training, mentorship programmes, affordable input supply, a seedling bank, assistance with tool and equipment provisions, marketing on behalf of producers, and technical support and guidance for farmers. The Newlands Community Development Centre was appointed by the Municipality to manage the Agri Hub (Gilmore & Chasomeris, 2015).

According to Lazarus (2012: 60), “an agricultural hub is an initiative that systematises the process of creating successful agricultural enterprises, by providing them with a comprehensive and integrated range of services. This includes value-added services that are flexible and affordable, common services that include secretarial support and shared use of office equipment, hands-on agricultural counselling, access to specialised assistance, such as agricultural research and development support, and networking activities that operate as a reference point inside the premises among agricultural entrepreneurs and outside to the local community”.

Lazarus (2012) further stated that there are three broad types of agricultural hubs, namely:

General purpose agricultural hubs: This type offers a broad range of assistance to agricultural businesses, occasionally including high-tech, industry-specific operators within the hub. Product-specific agricultural hubs: These focus on certain industries or products, with a focus on knowledge transfer and the development of those particular products. And agricultural hubs without walls: provide farmers living in different geographic regions with the same support services. Using technological tools, they employ an outreach or virtual services strategy.

The author further indicated that the agricultural hubs can also be categorised according to their sizes and financial status. There are three broad models, namely, an independent hub, embedded hub, and networking hub.

Urban-Econ (2016: 20) conducted a feasibility study of an Agri Park in the Mpumalanga Province. The study presented the Agri Park model with “three interlinked components, namely, Farmer

Production Support Units (FPSUs), an Agri-Hub, and a Rural Urban Market Centre (RUMC). The functions of each component are briefly described” subsequently (Urban-Econ, 2016: 20-21):

1. “FPSU: The FPSU is a rural outreach unit connected with the Agri-Hub. The FPSU is responsible for the primary collection, storage, processing for the local market, and extension services that include mechanisation.
2. Agri-hub Unit (AH): The AH is a production, equipment hire, processing, packaging, logistics, and training (demonstration) unit.
3. RUMC: The RUMC has the following three main purposes:
 - Linking and contracting rural, urban and international markets through contracts.
 - Acts as a holding-facility, releasing produce to urban markets based on seasonal trends.
 - Provides market intelligence and information feedback, to the AH and FPSU, using the latest Information and communication technologies.”

Three components of the Agri Park aim to offer a simplified and comprehensive strategy to agriculture and rural development in South Africa. Figure 2.3 indicates the guidelines for the catchment centre of each component as per the Agri Park Model.



Figure 2.3: The Agri-Park model

Source: Urban-Econ (2016:21)

Urban-Econ (2016) also developed the guidelines for the catchment centre of each component as per the Agri Park Model, which is depicted in Table 2.2.

Table 2.2: Norms and standards for Agri Parks

<i>Component</i>	Proposed catchment area in areas of low density population	Proposed catchment area in areas of high density population
<i>FPSU</i>	30km	10km
<i>Agri-Hub</i>	120km	60km
<i>RUMC</i>	250km	150km

Source: Urban-Econ (2016:22)

The Department of Agriculture and Rural Development identified agri-hubs as a solution to addressing the challenges faced by the smallholder farmers. These are mainly limited to access to production inputs and equipment, poor infrastructure, and access to both market and credits. The process of implementing the agri-hubs involves a feasibility study, business plans, and identifying a site. The description and proposed agri-hub value chains are summarised in Figure 2.4 and Table 2.2.

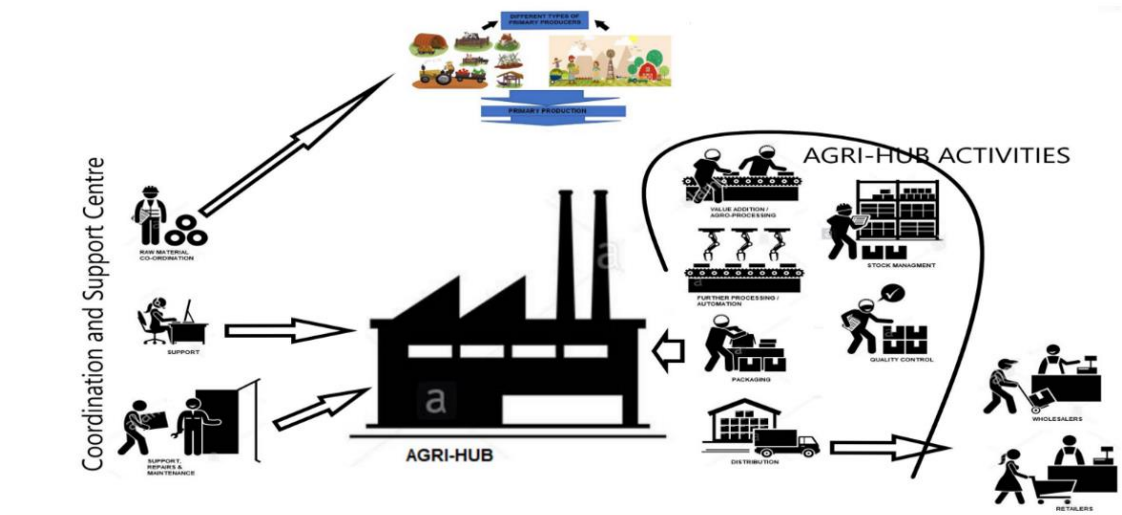


Figure 2.4: Agri Hup description and the proposed Agri Hup value chains

Source: KwaZulu-Natal Agri-Hubs Programme (2023:4)

Table 2.3 summarises the implementation of five agri-hub value chains that have been proposed by the Department of Agriculture and Rural Development. The sites have been identified and the production in coastal districts includes vegetables, bananas, pineapples, and macadamia nuts. Production in the inland districts includes dairy, egg production, broilers, goats, and sheep. Major production in the western parts of KZN includes maize, cattle beans, sheep, goats, and soybeans, while piggery and broilers are found all over the province.

Table 2.3: Summary of the Agri-Hubs’ value chains

<p>1. The Red Meat Hub consisting of the following:</p> <ul style="list-style-type: none"> a. Cattle Abattoir for 350 cattle per day, Deboning Facility, Offal Facility & Distribution Centre b. Sheep & Goat Abattoir for 750 animals per day, Deboning Facility, Offal Facility & Distribution Centre c. Pig Abattoir for 500 pigs per day, Deboning, Processing, Offal Facilities & Distribution Centre d. Separate Administrative Offices for Cattle, Sheep & Pigs e. Skin, Wool & Hide Facility 	<p>3. The Fresh Produce Hub consisting of the following:</p> <ul style="list-style-type: none"> a. Bulk Vegetable Handling & Distribution Facility – 400 tons daily b. Vegetable Processing & Distribution Facility – 15 tons daily c. Banana Handling & Ripening Facility d. Administrative Office 	<p>5. The White Meat Hub consisting of the following:</p> <ul style="list-style-type: none"> a. Chicken Abattoir with a capacity of 50 000 birds per day (to be increased to 304 000 per day) b. Deboning Facility (frozen & fresh line) c. Portioning Facility (frozen & fresh line) d. Distribution Facility e. Administrative Office
<p>2. The Grain Handling consist of the ff:</p> <ul style="list-style-type: none"> a. Yellow Maize Silos – 25 000 tons capacity b. White Maize Silos – 15 000 tons capacity c. Soybean Silos - 10 000 tons – capacity d. Dry beans silos Facility – 3000 ton facility e. Dry bean packaging Facility f. Administrative office 	<p>4. The Dairy Hub consisting of the following:</p> <ul style="list-style-type: none"> a. Raw milk tanks b. Long-Life UHT Facility – 100 000L/day c. Distribution Centre for Long-life UHT Milk d. Amaas Factory - 100 000L/day e. Drinking Yoghurt Factory – 10 000L/day f. Administrative office 	

Source: KZN Agri-Hubs Programme (2023 :8)

It is impossible to provide a single, comprehensive description of agricultural hubs, and despite the existence of all these broad models, these hubs need to be connected to local services and possess a range of attributes in order to satisfy the unique requirements of their community (Gilmore & Chasomeris, 2015). However, conceptually speaking, the Agri-Hub can be defined as “creating a supportive environment, filled with the kinds of facilities and services that young, growing agricultural businesses need, and often cannot afford” (Lazarus, 2012: 65). An agri-hub is a secondary and tertiary value-addition facility that consists primarily of agricultural products. It is an agro-processing infrastructure that links producers with domestic and export market opportunities or end users, designed according to industry-specific value chain requirements and market standards. Overall, this is a catalytic agricultural production infrastructure project designed to meet the highest stringent fresh produce export standards, such as Global-GAP (Good Agricultural Practices) and other food safety requirement standards. Therefore, the Agri-hubs programme is a strategy that facilitates current and future adaptation of the agricultural sector to changing food safety requirements. This strategy ensures that producers remain in business and have supply products that meet or comply with stringent market standards. This model was developed for the fresh produce hub, which consists of bulk packaging, processing of vegetables and herbs, and distribution to various wholesale and retail markets.

2.9 Feasibility studies

In 2006, the eThekweni Municipality conducted a feasibility study through the Institute of Natural Resource (INR) in order to provide a basis for the understanding of the function, operations, and management of the agricultural hubs that related to the Umbumbulu Agri-Hub business plan of 2006 (Gilmore & Chasomeris, 2015).

2.9.1 The role of the Agri-Hub

The feasibility study proposed that the Umbumbulu Agri-Hub should be constructed to accommodate the areas of reception and administrative tasks; training facility; centre for supporting SMMEs; produce shop for organising the handling of produce, purchasing input, and leasing equipment; produce depot for organising and selling produce; and facility for storing input and equipment (Institute of Natural Resource, 2004). The KZN Department of Agriculture, Department of Land Affairs, and/or Department of Economic Development & Tourism, resource centres, kitchen areas, shop space for entrepreneurs providing agricultural services, office space for primary cooperatives and the contractors' organisations, and a tele-centre were among the amenities available. It was expected that a later expansion would include a workshop dedicated to fixing farm machinery, an additional office space for the service provider, a training garden, and a boardroom (Institute of Natural Resource, 2004).

The Umbumbulu Agri-Hub plan incorporated capital funding for construction, vehicles, furniture, and equipment that would come from the municipality and operational revenues that would be used for building maintenance. Apart from that, the cooperative would require a limited amount of money, which it could obtain from government subsidies, in order to purchase input supplies and equipment for rental that would be offered through the store. In exchange for the Hub's services, farmers also pay an annual membership fee as part of developing an economic and commercial plan for the agricultural centre (eThekweni Municipality, 2010).

2.9.2 Agri Hub ownership

The Umbumbulu Agri-Hub model has two ownerships; the municipality owns the land and assets. It also takes responsibility for the overall ownership and functioning of the Agri-Hub and the cooperative that provides most of the services at the Hub. Lazarus (2012) proposed three model types, namely, the commercial large-scale model, the “open-source” small-scale model, and the market-led “evolutionary” model. The author identified four categories that the Agri-Hub offerings can be divided into, which are direct business development assistance, marketing network and relationship support, educational programmes, and facility-based services. The author further identified the factors that need to be taken into consideration for the Agri-Hub to be successful. These are sufficient demand, institutional support, and the buy-in from potential service providers.

2.10 Beneficiaries of Umbumbulu Agri-Hub

The beneficiaries of the Umbumbulu Agri-Hub are the agricultural enterprises or agricultural SMMEs in rural areas of Umbumbulu within the eThekweni Municipality in KZN. Currently, there is no universal definition for SMMEs that has been agreed upon (Longenecker et al, 2003; Lazarus, 2012). Nonetheless, numerous attempts have been made to characterise SMMEs in terms of the number of workers, sales, and asset worth (Longenecker et al, 2003; Nieman et al, 2004; Ladzani, 1999; Lazarus, 2012). SMMEs in the agricultural sector of South Africa are classified as subsistence, semi-commercial, or commercial businesses as per the DAFF. A guideline is presented in Table 2.1 The Agri-Hub beneficiaries are thus the agricultural SMMEs in Umbumbulu with different forms and sizes based on their operational complexity.

2.11 Agricultural service centres in South Africa

Although the ‘agricultural hub’ term is not new in South Africa, little has been done in terms of implementation and research on the topic. The formal articles were published by Gilmore and Chasomeris (2015), evaluating the Umbumbulu Agri-Hub model, and there has been no other study that has been conducted on the topic. The following commodity service centres were identified by Gilmore and Chasomeris (2015: 51-52):

- “Cotton service centres.
- Ndundulu Service Centre in Melmoth, KwaZulu-Natal, co-funded by the Institute of Natural Resources and Mondi.
- BelaBela Agricultural Service Centre in Limpopo Province.
- Multi-functional facility at Nondabuya near Jozini, KwaZulu-Natal operated by the Planning, Education, Agriculture, Community and Environment Foundation.
- Umzumbe Agricultural Service Centre in KwaZulu-Natal.
- Electronic agricultural hubs by Afgri Logistics.
- Ncera Farms Service Centre by the Department of Agriculture, Forestry and Fisheries.
- Marketing intelligence services driven by the Department of Agriculture.
- Proposed agricultural college at Umbumbulu, eThekweni Municipality modelled on the CIDA City Campus in Johannesburg”.

Similar to the services outlined in the business plan for the Umbumbulu Agri-Hub, these facilities provide a range of services in a single location. Some things can be taken from these centres as lessons and recommendations to improve the Umbumbulu Agri-Hub. The objective of all the centres is to provide emerging farmers with an opportunity to grow into commercial farmers where possible, with a focus on capacitating and empowering organised people and projects that could then serve the rest of the community through their activity. The inability to secure finance proved to be a hindrance to the autonomous operation of the centres that were initially established in collaboration between the business sector and NGOs, with the ultimate goal of local employees managing them. These centres are made available for community development initiatives, including preschool facilities, adult literacy programmes such as the Adult Basic Education and Training (ABET), general skills development, and basic healthcare. The facilities occasionally act as satellite campuses for certain industry training institutes.

According to Lazarus Developments (2012) an analysis of South African service centres with an agricultural focus, the idea of service centres is not a recent development. The review presents a pattern of support services that are given to either multipurpose sectors controlled by different public, corporate, and NGOs, or specialised commodity sectors (Department of Agriculture, 2005).

2.12 Policy, legislation, and strategy impacting extension support and agricultural development in South Africa

The economic policy that guides the environment for extension programmes, was suggested by Rivera and Schram (1987). The authors argued that these are non-agricultural policies that have had a direct and indirect impact on agriculture and need to be discussed in the section. Worth (2012) in Gilmore and Chasomeris (2015) argued that in the South African context, agriculture, rural development, and land reform are interrelated factors that have an impact on extension options. The authors further argued that the primary concerns of these policies are funding and public restructuring and offering broad frameworks to direct extension initiatives. Agriculture growth and extension assistance in South Africa are significantly impacted by several laws, rules, and strategies. Since South Africa's democratic election of a new government in 1994, a considerable deal of legislation, policies, and initiatives have been developed and implemented at the national and provincial levels. Their primary objectives were to correct the wrongs of the apartheid past and offer equitable access to all South Africans, with a particular emphasis on the historically marginalised Black smallholder farmers (Worth, 2012). Gilmore and Chasomeris (2015: 56) identified the following as the key rural and development policies and legislation affecting the extension support and agricultural development in South Africa:

- “Land Reform.
- Integrated Sustainable Development Strategy (ISDS).
- Comprehensive Rural Development Programme (CRDP).
- National Development Plan, 2030.
- New Growth Path.
- White Paper on National Strategy for the Development and Promotion of the Small Business Sector in South Africa (1995).
- National Small Business Act (Act 102 of 1996).
- National Small Business Amendment Act (Act No 26 of 2003).
- Preferential Procurement Policy Framework Act (Act No 5 of 2000).
- Board Based Black Economic Empowerment Act (Act No 53 of 2003).
- Cooperatives Act No. 14 of 2005.
- Integrated Small Enterprise Development Strategy.”

According to the 1996 South African Constitution, national legislatures are the appropriate body to handle matters pertaining agriculture. As a result, national policy and legislation pertaining agriculture are enacted primarily at this level. Although the National Department of Agriculture assigns funds and policies to provinces, extension operations are still the purview of the province and have the freedom to determine their own resource allocation and operational plans (The Constitution, 1996). Collectively, these tactics and laws shape the trajectory of South Africa's agricultural sector, where extension services are essential to translating the intentions of these laws into outcomes that benefit farmers.

2.13 Policy and strategy impacting agricultural development in the eThekweni Municipality

Municipalities are not mandated to engage in agriculture, according to the South African Constitution (Institute of Natural Resource, 2004). However, their involvement in this local economic sector is beginning to grow. Instead of focusing on generating employment opportunities, their mission is to create an atmosphere that is conducive to economic activities, such as semi-commercial and commercial farming. The National Development Plan 2030 places an emphasis on the expansion of the agricultural sector as a means of expediting the resolution of challenges related to rural and economic development. Four of the eThekweni Municipality's Sustainable Development Goals (SDGs) are no poverty, zero hunger, good health and well-being, and decent work and economic growth (eThekweni Municipality, n.d.). The agricultural SMMEs, in the form of smallholder farmers, are contributing directly to this SDG since they create job opportunities and assist in providing food for farmers to address the food security and nutrition challenge.

The set of rules for the eThekweni Municipality support for agricultural development is provided by the eThekweni Rural Agricultural Policy of 2004 (Institute of Natural Resource, 2004). in order to promote integrated, coordinated, and sustainable agricultural development. In terms of economic growth and food security, the Municipality views agriculture as one of the sectors that plays a significant role in its development and as a crucial component of multiple lifestyle plans (INR, 2004). A wide range of agricultural sectors are the focus of the programme that is tailored to suit the needs of the level of the farmer. These include home producers who produce food for

subsistence, newly emerging commercial businesses, and critical high-tech project, as illustrated in Figure 2.5.

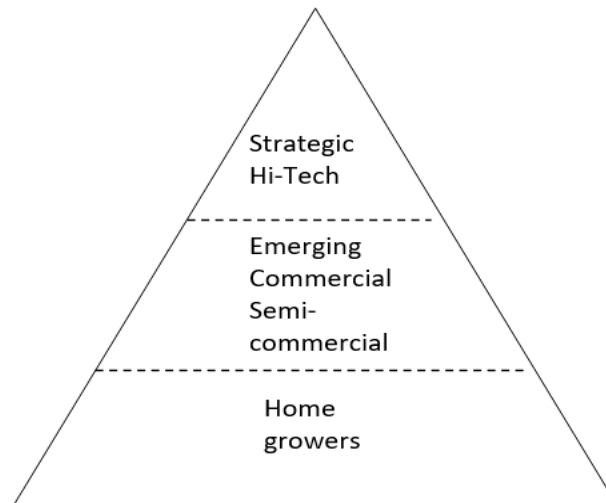


Figure 2.5: Agricultural support levels

Source: INR (2004)

The INR (2004) identified the following policies and strategies, both at the local and national level that influence the eThekwini agricultural development:

1. KwaZulu-Natal Provincial Growth and Development Plan.
2. eThekwini Municipality Integrated Development Plan.
3. Agricultural sector plan and local development strategy.

The Municipality has the Strategic Framework Plan for the Agricultural Management Unity (AMU) that was compiled in 2010. The Agricultural Management Unity's goals are to support community mini-farm and homestead gardens while advancing food security through sustainable agriculture (eThekwini Municipality, 2010). The agricultural hub is the vehicle in the AMU's strategy for coordinating and delivering the programmes. Aligning national policies with local needs and focusing on practical support mechanisms allows the eThekwini Municipality to enhance its agricultural development and contribute to broader economic and social goals.

2.14 Conclusion

Given the agricultural terrain of South Africa, the evaluation of the literature emphasises the vital role that agri-hubs play in assisting smallholder farmers. A larger network of sustainable agricultural practices, market access facilitation, and rural development surrounds the Umbumbulu Agri-Hub. In order to solve major issues, including restricted market access, poor infrastructure, financial limitations, and the requirement for smallholder farmers to increase their ability, the literature emphasises the significance of agri-hubs. Furthermore, studies highlight the need for financial viability, institutional support, and environmental stewardship in guaranteeing the long-term survival of these hubs, demonstrating that sustainability is still a crucial factor. Although agri-hubs offer substantial potential for rural economic growth, the analysis also shows that their success frequently depends on stakeholder cooperation, policy backing, and the adoption of innovative farming techniques.

This examination of the literature lays the groundwork for the consideration of the sustainability and role of the Umbumbulu Agri-Hub that follows. It offers a framework for analysing the challenges to determine best practices and their impact. Building on these conclusions, the following chapter discusses the methodology used in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three gives a synopsis of research methodology, including the data collection techniques and analytical framework that was employed to conduct this study. Establishing a research design provided satisfactory solutions to address the research problem and questions. According to Zegeye et al. (2009), research is an ethical, systematic, and methodical process of inquiry and investigation that can assist with real-world issues and advance knowledge. Collins and Hussey (2003) assert that the purpose of research encompasses reviewing or synthesising existing knowledge, investigating current situations or problems, providing solutions, exploring and analysing broader issues, constructing new procedures or systems, explaining new phenomena, generating new knowledge, or a combination of these objectives. This chapter covers the research approach, primary and secondary data collection methods, including qualitative and quantitative components, sampling techniques, challenges encountered during data collection, study limitations, and concludes with key insights.

3.2 Research approach

The study was approached with a pragmatic worldview philosophy. The worldview is defined by Guba (2009) cited in Creswell (2009: 6) as "a basic set of beliefs that guide action." According to Creswell (2009), a pragmatic worldview is a philosophy that emerges from circumstances, decisions, and outcomes, rather than pre-existing circumstances. A researcher's philosophy influences the decision on whether to employ mixed, qualitative, or quantitative methodologies. In order to gather a variety of data that will help to comprehend the research problem, a pragmatic worldview approach requires the use of mixed techniques (Creswell, 2009). This study thus employed the mixed-method research design. "The mixed method design can be defined as research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study" (Creswell & Creswell, 2018: 12).

Considering various kinds of data may offer insightful information and improve the study's efficiency. Therefore, a multi-faceted approach was used in data collection, where multiple methods or sources of data were to collect information from the study subjects. This method is referred to as a triangulation by Dawson (2002), and it is defined by Creswell (2009) as a procedure that gathers quantitative and qualitative data simultaneously, and then compares the two to see if there are any patterns or discrepancies in the issues and emerging trends in the data. This concurrent data collection method was most suitable for the study as the data collection time was limited. The data should ideally be integrated into the interpretation and discussion, where the quantitative statistical results are presented first, followed by the qualitative data that support or contradict the quantitative results (Creswell, 2009). The study presented the statistics from the questionnaire and subsequently presented the qualitative interview data. The advantage of this method is that it may yield findings that are well-validated and supported. However, its disadvantage is that it takes skill and hard work to thoroughly investigate a topic with two different approaches. Should any disparities emerge from the contrasted results, the researcher may be faced with challenges on how to address them (Creswell, 2009).

Both primary and secondary methods were used to collect the data for this study. Furthermore, a combination of qualitative and quantitative research techniques was used to gather a variety of pertinent data that helped to develop a thorough grasp of agricultural extension services and the function that agri-hubs can play as a model for assisting small-scale farmers in rural areas.

3.3 Primary data collection strategies

Quantitative and qualitative strategies were used to collect primary data for this study. These are further explained in subsequent sections.

3.3.1 Quantitative component

Quantitative research offers a suggested explanation for the link between the variables the researcher is testing (Creswell & Creswell, 2018). “Quantitative research is the numerical representation and manipulation of observations for the purpose of describing and explaining the

phenomena that those observations reflect” (Sukamolson, 2007: 2). Questionnaires are a tool used to collect the data. The contact time with the respondents is much quicker than that of the qualitative research. Quantitative research, according to Creswell (2009), uses a sample of a population to provide a numerical account of its patterns, attitudes, and opinions. The quantitative method has its advantages and disadvantages. Matveev (2002) cited by Gilmore and Chasomeris (2015: 66) listed the following advantages of the quantitative method:

- a. ability to clearly define the problem;
- b. identification of the independent and dependent variables under investigation;
- c. follows the initial research goals;
- d. use of controlled observations and other forms of research observations to ensure the reliability of the data collected; and
- e. reduction of subjectivity of judgement.

However, the following limitations were also identified:

- a. inability to regulate the surroundings in which the survey participants are located;
- b. a lack of information regarding the situational setting in which the examined element happens; and
- c. the organised style and question type of the research proposal lead to limited end results and are only indicated in the original study proposal.

3.3.1.1 Quantitative data collection

The data were collected using both closed and open-ended questionnaires, which were administered by the researcher to smallholder farmers. The close-ended type of questionnaire contained predetermined responses to the questions which the respondents needed to choose responses from. This made it simple to record and analyse, allowing for the production of greater numbers with ease. The open-ended questionnaire was used to obtain a thorough response regarding the advantages that farmers experienced when utilising the Umbumbulu agricultural infrastructure.

Due to time and logistical constraints to reach the farmers for the survey, the researcher attended one of the regular farmer's training sessions. Out of 50 farmers who are supported by the Umbumbulu Agri-Hub, only 29 attended the training on the day. The convenience sampling was employed to select the respondents and 29 questionnaires were distributed and received from farmers who attended the training on the 4th of October, 2024 (see Appendix C).

3.3.1.2 Regression

After the completion of the surveys, an Excel spreadsheet was used for data entry since raw data was difficult to interpret. Descriptive statistics (Interviewee 1,2,3 and 4) were used to analyse the data.

A multiple linear regression model was employed to analyse the determinants of increased income among the Umbumbulu Agri-Hub farmers. The dependent variable is the farmers' income (ln income). The independent variables include demographic, socioeconomic, and farming-related factors that theoretically influence income.

The general form of the model is as follows:

$$\begin{aligned} \ln(\text{Income})_i = & \beta_0 + \beta_1(\text{Gender}_i) + \beta_2(\text{Age}_i) + \beta_3(\text{MaritalStatus}_i) \\ & + \beta_4(\text{EducationLevel}_i) + \beta_5(\text{FarmingExperience}_i) \\ & + \beta_6(\text{TypeofFarming}_i) + \beta_7(\text{YearStarted}_i) + \beta_8(\text{LandSize}_i) \\ & + \beta_9(\text{AttendedTraining}_i) + \beta_{10}(\text{AccessToExtensionOfficers}_i) \\ & + \beta_{11}(\text{VisittotheHub}_i) + \epsilon_i \end{aligned}$$

“Heteroscedasticity is the situation that occurs when the error terms vary. When this assumption is violated, then the Gauss-Markov theorem does not apply” (Volkan Sevinç & Atila Göktaş, 2019: 382). In other words, at various levels of the explanatory variable or variables, the errors "spread out" or "shrink." This can be demonstrated by a scatterplot of residuals that shows rising or falling variability in the form of a funnel. A small sample size, missing values, and multicollinearity are frequent issues in behavioural research (Farahani et al., 2010). The OLS regression was estimated. Prior to its estimation, the STATA version 18 software programme was used to evaluate the degree

of multicollinearity. At first, multicollinearity and heteroscedasticity were tested using OLS regression.

3.3.2 Qualitative component

Rahman (2020: 103) states that “by the term ‘qualitative research’, we mean any type of research that produces findings not arrived at by statistical procedures or other means of quantification.” It could include research on people's lives, lived experiences, actions, emotions, and feelings, as well as social movements, cultural phenomena, international relations, and how organisations function. According to Dawson (2002), qualitative research uses focus groups and interviews to collect data that examines attitudes, behaviours, and experiences. It seeks to gather detailed information about the participants' beliefs, attitudes, actions, and experiences. Elo et al. (2014), added that the emphasis is on the significance of the data gathered that could use content analysis techniques. In general, this is more descriptive since the responses are interpreted according to the complexity levels. According to Guba and Lincoln (1994) cited in Morakaladi (2024), these qualitative analyses may involve coding data into groups or levels, which are then utilised to search for patterns and discrepancies contained within the information. There are several benefits to using qualitative research methods and techniques. Atkinson (2004: 85) stated that the “qualitative research approach produces the thick detailed description of the participants’ feelings, opinions, and experiences, and interprets the meanings of their actions”. Chalhoub-Deville and Deville (2008) cited in Rahman (2020: 106) also contended that “qualitative methods are used to gain a greater understanding of problems pertaining to the creation, use, and interpretation of language assessments. However, the qualitative methods have limitations”. According to Silverman (2011), qualitative research methodologies may overlook contextual sensitivity in favour of emphasising meanings and experiences. Matveew (2002) cited in Gilmore and Chasomeris (2015: 66) list the following disadvantages of the qualitative method: (i) depending on the researcher's personal traits, the researcher may draw different conclusions from the same data; (ii) the research may deviate from the original goals due to the environment's variability; (iii) it may be challenging to determine the causality between various research phenomena; and (iv) it may be challenging to explain the variations in the amount and caliber of information gathered from various respondents, particularly if the researcher draws distinct and inconsistent conclusions.

3.3.2.1 The semi-structured and unstructured interviews

Semi-structured interviews served as the foundation for this study's qualitative component. According to Dawson (2002), the three interview types most frequently used in social science research are unstructured, semi-structured, and structured. In this study, the researcher carried out semi-structured interviews with the municipal officials who work directly with the Umbumbulu Agri-Hub and the Hub's management. Semi-structured interviews are described by Dawson (2002) as the most commonly used in qualitative research. By using this technique, the researcher can obtain particular data that can subsequently be compared with data obtained from further interviews (Dawson, 2002).

The table below shows the important figures involved in the Umbumbulu Agricultural Hub that were scheduled for semi-structured interviews:

Table 3.1 The interviewees, positions and roles, date of the interviews, and the time taken

Interviewee	Position and Role	Date	Duration of the interview
1	The Umbumbulu Agricultural Hub Coordinator, who is in charge of the center's operations.	04/10/2024	1h 20m 8s
2	The Municipal Agri Ecology Head of Department, who is responsible for the unity running the pilot project with seven Agri-Hubs.	04/10/2024	58m 28s
3	The Municipal Agri Ecology senior manager, who is also responsible for the unit running the pilot project with 7 Agri-Hubs.	04/10/2024	1h 3m 39s
4	The Municipal Agribusiness Development facilitator, who is responsible for overseeing the pilot project and managing the operating company.	04/10/2024	49m 08s

Semi-structured interviews, according to Dawson (2002), result in an interview schedule and a list of pre-determined questions or topics to be discussed, which is included in the schedule to

guarantee consistency and continuity in the interviews. The researcher used an interview schedule to guide and set the direction for the interviews with the participants (see Appendix D).

Interviews were recorded using a cell phone voice recorder, Microsoft Teams, and the researcher's notes. The interviews were transcribed using the Turboscribe software. The researcher then carefully read the transcriptions and coded the data for themes, which were then manually selected and grouped to gain perspective.

To achieve the research objectives, both quantitative and qualitative data were analyzed, and a comparative analysis was conducted between the collected quantitative and qualitative data to identify any parallels or differences.

3.4 Secondary data collection

The researcher collected the secondary data using the following data sources:

3.4.1 Literature review

A review of the literature was done as a secondary data source for the study. Books, journals, research papers, journals, South African laws and regulations, case studies, and online sources were reviewed to gather and help provide the context needed for the study to identify the research gap. Additionally, information was obtained from the eThekweni Municipality's website. To ascertain any patterns, confirm the need for agricultural extension, and ascertain the role that an agricultural hub can play in agricultural development, the data were collected and examined.

3.5 Sampling

Fink (2003:33) “states that a sample is a portion of a larger group called a population,” hence in research surveys, samples are employed instead of populations since they constitute a representative of the population. According to Dawson (2002), most research projects involve vast populations which make it challenging to interview everyone unless the researcher has a sizable

staff, an unlimited budget, and a certain amount of time. In order to get around this, the researcher selects a sample which is a more manageable, in which a small group of individuals are chosen to take part in the study (Dawson, 2002). If a sample is properly selected in quantitative research, the findings can then be extrapolated to the entire population (Dawson, 2002).

In this study, the convenience sampling approach was employed to select the farmers to participate in the study due to time, financial, and accessibility limitations. This sampling approach is described as "a group of individuals who are ready and available" (Fink 2003: 41). "Convenience sampling is non-probability sampling that is often used for clinical and qualitative research. This sampling technique often selects clinical cases or participants that are available around a location (such as hospital), medical records database, Internet site, or customer-membership list" (Stratton, 2021: 373). The intended audience for this survey were the farmers who are the Umbumbulu Agri-Hub members. However, the researcher was unable to contact every farmer since many of them were inaccessible and dispersed around a wider rural area. The only practical means of engaging with the farmers was at one of their regular trainings that are held at the Agri-Hub, where the 29 farmers who attended were then given questionnaires.

3.6 Inclusion criteria for the study

According to Polit and Beck (2012), inclusion is defined as a set of conditions or standards that study participants must fulfill in order to be accepted. This method was essential for identifying the study participants because the sample was taken from those who had registered and were involved at Umbumbulu Agri-Hub. To be eligible for the survey, the farmers had to be members of the Agri-Hub. The questionnaires were distributed at one of the regular training, which enabled the researcher to connect with the respondents and make sure that every questionnaire was filled out. Four participants in the pilot agri-hub project from the eThekweni Municipality and the Umbumbulu Hub were interviewed by the researcher. This study used convenience sampling techniques because the researcher was unable to obtain a larger interview sample size due to the limited participation of important individuals in the case study project and in agricultural hubs generally.

3.7 Challenges experienced during data collection and limitations of the study

Using questionnaires was the only practical way to engage with all farmers due to time, financial, and accessibility limitations. It became clear during the questionnaire administration process that several respondents lacked literacy, which made the process time-consuming. It was challenging to set up interviews with the participants for semi-structured interviews since they had limited availability and often postponed the interviews. The researcher was unable to obtain a larger interview sample size due to the limited participation of the participants in the case study project and in agricultural hubs generally. The availability of peer-reviewed publications was insufficient since agricultural hubs are a relatively recent development in South Africa.

3.8 Validity and reliability

According to Yamson et al. (2018), validity has to do with how well a measure achieves its goals. To ensure the validity of this study, similar research papers that aimed to achieve similar goals were reviewed. Multiple sources of data were used, the questionnaire was clear and administered by the researcher to assist if there was a misunderstanding, and transparency was ensured in data collection and analysis. According to Babbie (2013), reliability is the extent to which a test reliably measures the anticipated outcome while guaranteeing consistency over time. In this study, reliability was ensured by developing the defined questionnaire; it was ensured that the participants were asked the same leading questions, the audio recording was used to ensure that the responses were captured correctly, and the Turboscribe software was used to transcribe.

3.9 Ethical considerations

The use of ethics is fundamental to any research project in order to safeguard both the researcher and the participants (Bell & Bryman, 2007 cited in Morakaladi, 2024).

3.9.1 Permission to conduct the study

The application for Ethical clearance was made to the University of KwaZulu-Natal's Humanities and Social Science Research Ethics Committee (HSSREC) and it was approved.

3.9.2 Gatekeeper letter

The gatekeeper's letter was sought from the eThekweni Municipality to conduct the study at Umbumbulu Agri-Hub.

3.9.3 Informed consent

The informed consent procedure was adhered to. An information letter explaining the study's nature and specifics was given to the participants, highlighting that participation was entirely voluntary. The participants were given a thorough explanation of the study, its goals, and the voluntary nature of their participation prior to the commencement of the interviews.

3.10 Conclusion

This chapter described the techniques and steps used to obtain the data required to meet the goals and objectives of the study. The study's theoretical foundation and philosophical approach were highlighted in the first section. This was followed by a review of the primary and secondary data-gathering techniques and the study's limitations. The sampling techniques utilised to select study subjects were also addressed by the researcher. Within the quantitative approach, questionnaires were administered to 29 farmers at a farmers' meeting, which allowed the researcher to interact with the farmers to ensure that all questionnaires were completed to achieve a high response rate. The final part of the chapter discussed the key challenges that were encountered during the research. The following chapter will discuss the findings from the study.

CHAPTER FOUR

RESULTS, FINDINGS, AND ANALYSIS OF QUALITATIVE RESEARCH DATA

4.1 Introduction

This chapter examines the results from the interviews conducted with the participants to assess the institutional framework of the Umbumbulu Agri-Hub, its responsiveness to smallholder farmers' demands, and the sustainability of its model. The results provided essential insights into the Hub's capacity to promote agricultural growth, improve farmer welfare, and ensure long-term sustainability. The findings from the interviews elucidate several critical themes concerning the Hub's institutional framework, operations, farmer assistance, and sustainability. The participants interviewed were the Agricultural Coordinator at Umbumbulu Agri-Hub (South region of eThekweni municipality), the Agribusiness Development Facilitator at the eThekweni Municipality in the Agribusiness Department, the Head of the Agroecology unit, and the Senior Manager of Agroecology. The data obtained from the interviews were used to evaluate the model's institutional setup, determine the extent to which it addresses the needs of the smallholder farmers, and assess the sustainability of the Umbumbulu Agri-Hub Model. This chapter explores the institutional setup, operational strategies, and services of the Umbumbulu Agri-Hub. It also examines capital assets, infrastructure, administration, partner support, challenges, key events affecting the model, feasibility, sustainability, and concludes with recommendations.

4.2 The institutional setup of Umbumbulu Agri-Hub

The Umbumbulu Agri-Hub operates as one of the six agricultural hubs in the eThekweni Municipality region, explicitly representing the southern region. Despite its strategic importance in supporting agriculture in this region, it is the smallest of the hubs, covering over 20 hectares. The Hub's origins trace back to the Municipality's agricultural policy adopted in 2004, which recognised the need for a dedicated facility to serve the southern areas. This led to the establishment of the Umbumbulu Agri-Hub to address agricultural needs that the existing Newlands Hub could not fully accommodate due to space constraints. The Umbumbulu Agri-Hub functions under an integrated institutional and business model designed for its rural environment

and the requirements of its smallholder farmers. Gilmore and Chasomeris (2015) refer to the hub adopting an 'open source' small-scale business model emphasising inclusivity and accessibility. Lazarus (2012) asserts that this paradigm benefits small-scale farmers that are dependent on agriculture for food security and economic prospects. Considering that most farmers at the Umbumbulu Agri-Hub are subsistence or semi-commercial cultivators from economically disadvantaged backgrounds, this model accommodates their financial constraints regarding service costs while optimising the effectiveness of external funding and assistance. The Hub is categorised as an 'embedded hub,' an organisation that cannot cover its operational expenses independently and depends on external financing, mainly from the Municipality. This funding strategy mirrors global trends in agricultural extension services, where public finance prevails owing to its designation as a public utility. The Umbumbulu Hub's dependence on municipal assistance conforms to this paradigm and guarantees that vital services are consistently available to farmers.

4.3 Operation strategies of the Umbumbulu Agri-Hub

The operational methodology of the Umbumbulu Agri-Hub is grounded in a practical, needs-based, and inclusive approach tailored to the diverse capabilities of the farmers it serves. This system ensures that the Hub prioritises feasibility and sustainability, and is aligned with its overarching goal of addressing food security. The first step in the process involves determining the suitability of land and the eligibility of the applicants. Farmers approach the Hub with a support request, providing documentation such as a Permission to Occupy (PTO) certificate, a constitution for cooperatives, lease agreements, or business plans for formally registered entities. The Hub then conducts a site visit to assess the soil structure, soil makeup, and overall feasibility of the proposed agricultural project. Only land deemed viable for farming and is already in use is considered, as the Hub does not engage with individuals presenting undeveloped or overgrown land. Successful projects are integrated into the system for consideration in the current or next financial year, depending on available resources.

The Hub adopts a differentiated training and support methodology based on the literacy levels of the farmers. The Hub provides simplified, practical training for illiterate farmers, who often approach the Hub for subsistence farming to meet family needs. Manuals are avoided in these

cases, as they can overwhelm or alienate the participants. Instead, the focus is on hands-on demonstrations and verbal instruction. Farmers who are literate or more commercially inclined, receive advanced training, including manuals and written materials, to equip them for scaling their operations into agribusiness. The Hub's primary goal is addressing food security, ensuring that farmers produce enough to feed their families while promoting healthy eating. Recognising the barriers that illiterate farmers face, the Hub simplifies requirements such as business plans or cooperative constitutions, making its services more accessible. This inclusivity reflects its commitment to empowering even the most vulnerable farmers, despite their limited potential for transitioning to commercial farming (interviewee 1).

This methodology fosters inclusivity and practical support for farmers with diverse capabilities. The Hub ensures that its interventions are effective and sustainable by focusing on site feasibility, simplifying requirements, and customising training approaches. However, the reliance on basic training for illiterate farmers limits the potential for these individuals to grow into commercial farming (interviewee 3). Conversely, providing advanced training to literate farmers creates opportunities for scaling operations, contributing to economic growth in the region.

4.4 Services of the Hub

The Umbumbulu Agri-Hub plays a pivotal role in supporting farmers through mentorship, training, and the provision of essential resources. This includes infrastructure, such as fencing, containers for tools and produce storage, water storage for irrigation, and seeds. The support extends to market access efforts, although the Hub faces significant challenges. Market days are organised at depots, although limited space for displaying produce often demotivates farmers. The last market day was in April 2023, which highlighted this limitation, reflecting on the need for better-organised events and infrastructure to enhance market access for farmers. The Umbumbulu Agri-Hub offers many services tailored to meet the distinct requirements of smallholder farmers (Gilmore & Chasomeris, 2015), including:

1. Training and mentorship services to enhance agricultural skills and methodologies.
2. Supply of subsidised inputs such as seeds and seedlings through a seedling bank.

3. Marketing support to enable market access through promoting and selling agricultural products on behalf of farmers.
4. A designated extension officer provides technical assistance and advisory services.

The Centre provides agricultural tools and equipment to lower production expenses for farmers, which focuses mainly on vegetable and seasonal herb cultivation for specialised local markets. These services are especially advantageous in rural areas where market options are few and agricultural supplies may be challenging to acquire. The eligibility criteria for farmers to receive support from the Hub emphasise land availability. During the initial stages, the Hub inspects and tests soil to ensure that it is suitable for productive farming. This approach ensures that resources are directed to viable projects, and thus optimising the Hub's impact on agricultural development.

However, the Hub lacks a formal marketing strategy, although various efforts have been made to promote its activities and engage with the farming community. Interviewee 2 uses opportunities such as talks and farmer meetings with local associations, such as Folweni, Umbumbulu, Mkhomazi, and Mfume, to raise awareness about the Hub's services. The Municipality complements these efforts through social media platforms such as Facebook and Instagram to provide information to the public. Market days are also leveraged to profile farmers and publish their details on social media, although the Hub receives limited direct promotion during these events.

Further outreach efforts include newspaper advertisements and participation in city-wide programmes such as Masakhane and Operation Sukumasakhe. These initiatives, led by the Head of the Agroecology unit, aim to inform the public about the Hub's services, provide contact details of Hub managers, and encourage farmers to seek support. Additionally, workshops and training sessions are conducted to build the farmers' capacity and foster community engagement. Despite these efforts, the Hub faces resource shortages that impact its ability to function effectively. The Hub lacks dedicated marketing efforts and infrastructural limitations, such as inadequate marketing and space restrictions for displays. This decreases its potential to support the farmers fully (interviewee 4). Addressing these challenges by developing a cohesive marketing strategy

and improving the facilitation of events would strengthen the Hub's role in enhancing farmer productivity and market access.

4.5 Capital assets and infrastructure

The Hub's physical architecture is simple yet practical, comprising of two repurposed shipping containers beneath a singular roofing system on a 600 square meter serviced plot. These containers contain vital amenities such as offices, restrooms, refrigeration units, and areas for produce grading, weighing, and washing. The property features a demonstration garden for agricultural instruction and parking facilities, which augments the Hub's operational capacity. The capital assets and infrastructure at the Umbumbulu Agri-Hub present significant challenges that impact the its operational efficiency and ability to support the farmers fully. The infrastructure, including the buildings, is notably inadequate. The Hub has only two toilets, which becomes a significant issue during market days when high foot traffic leads to long queues. Accessing these facilities after physically demanding work in their gardens is particularly stressful for the farmers. Additionally, the Hub's small structure limits its functionality, with a boardroom that can accommodate only a few people. The Hub needs to outsource space for larger meetings from other facilities such as Sizakala. Furthermore, insufficient parking space for vehicles and tractors further complicates logistics during events or busy operational periods (Interviewee 2).

Despite these challenges, the Hub's strategic location at the heart of the southern region of the eThekweni Municipality enables it to serve many farmers effectively. Its centralised position enhances accessibility, allowing it to act as a focal point for agricultural support. However, its assets are stretched thin, including two tractors, one water truck, and one van. The tractors are tasked with servicing the entire southern region, a vast area, and rely on just two implements – a plough and a disc. Similarly, the 6 000-litre water tanker serves the southern region and the entire eThekweni Municipality, underscoring the strain on resources (Interviewee 1).

Interviewee 3 emphasised the need for significant infrastructure and operational improvements to address these limitations. Key recommendations include the development of a larger, agro-oriented packhouse with proper food processing facilities and a cooling system to help farmers store and

process their produce effectively. Additionally, expanding the boardroom to accommodate more farmers in one place would improve training and engagement sessions. The Hub also urgently requires more staff, tractors, and water tanks to address the backlog caused by limited resources and personnel. While the Hub is operationally sound despite these constraints, the shortage of infrastructure and assets significantly hinder its ability to meet the growing needs of the farmers in the region. Addressing these issues would enhance its efficiency, and unlock its potential to serve as a model for agricultural development, supporting farmers with better resources and facilities. In summary, while the Hub demonstrates resilience and functionality, strategic investment in its capital assets and infrastructure is critical to scaling its operations and impact.

4.6 Administration

The Hub functions with a compact team of three personnel, comprising a centre manager, administrative assistant, and an extension officer to facilitate efficient operations. The Umbumbulu Agri-Hub's hybrid paradigm is practical and contextually appropriate. It utilises municipal finance and NGO administration to solve significant deficiencies in resources and skills. However, its viability relies on ongoing external finance, enduring infrastructure development, and the capacity to expand services in response to the rising demand. The inadequate infrastructure and dependence on provisional structures emphasise the necessity for investment to provide more permanent and resilient facilities. Furthermore, broadening collaborations, particularly with private sector entities, may diminish reliance on public funding and improve financial resilience.

This institutional framework corresponds with agricultural development trends, wherein hubs are widely acknowledged as essential instruments for enhancing production, facilitating market access, and strengthening the capabilities of smallholder farmers (Gilmor & Chasomeris, 2015).

4.7 Partner leveraging and support roles

The Umbumbulu Agri-Hub's engagement with stakeholders and external partners is limited, as it primarily focuses on collaboration within the eThekweni Municipality and its internal sister departments, such as agribusiness. While this internal coordination helps to address immediate

farmer needs, the Hub has had minimal interactions with broader stakeholders or external organisations. Efforts to engage with food partners and farmers servicing markets in Marianhill eThekweni have been sporadic and lacked long-term integration. These stakeholders were involved in training activities related to marketing, packaging, and grading produce, but the partnerships have not been fully leveraged for sustained collaboration. Currently, the Hub works with the National Department of Agriculture to provide guidance and support, but this interaction appears more transactional than strategic. The Hub primarily relies on informal communication, or a "word-of-mouth" approach, to facilitate partnerships and guidance. This reliance on informal channels reflects the lack of a structured framework for stakeholder engagement and outreach, which limits the Hub's ability to expand its support network and leverage external expertise effectively.

One critical gap is the absence of formal evaluations or adjustments based on feedback from partners or farmers. Without regular assessments of the Hub's engagement strategies and partnership outcomes, opportunities for improvement or expansion remain unexplored. This lack of evaluation also hinders the development of a more systematic approach to leveraging external partnerships, which could enhance the hub's capacity to provide comprehensive support to farmers.

4.8 Challenges

Umbumbulu Agri-Hub operates as one of the six agricultural hubs within the eThekweni Municipality area, explicitly representing the southern region. Despite its strategic importance in supporting agriculture in this region, it is the smallest of the hubs, covering over 20 hectares. The Hub's origins trace back to the Municipality's agricultural policy adopted in 2004, which recognised the need for a dedicated facility to serve the southern areas. This led to the formation of the Umbumbulu Agri-Hub to address the agricultural needs which the existing Newlands Hub could not fully accommodate due to space constraints.

However, the Hub faces several operational challenges, particularly regarding staffing. According to the Agricultural Coordinator at Umbumbulu, the Hub is significantly understaffed, with only two general workers, one tractor driver, one heavy-duty driver, and the coordinator. This situation

is reflective of the broader staffing shortages across all the six hubs. The Head of Agroecology confirmed that the entire Agriculture division under the municipality employs just 39 staff members, far short of the required 178. These shortages are attributed to several disruptions, including the COVID-19 pandemic, July riots, and recent floods, which compounded the existing budget constraints.

The lack of personnel directly impacts the efficiency and effectiveness of the Hub. The coordinator noted that at least six tractor drivers, two heavy-duty drivers, and five agricultural assistants would be required to function optimally. Although the Municipality provides critical infrastructure such as land and water storage, the Hub itself is not self-sufficient. It offers free services to farmers as part of its public mandate and its operations are reliant entirely on an annual budget allocated by the Municipality. This operating budget funds agricultural inputs, salaries, and other essentials. However, it is insufficient to meet the growing demands of the agricultural community. Logistics further hinder operations. According to the Agribusiness Development Facilitator, the Hub's equipment and tractors are in poor condition, and logistical issues, such as the unavailability of vehicles for field visits, disrupt planned activities. These challenges are compounded by administrative difficulties and the limited capacity of human resources, leaving fewer employees to manage an ever-increasing number of farmers. The Head of Agroecology highlighted that while there is capital funding for infrastructure improvements within the community, no direct capital investment is made to the hubs, which results in them relying solely on the operating budget.

The funding inadequacy is particularly stark. The Municipality's total budget for agricultural infrastructure once stood at R21 million, yet it is now strained by the growing number of farmers requiring support. For the Umbumbulu Agri-Hub alone, R6 million is allocated for the financial year, despite an estimated demand of R50 million for the entire geographic area that it serves. This shortfall limits the Hub's ability to address critical needs, such as fencing to protect crops from livestock.

4.9 Events impacting the Umbumbulu Agri-Hub model

The operations of the Umbumbulu Agri-Hub have been significantly affected by a series of events, including socio-political unrest, natural disasters, and the COVID-19 pandemic. These disruptions have created logistical, operational, and community challenges that have hindered its ability to serve farmers effectively.

4.9.1 July unrest

In July 2021, a widespread civil unrest swept through parts of South Africa, including the eThekweni region. Known as the "July Unrest", this period of violence, looting, and economic disruption severely impacted businesses and infrastructure (Desai, 2022). For the Umbumbulu Agri-Hub, this unrest disrupted supply chains and logistical operations. Due to transportation shutdowns, farmers struggled to transport personnel and access essential inputs like seeds. The closure of markets and shops during the unrest also prevented the timely sale of perishable produce, resulting in significant financial losses. This crisis highlighted the critical vulnerabilities in the Hub's supply chain and emphasised the need for robust contingency measures to ensure continuity during such events.

4.9.2 Floods

The KZN region, including the eThekweni area, experienced devastating floods in April 2022, which are among the worst in the Province's history. Torrential rains caused widespread destruction, leaving many farmers without the necessary infrastructure or resources to recover. Crops were washed away shortly after planting or destroyed near harvest, compounding the smallholder farmers' financial challenges (Mudefi, 2023). In response, the Hub shifted its focus to assist those most severely affected by the floods. While this effort demonstrated the Hub's commitment to farmer support, it led to delays in regular operations and dissatisfaction among farmers not receiving direct assistance. The floods revealed the urgency of investing in climate-resilient infrastructure and proactive disaster management strategies to protect farmers and the Hub's operations.

4.9.3 COVID-19 pandemic

The COVID-19 pandemic presented significant challenges for both the farmers and the Hub. Farmers could not tend to their crops and assets during the lockdown, leading to widespread crop failures and financial losses. Farms also experienced theft and vandalism due to prolonged periods of inactivity. Restrictions on movement disrupted the Hub's ability to provide timely support. According to Interviewee 1, *“the hub has also been affected by the essence of restriction; it has been over a year; the hub has been operating without electricity, and the farmers could not use the store room anymore.”* Farmers were unable to use storage facilities effectively, which thus amplifying post-harvest losses.

4.9.4 Political instability

Political dynamics in the region have also affected the Hub's functionality. Interviewee 3 noted that some people were referred by the councillor. After the introduction of the uMkhonto weSizwe party (MKP), there was a fight among the farmers, and those who were referred by the councillor of other political parties were chased away, which affected the operation of the Hub because the parties were now using the Hub to fight their political battles. This interference disrupted operations and undermined the Hub's mission to provide impartial support to farmers, irrespective of political affiliations. *“Political instability, especially when it is violent, diminishes the productivity and transactional capacities of the economy. This has adverse consequences for investment and thus future economic growth, a situation which, in turn, creates a fragile socio-political environment”* (Dalyop, 2018:1).

The recurring disruptions have exposed critical vulnerabilities in the Hub's operational framework and its ability to maintain consistent support for farmers. Natural disasters and socio-political instability underscore the need for improved disaster preparedness, infrastructural resilience, and the depoliticised governance of the Hub. Establishing emergency response plans, investment in climate-resilient infrastructure, and strengthened operational independence are essential to mitigating future disruptions. Addressing these challenges will ensure that the Hub can fulfil its mandate and support regional agricultural development.

4.10 Sustainability of the Umbumbulu Agri-Hub model

The sustainability of the Agri-Hub was analysed using the PESTEL framework, which serves as a strategic analysis tool, representing the macro-environment through six segments, namely, Political, Economic, Social, Technological, Environmental, and Legal. This structured segmentation facilitates a comprehensive diagnosis of the macro-environment in which the Umbumbulu Agri-Hub model operates, aiding in identifying threats and opportunities that contribute to achieving its goals (De Sousa & Castañeda-Ayarza, 2022). The PESTEL analysis based on the interviews with the farmers as highlighted in Table 4.1.

4.10.1 Political factors

Farmers reported a lack of awareness regarding specific policies that impede the growth and performance of the Umbumbulu Agri-Hub. This indicated a deficiency in policy awareness, potentially hindering their capacity to utilise current agricultural policies or promote favourable legislative modifications. Insufficient engagement with political structures may diminish their policymaking influence, affecting their operational environment.

4.10.2 Economic factors

The inaccessibility of micro-finance institutions poses a challenge for farmers, potentially restricting their capacity to invest in inputs, equipment, or technology. Profitability presents a challenge, as some farmers report that their produce is mainly intended for subsistence rather than generating income. This highlighted the economic limitations in transitioning the farmers from subsistence to commercial scales, necessitating specific financial support mechanisms.

4.10.3 Social factors

Farmers encounter significant socio-cultural obstacles. The COVID-19 pandemic disrupted youth training programmes and intensifying a generational disinterest in farming, as observed by the farmers. Numerous farmers reported dissatisfaction regarding their challenges in transmitting knowledge and skills to younger generations, who perceive farming as undesirable or unprofitable.

The perception of farming as a subsistence activity rather than a commercial enterprise further restricts its appeal and social value.

Table 4.1: Interviews on the political, economic, social, technological, environmental, and legal challenges faced by the farmers

Themes	Concepts	Responses
Political	Are any existing policies that hinder the growth of Umbumbulu farmers ?	Farmers stated that they were not aware of any existing policies that hinder the growth and performance of UF
Economic	Access to micro-finance institutions Did profit generate enough profit?	Farmers stated a lack of financial support from the micro-finance institutions
Socio-cultural	Is Umbumbulu farmers affected by unemployment? Age?	COVID-19 put a stop to crop production training programmes that were implemented in Umbumbulu specifically for the youth. “I have nothing to show to encourage the youth to participate in farming” (farmer 1) Farmers expressed that they are uninterested and cannot pass on their knowledge and skills to the youth. “My produce is only for subsistence purposes and is not utilized as a source of income” Farmer 2)
Technological	Constraints to access technology	“This is for the youth” (farmer 3)

		Farmers do not know of technical ways of accessing markets and information.
Environmental	Common environmental issues	<p>Farmers have stressed heavy rainfall, high temperatures, and hailstorms playing a significant role in crop loss, with the farmers depending on rainfed agriculture severely affected during the dry season.</p> <p>“I use the municipal tap water, and sometimes there are water cuts”(farmer 4)</p> <p>Farmers stated that the river showed visible signs of contamination. However, they still await water quality results from scientific assessments conducted on the river by the local municipality and academics.</p>
Legal	Are there any discrimination, consumer, employment, and health and safety laws?	The farmers stated that they are often required to provide certification (i.e., SA-GAP certification) to ensure food safety and quality standards are met by the markets. Farmers feel robbed (profit) in the formal markets due to the lack of certification.

4.10.4 Technological factors

Farmers face challenges in accessing modern technology and market information as they frequently view it as primarily intended for younger individuals. The generational divide hinders the adoption of technological solutions that could improve productivity and expand market reach. The absence of understanding regarding technical platforms for marketing and information dissemination exacerbates these challenges.

4.10.5 Environmental factors

Environmental challenges are significant and characterised by heavy rainfall, increased temperatures, hailstorms, and drought, and they contribute to considerable crop losses. Farmers who are dependent on rained agriculture exhibited heightened vulnerability during arid periods. Access to water presented challenges, with certain farmers experiencing municipal water interruptions or depending on contaminated river sources. Ongoing scientific assessments contribute to water quality uncertainty, which complicates environmental management efforts.

4.10.6 Legal Factors

Legal compliance presents a considerable challenge, especially on food safety and quality standards. Farmers experience a disadvantage in formal markets due to the absence of certifications, such as the SA-GAP, which are frequently necessary for entry into lucrative supply chains. The observed disparity in market participation highlighted the necessity for training and support to comply with regulatory standards.

4.11 Feasibility and sustainability

The sustainability of the Umbumbulu Agri-Hub was evident. This remains a work in progress, with significant areas requiring attention, particularly in infrastructure and resource allocation. Interviewee 1 at the eThekweni Municipality emphasised the Hub's feasibility, noting that it complements the Department of Agriculture by alleviating the demand for essential services such as tractor infrastructure. Farmers who cannot access assistance directly from the Department of Agriculture rely on the Hub as a reliable alternative. This synergy between the Hub and the Department enhances agricultural productivity and strengthens the support for eThekweni farmers. Interviewee 4 underscored the Hub's role in transforming smallholder farms into viable businesses. Farmers are mentored to operate on a small scale through agroecology, eventually transitioning to agribusiness. They receive guidance on operating their farms as profitable enterprises. The manager noted that, "*our slogan is, 'Plant, eat what you can, and then what you cannot eat, sell it,'*" which encapsulates the Hub's sustainable farming philosophy. Furthermore, agroecology is

gradually withdrawing its direct resources, as the Hub grows increasingly self-sufficient, with agribusiness providing critical support, including marketing and business mentorship.

Despite its promising potential, the Hub faces substantial challenges. According to Interviewee 1, the most pressing issue is insufficient staff to manage the growing number of farmers. Limited human resources hinder the ability to provide individualised support to all farmers. Additionally, budget constraints for infrastructure development further compound the problem, which is exacerbated by unresolved land issues. While the Municipality has allocated operating funds for the Hub, Interviewee 2 and 3 stressed the importance of seeking external funders and partnerships to sustain operations, especially since charging farmers for services is not feasible, given the Hub's food security mandate. Interviewee 2 identified budget cuts as a significant challenge, yet expressed optimism about the Hub's future growth. The interviewee 1 envisions the Hub expanding its capacity to provide more services, framing it as a crucial vehicle for addressing food insecurity and implementing food security policies. However, he also acknowledged that political factors such as competing priorities between agriculture and housing development impede progress. The government, he suggested, needs to adopt a more holistic approach to community development, ensuring space for agricultural activities alongside housing and social facilities.

Interviewee 4 highlighted another critical sustainability issue, which is the need for an exit strategy for farmers. Without a structured plan for farmers to graduate from the Hub's assistance, many remain dependent, and thus limiting the Hub's capacity to support new participants. This dependency and space limitations constrain the Hub's ability to expand its reach. The facilitator advocated sourcing external grants and fostering partnerships with public and private entities, including NGOs and agencies, to reduce reliance on municipal funding and ensure the Hub's long-term sustainability.

Various strengths and challenges influence the sustainability of the Umbumbulu Agri-Hub model. The Hub's integration of external partnerships and funding mechanisms has provided access to resources and technical expertise that surpass its internal capacity. This collaborative approach has

enhanced its capacity to meet smallholder farmers' needs effectively. Additionally, its alignment with government policies prioritising support for smallholder farmers establishes it as a significant contributor to overarching agricultural development objectives. However, challenges could jeopardise the model's sustainability over time. The absence of permanent infrastructure, especially in training and storage facilities, compromises the Hub's capacity to sustain and expand its operations, leading to uncertainty regarding its future. The temporary structure of the Hub has resulted in the farmers' hesitancy regarding total commitment to its membership programmes, potentially diminishing its overall impact. Addressing these gaps is essential for ensuring the model's sustainability.

4.12 Conclusions and recommendations

In summary, while the Umbumbulu Agri-Hub serves a vital role in the agricultural development of eThekweni's southern region, its institutional setup is constrained by insufficient staffing, logistical challenges, and inadequate funding. Addressing these challenges will require increased investment, both in terms of human and financial resources, as well as more effective logistical and administrative planning to meet the growing demands of farmers in the region.

In conclusion, while the Umbumbulu Agri-Hub demonstrated significant potential as a sustainable agricultural support system, addressing infrastructure, funding, and farmer dependency challenges is essential. By leveraging partnerships, adopting a holistic development strategy and implementing farmer graduation plans, could allow the hub to solidify its role in combating food insecurity and fostering sustainable agricultural practices in eThekweni.

CHAPTER FIVE

RESULTS, FINDINGS, AND ANALYSIS OF QUANTITATIVE RESEARCH DATA

5.1 Introduction

This chapter summarises the results of the quantitative data gathered to address the research objectives, in order to assess the role and sustainability of the Umbumbulu Agri-Hub as a model to support smallholder farmers. Semi-structured questionnaires were randomly administered to farmers who are agricultural hub members. Data were collected from 29 farmers at their monthly meeting on the 4th of October 2024. The interviews were conducted with the Umbumbulu Agricultural Hub Coordinator, Municipal Agricultural Ecology Head of Department, Municipal Agricultural Ecology Senior Manager, and the Municipal staff from the Agribusiness unit. The data collected were processed, analysed, and discussed.

This chapter presents the findings and analysis of the data obtained on the impact of Umbumbulu Agri-Hub on the income levels of the smallholder farmers in the eThekweni region, the impact of Umbumbulu Hub on the productivity and yield of crops, and the feasibility of the Umbumbulu Agri-Hub model. This section summarises the main qualitative findings from the study, discusses the results, and offers conclusions based on the study's objectives.

This chapter examines the impact of the Umbumbulu Agri-Hub on income levels, feasibility, and agricultural activities. It also explores its effects on crop productivity, yield, and market access, as well as the role of various stakeholders in supporting smallholder farmers and concludes with key insights.

5.2 Impact Umbumbulu Agri–Hub on income levels and its feasibility

This section described the respondents' socioeconomic and household characteristics of smallholder farmers in Umbumbulu and provides background information on their participation

and the impact of the Agricultural Hub in the area. The first section presents the farmers' socioeconomics and household demographics, which might influence the performance of the Hub. This is followed by a discussion on the impact of the Umbumbulu Agri-Hub model on income, yield, and productivity. The drivers of income realised in crop production among Umbumbulu Agri-Hub farmers were estimated using the OLS model, as well as the feasibility of the Hub model.

5.2.1 Household demographics and socio-economic characteristics

The study considered the following demographics: age, gender, marital status, education, number of dependents, employment status, and source of monthly income.

5.2.2 Gender of respondents

Figure 5.1 highlights the gender distribution of the respondents in the study, where 52% were female and 48% were male. In the area, agricultural activities are predominantly conducted by female household members, as most men are occupied with wage labour or are employed as migrant labourers in neighbouring cities. This aligns with the study by Gilmore and Chasomeris (2015), who evaluated the Umbumbulu Agri-Hub and found that 60% of the farmers were female. Seleti and Tlhompho (2014) found that South African rural women farmers play a central role in household and community agricultural activities. Women are assets in Africa, producing cash and subsistence crops (Todaro & Smith, 2011).

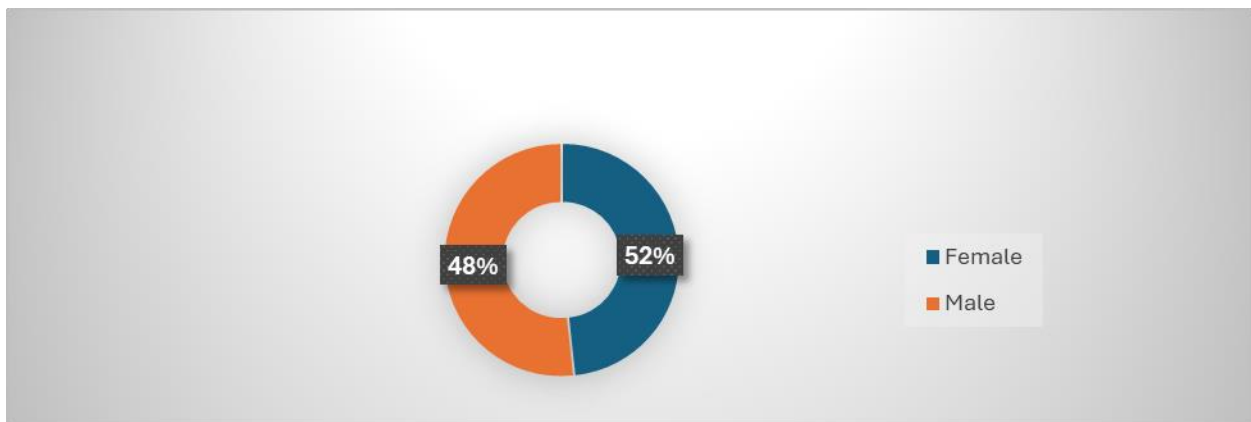
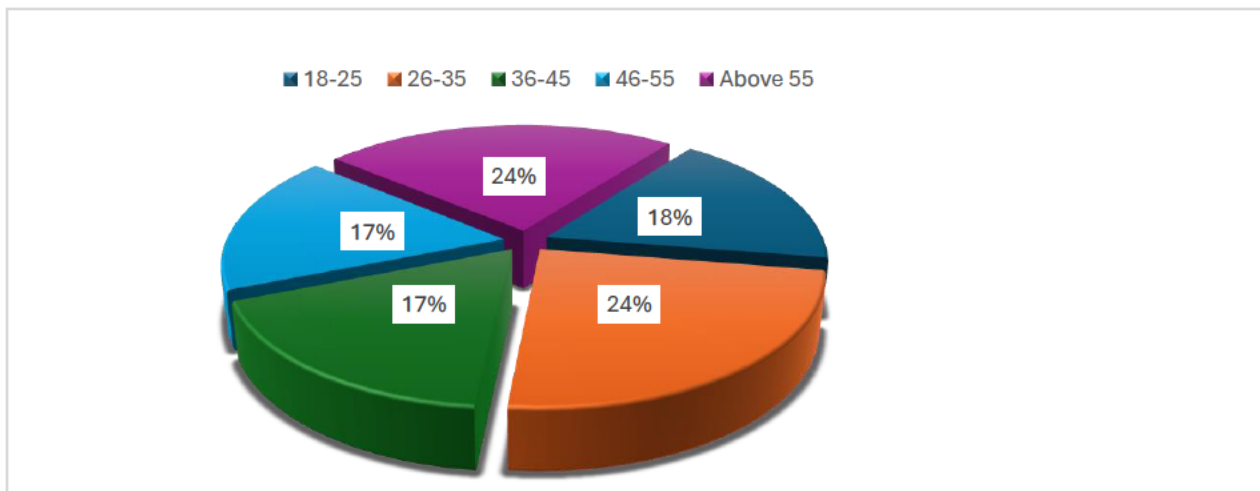


Figure 5.1: Distribution of respondents by gender

The World Economic Forum (2018) stated that women comprise 70% of African household food production. This could be the reason women are dominating the agricultural sector, as agriculture is the primary food source, and most rural farmers practice subsistence farming.

5.2.3 Age of the respondents

Figure 5.2 indicates the age distribution of the respondents at the Umbumbulu Agricultural Hub. 18% of the respondents were aged 18-25, while 24% were between 26 and 35, 17% were between 36 and 45, 17% were between 46 and 55 years, and 24% were aged above 55 years. This indicates that 87% of the respondents were of working-age. The StatsSA (2021) revealed that the working-age population consisted of individuals aged 15-64 years, and the share of the working-age population in the total population was 66.1% in 2021. The mean age was 42.103 (± 15.864) years, suggesting that the farmers are still active and agile. This aligns with the findings by Gilmore and Chasomeris (2015), who found that the average age was 49 years. This can be attributed to the agrarian nature of the Umbumbulu community, as it is primarily an agricultural village with limited opportunities for this generation to pursue other careers, leaving farming as their only alternative.. Participation in agricultural activities is influenced by age in many African regions, including urban areas (Agbadi et al., 2017).



Note: Mean age is 42 years

Figure 5.2: Distribution of respondents by age

5.2.4 Marital status of the respondents

Most respondents (65.5%) were single, while 27.59% were married, and only 6.9% were widowed, as shown in Figure 5.3.

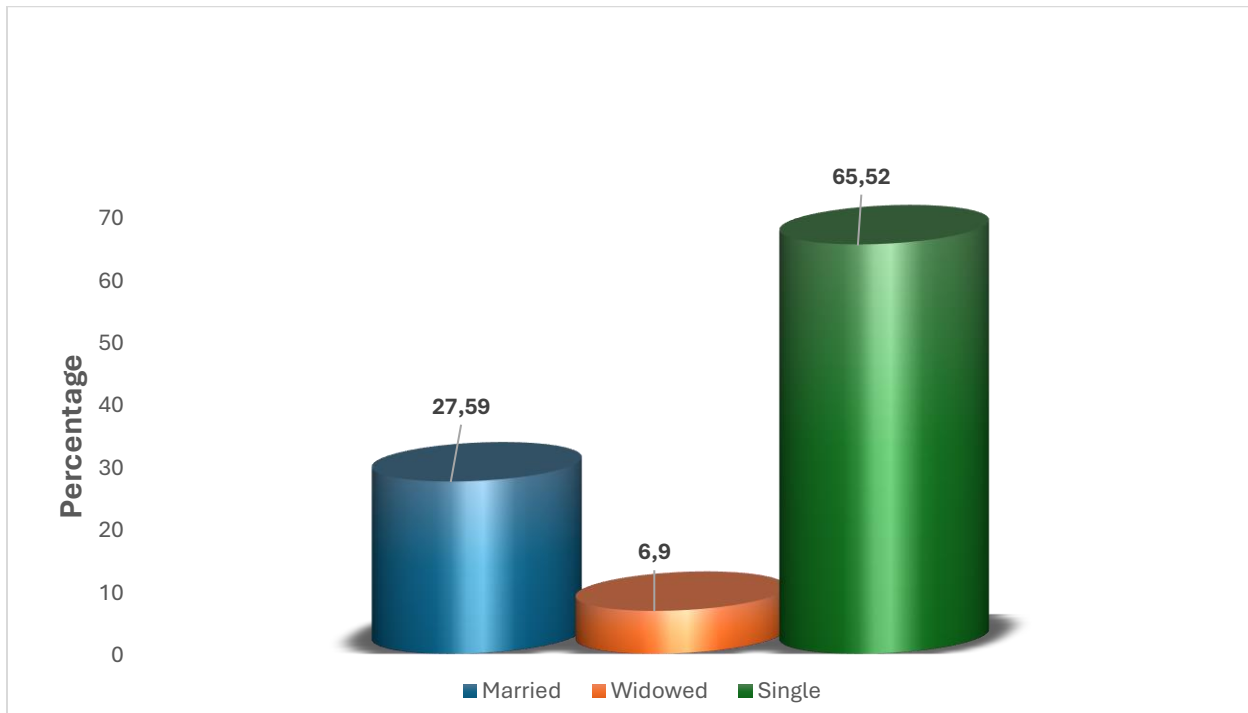


Figure 5.3: Distribution of respondents by marital status

5.2.5 Education level of the respondents

Figure 5.4 indicates that 89.66% of the farmers received formal education, about 45% possess secondary education, while 28% have attained higher education, and 10.34% completed primary education. The findings align with those by Chipfupa and Tagwi (2021). However, the literacy level is low, although the technical expertise necessary for effective farm management, pest and disease control, and harvesting and post-harvest production is adequate. The low level justified a lack of skills and ability, reducing their employability even if job opportunities exist in the formal sector. This showed the availability of youth engagement in agriculture as a viable livelihood option. Gilmore and Chasomeris (2015) observed that the significant illiteracy rate among farmers suggested that they would greatly benefit from the Agri-Hub's training and assistance programmes. All educational attainment levels must be considered when developing the Agri-Hub's programmes.

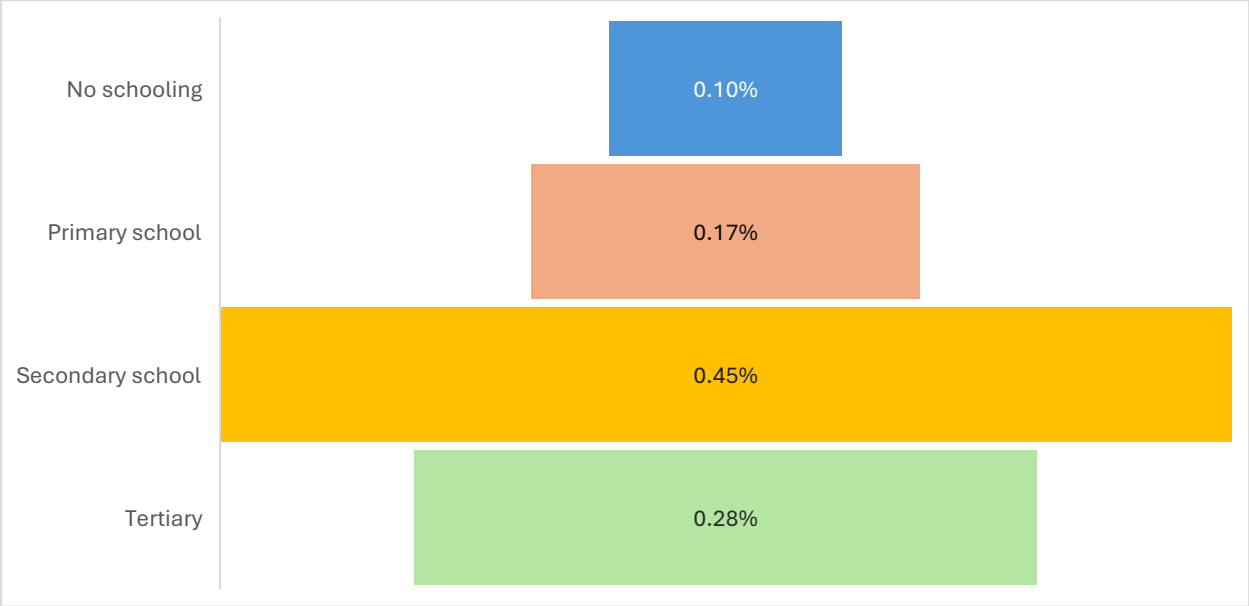


Figure 5.4: Distribution of respondents by level of education

5.2.6 Sources of income

Figure 5.5 displays the primary income source for the Umbumbulu Agri-Hub farmers. The primary source of income for these farmers is farming, which accounts for 31.03% of their income, followed by social grants at 24.14%, full-time employment at 13.79%, remittances at 13.79%, part-time employment at 10.34%, own enterprises at 3.45%, and other sources at 3.45%. This outcome corroborates the findings by Bhatti et al. (2021), who asserted that crop production and livestock farming constitute a substantial income source for smallholder farmers. This indicated that enhancing smallholder livelihoods necessitates a balanced focus on all agricultural products (the whole-farm strategy), where 61% depended on alternative income sources, including social grants, remittances, self-employment, salaries, and wages. Most smallholder farmers in South Africa tended to diversify their income and livelihood sources when feasible, a strategy that mitigates risk and serves as a buffer against poverty. This result supported the argument made by Boakye et al. (2021), that, although agricultural production and the exchange of produce contributed to livelihood and income, a larger proportion of income is derived from alternative sources. These include remittances in the form of social grants and migrant labour contributions, buying and selling goods, particularly consumables such as food, beverages, and paraffin, and full-time and seasonal off-farm employment in rural towns or on commercial farms.

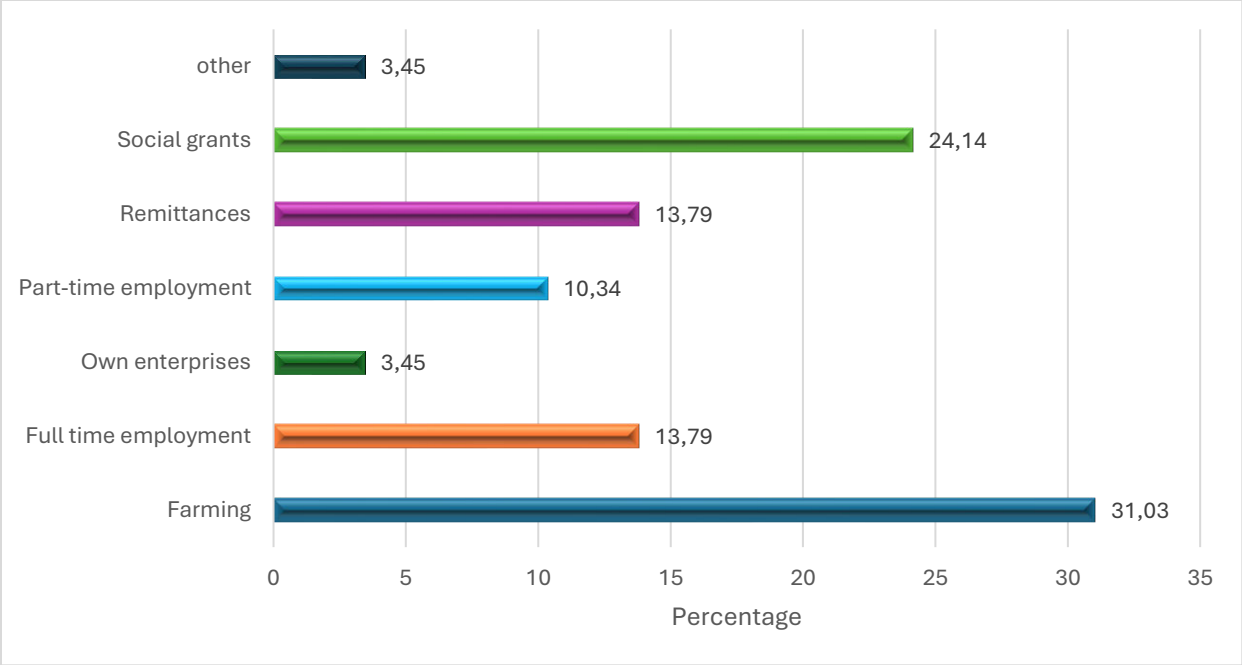


Figure 5.5: Farmer’s main sources of income

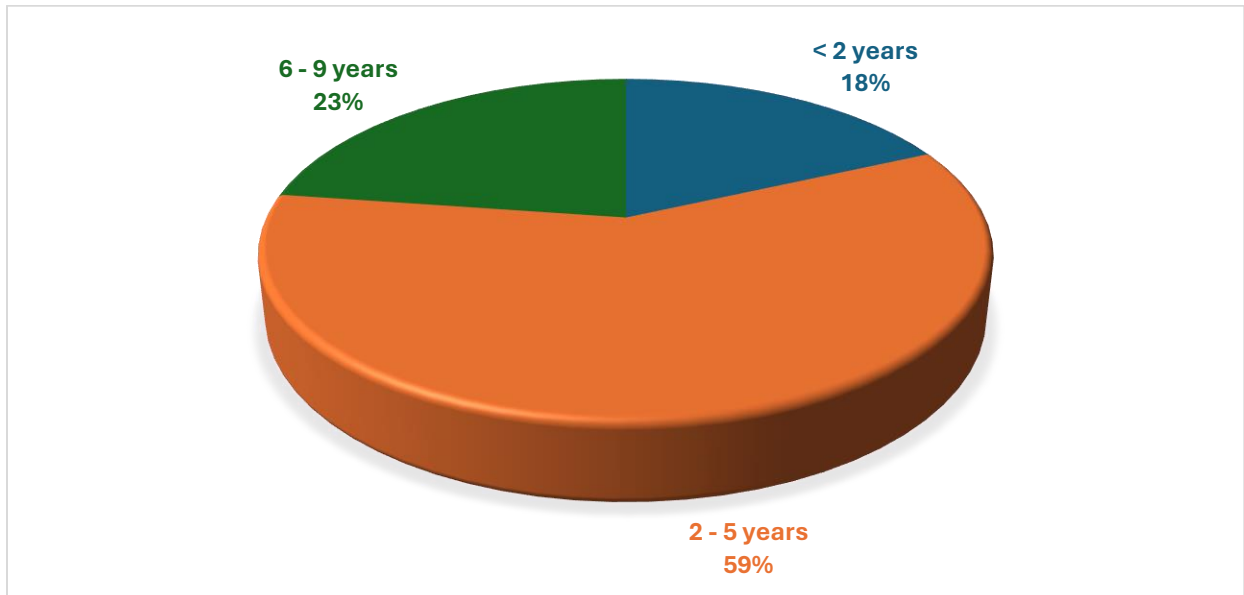
5.3 Agricultural activities

This section documents the Umbumbulu Agricultural Hub's agricultural operations to ascertain the local farmers' support needs. The subsequent subsections address the years of experience, farming types, and farm size.

5.3.1 Years of farming experience

The distribution of farming experience among farmers in the Umbumbulu Agricultural Hub, as shown in Figure 5.6, provides essential insights for customising support measures to meet their needs. The statistics indicate that 77% of the farmers have five or less years of farming experience, which implies that a significant portion is relatively inexperienced in farming. The mean number of years of experience is 6.5, with a standard deviation of 5.48. This could result in insufficient knowledge and skills to optimise productivity and profitability. The prevalence of the less experienced farmers highlighted the necessity for targeted interventions that concentrate on fundamental agricultural practices, market integration, and capacity development. Gilmore and

Chasomeris (2015) observed that the development stage of farmers is a critical factor in determining the necessary support measures.



Note: Mean value = 6.531 (5.448)

Figure 5.6: Farming experience for the respondents

Furthermore, 23% of the farmers possessing six to nine years of experience constitute an intermediate group. Their previous experience with farming may be significant. However, their success rate is likely contingent upon advanced support measures. This includes improved market access, value-chain integration, and technical assistance for adopting modern farming techniques. Only 18% of the farmers with less than two years of experience, many of whom are likely younger individuals, highlighted the necessity of targeted programmes to facilitate the transition from subsistence farming to semi-commercial production. The programmes should incorporate mentorship, financial literacy, access to credit, and incentives to promote sustained participation in agriculture.

5.3.2 Farming type

The predominant category of farmers at Umbumbulu the Agri-Hub consists of semi-commercial farming at 48%, followed by subsistence farming at 45%, while commercial farming constituted

only 7%, as shown in Figure 5.7. The findings differ slightly from those by Gilmore and Chasomeris (2015), who reported that most farmers (84%) engage in semi-commercial farming. In their study, 85% utilise 20% of their produce, while 15% utilise 50%, and 10% engage exclusively in subsistence farming, consuming all their produce. Further, only 6% operate on a fully commercial basis, selling all their produce to the Agri-Hub.

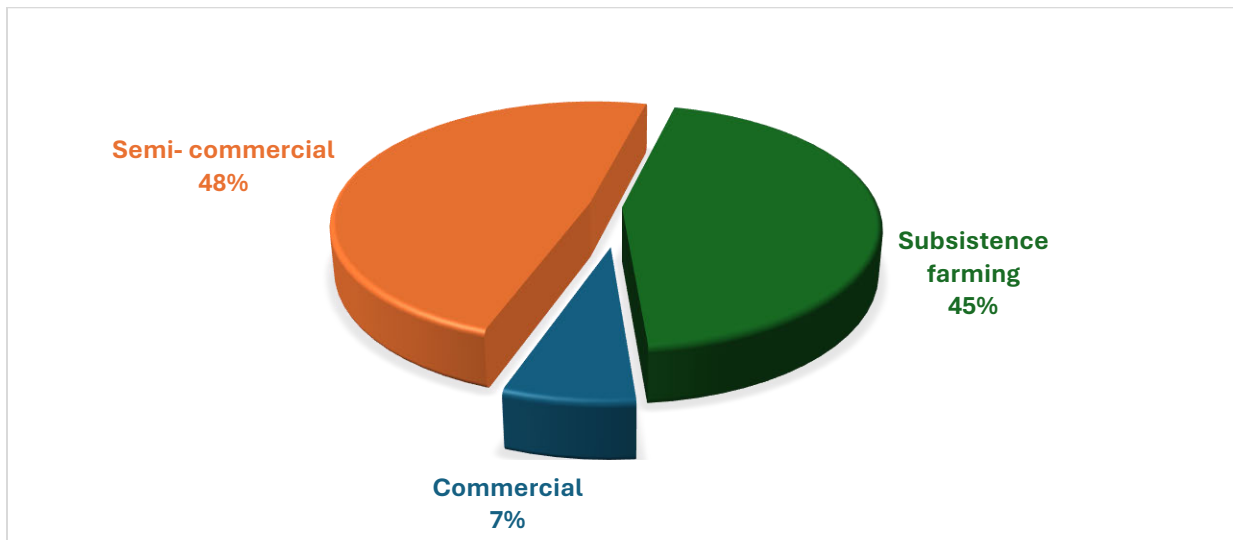


Figure 5.7: Types of farming among the respondents

5.3.3 Farm size

Figure 5.8 highlights the farm sizes cultivated by farmers at the Umbumbulu Agricultural Hub. A large percentage (31%) of the farmers grow less than one hectare of land, while 27.6% operate in areas ranging from one to two hectares, where 17.2% of those surveyed are farming on land from 2.1 to three hectares, while the remaining 24.14% are farming on land above three hectares. Literature indicated that a sizeable proportion of homeland households have access to arable land, potentially up to 58%, yet their average land holdings were significantly small, at less than two hectares. There is a notable variation in plot sizes, with a small percentage of households cultivating plots exceeding three hectares.

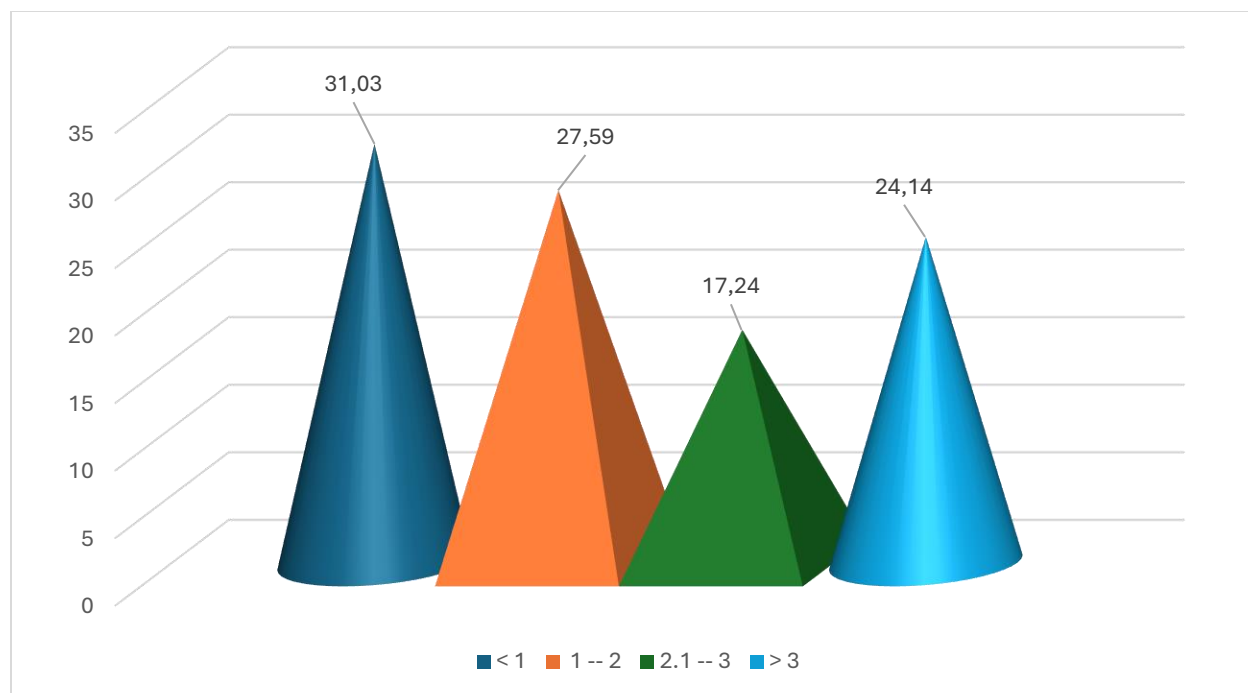


Figure 5.8: Farm size (in hectares)

The size of a farm is a significant factor that influences the income of smallholder farmers. Farmers with less than two hectares are constrained to subsistence farming or low-intensity cash crop production, limiting their income-generating capacity. Farmers managing more than two hectares can attain a modest income by effectively utilising the resources provided by the Agri-Hub. This includes access to enhanced inputs, training, and market connections. Farmers managing larger plots can leverage economies of scale and value-chain integration supported by the Agri-Hub. The identified differences underscore the necessity for targeted interventions by the Agri-Hub to assist smaller landholders, thereby ensuring equitable access to resources and opportunities for enhancing productivity and income generation.

5.4 The impact of Umbumbulu Agri-Hub on the farmers' income levels

Table 5.1 indicates that 24.14% of the farmers participated in the Hub mainly for household consumption. They are likely to be engaged in subsistence farming, with the primary objective of ensuring food security for their families. Additionally, 48.28% of the farm is utilised it for both household consumption and commercial purposes. This group embodies a transitional segment

progressing towards semi-commercial farming which seeks to reconcile their nutritional requirements with the potential for supplementary income generation. Finally, 27.59% of the farmers engage solely in commercial farming, which aligns significantly with the Hub's goals of promoting entrepreneurship and market-oriented agriculture (Gilmore & Chasomeris, 2015).

The focus on income generation among farmers indicated the Hub's positive impact on their economic well-being. The Hub integrates commercial opportunities with support for subsistence needs, addressing various farmer profiles and promoting inclusivity and economic resilience. Farmers engage in the Hub for diverse reasons, highlighting agriculture's dual purpose of ensuring household food security and generating income. Studies indicated that smallholder farmers participate in agricultural activities to fulfill household sustenance needs and generate income (StatsSA, 2020). Von Loeper et al. (2016) assert that subsistence farming remains a fundamental goal for numerous rural households, especially in developing areas, where food security poses a significant challenge. The study indicated that 24.14% of farmers engage with the Umbumbulu Agri-Hub exclusively for household consumption. The shift to semi-commercial farming is demonstrated by the 48.28% of farmers engaging in household consumption and commercial activities facilitated by hubs that offer access to resources and markets (Gilmore & Chasomeris, 2015).

Table 5.1: Impact of Umbumbulu Agri-Hub on the income levels

Variable	Percentages
Household consumption only	24.14
Household Consumption and Selling	48.28
Selling only	27.59

The benefits, as reported by farmers, emphasise the Hub's essential role in enhancing livelihoods, where 75.86% of the farmers recognise income generation as a primary benefit, while 72.42% identify food security as a significant advantage. This is significant, as 23.6% of the population experience food insecurity as of 2020 (StatsSA, 2020). A significant majority indicated that the

Umbumbulu Agricultural Hub effectively facilitates economic opportunities, allowing the farmers to sell surplus produce and shift towards more profitable farming practices. This corresponds with the dual purpose and motivations of numerous participants, that highlighted the Hub's function in enhancing household nutrition through improved productivity and resource access. The economic advantages were noted by farmers, with 75.86% indicating an income generation. This corresponds with research that demonstrated that agricultural hubs improve smallholder farmers' access to lucrative markets. Bernard and Spielman (2008) asserted that these hubs facilitate collective marketing and economies of scale to enhance the farmers' bargaining power and decrease transaction costs. Furthermore, food security advantages underscore the significance of hubs in enhancing productivity, as indicated by Boakye et al. (2021), who asserted that access to training and quality inputs enhances household nutrition and agricultural output. Agricultural hubs significantly enhanced income levels for smallholder farmers. Kilelu et al. (2016) indicated that hubs integrating value-chain approaches and providing market linkages are crucial for facilitating farmers' transition from subsistence to commercial agriculture.

5.4.1 Determinants of farm income among Umbumbulu Agri-Hub farmers

A multiple linear regression model was employed to analyse the determinants of increased income among Umbumbulu Agri-Hub farmers. The dependent variable is the **logarithm of farmers' income** (ln income), which provides a normalised measure of income changes and facilitates the interpretation of coefficients as percentage changes. The independent variables include demographic, socioeconomic, and farming-related factors that theoretically influence income.

The general formular of the model is as follows:

$$\begin{aligned}
 \ln(\text{Income})_i &= \beta_0 + \beta_1(\text{Gender}_i) + \beta_2(\text{Age}_i) + \beta_3(\text{MaritalStatus}_i) \\
 &+ \beta_4(\text{EducationLevel}_i) + \beta_5(\text{FarmingExperience}_i) \\
 &+ \beta_6(\text{TypeofFarming}_i) + \beta_7(\text{YearStarted}_i) + \beta_8(\text{LandSize}_i) \\
 &+ \beta_9(\text{AttendedTraining}_i) + \beta_{10}(\text{AccesstoExtensionOfficers}_i) \\
 &+ \beta_{11}(\text{VisittotheHub}_i) + \epsilon_i
 \end{aligned}$$

Where:

The dependent variable is $\ln(\text{Income})_i$: Natural logarithm of income for farmer i

Independent variables:

1. **Gender:** Dummy variable (1 = male, 0 = female).
2. **Age:** Continuous variable (in years).
3. **Marital status:** Dummy variable (1 = married, 0 = otherwise).
4. **Education level:** Years of formal education.
5. **Farming experience:** Years engaged in farming.
6. **Type of farming:** Dummy variable (1 = commercial, 0 = subsistence).
7. **Year Started:** Year farming activities began.
8. **Land size:** Farm size in hectares.
9. **Attended training:** Dummy variable (1 = yes, 0 = no).
10. **Access to extension officers:** Dummy variable (1 = yes, 0 = no).
11. **Visit to the hub:** Number of visits to the Umbumbulu Agri-Hub.

Table 5.2: Determinants of increased income among Umbumbulu Agri-Hub farmers

Log of income	Coef.	St. Err.	P-value	VIF
Gender	-0.103	0.033	0.008***	1.679
Age	0.002	0.001	0.058*	2.097
Marital status	0.026	0.023	0.286	2.453
Education level	0.019	0.022	0.406	2.403
Farming experience	-0.006	0.007	0.368	8.295
Type of farming	-0.046	0.022	0.054*	1.30
Year Started	-0.004	0.005	0.441	5.362
Land size	0.002	0.003	0.633	1.425
Attended training	0.027	0.031	0.403	1.443
Access to extension officers	-0.011	0.017	0.547	1.156

Visit to the hub	0.072	0.034	0.051*	1.631
Constant	4.307	0.133	0.000***	
Mean dependent var	4.307			
R-squared	0.645			
F-test	2.146			
Akaike crit. (AIC)	-59.030			
Bayesian crit. (BIC)	-44.403			
SD dependent var	0.079			
Mean VIF				2.659
Prob > F	0.096			

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The OLS model was utilised to estimate the determinants of farm income among the Umbumbulu Agri-Hub farmers. To avoid biases in the results, multicollinearity and heteroscedasticity were tested before running the regression model that utilised the STATA version 18 software package. The mean VIF for the explanatory variables in the model is shown in Table 5.2. A VIF larger than 10 indicates the presence of multicollinearity among variables, according to Gujarati (1995). The VIF value (mean value of 2.65) was less than the standard threshold VIF value of 10. As a result, the hypothesis of multicollinearity between the variables was ruled out. There were no multicollinearity issues among the explanatory variables used in the model. Furthermore, in regression analysis, one of the assumptions is that the errors term (u_i), should have a standard (constant) variance σ^2 . The heteroscedasticity problem arises when the errors do not have constant variance (Maddala, 2005). The heteroskedasticity was tested Breusch–Pagan/Cook–Weisberg test, and the null hypothesis of constant variance was not rejected with the non-significance of Prob > chi2 = 0.3439. Therefore, heteroscedasticity did not pose a challenge for the OLS result.

The Wald statistic for the regression model was significant at 10%, suggesting a significant fit of the model in explaining the variation. These findings, coupled with no issues of heteroscedasticity and multicollinearity, resulted on the OLS model's estimated coefficients being considerably unbiased and consistent. The R^2 was 0.645, indicating that the variables in the model explain approximately 64.5% of the variation in increased farm income. The significant positive determinant factors are age and visits to the Hub, while significant negative determinant factors are gender and type of farming.

Gender is statistically significant at 1% and a negative determinant of income. Being male was shown to lead to a decrease in their income, possibly due to most of the crop farming being vegetable, which is a major crop that women cultivate. This also meant that efforts to empower women in farming yielded good outcomes and bridged the gender gap. This finding was significant, as it contests the established beliefs regarding male dominance in agricultural earnings. Research indicates that women in small-scale farming frequently demonstrate greater efficiency, attributed to their meticulous resource management and involvement in specialised support programmes designed to empower female farmers (Quisumbing et al., 2023).

These programmes frequently improve women's productivity and market access, which may account for the increased income levels observed among female farmers in this study. This is contrary to the findings of Wale et al. (2021), who found that male smallholder farmers in South Africa tend to be more entrepreneurial than their female counterparts.

The type of farming is statistically significant at 10%, with a negative determinant of income. The negative coefficient for the type of farming indicated that participation in diverse farming activities, such as combining multiple crops, could lead to lower incomes relative to focusing on a single crop (specialisation). This result is consistent with the findings of Amare et al. (2012), who contended that diversified farming systems, despite their resilience, may experience inefficiencies in resource allocation, labour distribution, and market preparedness. Specialisation enables farmers to allocate resources and expertise more effectively, which may result in improved market outcomes and increased earnings.

Age is statistically significant at 10% and a positive determinant of income. This implies that older farmers generally earn more. This outcome is linked to the gradual accumulation of farming experience, resources, and social capital. Experienced farmers can make informed decisions regarding crop selection, resource allocation, and risk management, which enhances their earnings. This is aligned to Sibiya et al. (2024), who found that age positively influenced the level of farm income for small-scale farmers in South Africa Gauteng Province. Paudel et al. (2022) also found that age positively influenced income from farming.

Visits to the Hub were statistically significant at 10%, with a positive determinant of income. Frequent visits to the Umbumbulu Agri-Hub highlighted the value of consistent interaction with its resources and services. This is consistent with the findings of Baiyegunhi et al. (2019) regarding the impact of extension on smallholder farmers' net farm income in South Africa, which indicated that institutional support and farmer involvement in extension programmes significantly enhanced access to training, inputs, and market information, and thus improving productivity and income. Frequent visits were most likely to equip the farmers with essential knowledge, technical assistance, and marketing prospects to enhance financial results.

5.5 The impact of Umbumbulu Agri-Hub on crop productivity and yield

5.5.1 Production types

Figure 5.9 shows that 100% of the farmers are engaged in vegetable farming, while 34.48% are in field crop production, and 17.24% are engaged in communal gardening projects. The full engagement in vegetables could be the reason for this, since smallholder vegetable farmers are essential to agricultural output in developing economies, and significantly contribute to food security and livelihoods (Gosa et al., 2024). The Umbumbulu Agricultural Hub is a prime example, where all its farmers participate in vegetable farming. This emphasis illustrated the significant demand for vegetables in local and urban markets, that were influenced by their shorter growth cycles, nutritional value, and capacity for stable income generation. The participation of all farmers in vegetable farming highlighted its significance as a dependable agricultural practice that

corresponded with the Hub's objective of aiding smallholder farmers in attaining sustainability and income generation. The Food and Agriculture Organization (FAO) (2020) highlighted that vegetables play a crucial role in the economy and offer considerable career prospects for youth, owing to their straightforward production methods and potential for substantial profits in a short timeframe and their high vitamin and mineral content.

Additionally, 34.48% of the farmers' supplement vegetable production with field crops, reflecting a strategy to diversify farming systems. This diversification offers staple foods for household consumption and mitigates market and climate risks for farmers by distributing their production among various crops. Additionally, 17.24% of farmers participate in communal gardening or project-based farming, indicating collaborative efforts. These initiatives are expected to improve resource sharing, lower individual expenses, and promote community cohesion, while providing a platform for innovation and collective marketing.

This combination of vegetable farming, field crops, and communal gardening illustrated a multifaceted approach employed by farmers to enhance productivity and economic stability. The Umbumbulu Agricultural Hub supports these efforts by providing capacity-building, resource access, and market facilitation, enhancing individual and collective farming activities. The comparatively lower engagement in communal projects indicated a potential area for development, as enhancing this strategy could improve social and economic results for the community.

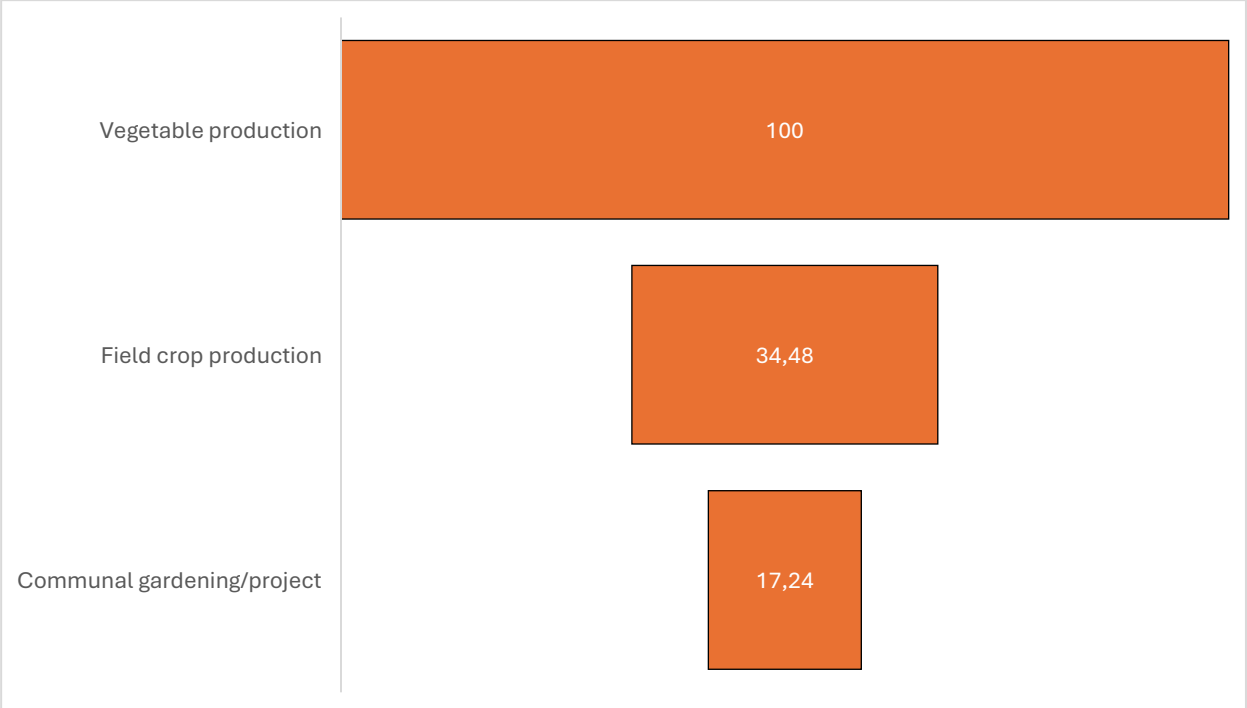


Figure 5.9: Production types

5.5.2 Agro-ecological practices by the farmers

Figure 5.10 shows the agroecological practices adopted by the farmers, with manual ploughing at 75%, kraal or animal manure at 67.86%, and organic pest control at 59.26%. Organic fertiliser at 53.57% and manual weeding at 55.56% were also utilised. The utilisation of wood ash was comparatively low at 40.74%. These findings highlight the significance of advancing sustainable and cost-efficient practices within agricultural systems that are consistent with ecological conservation. The Hub promoted sustainable farming practices by reducing chemical input dependency to enhance environmental sustainability. The adoption rates of kraal or animal manure and organic fertilisers indicated a transition towards natural soil enhancement methods. These methods enhance soil fertility, water retention, and the long-term availability of nutrients, which are essential for increased crop productivity (Zhao et al., 2024). Manual weeding is a practice that facilitates weed management without the use of chemical herbicides, thereby minimising competition for nutrients and promoting organic crop production. Organic pest control, an effective method without synthetic pesticides, reduces crop losses and increases quality and yields (Saddam et al., 2024).

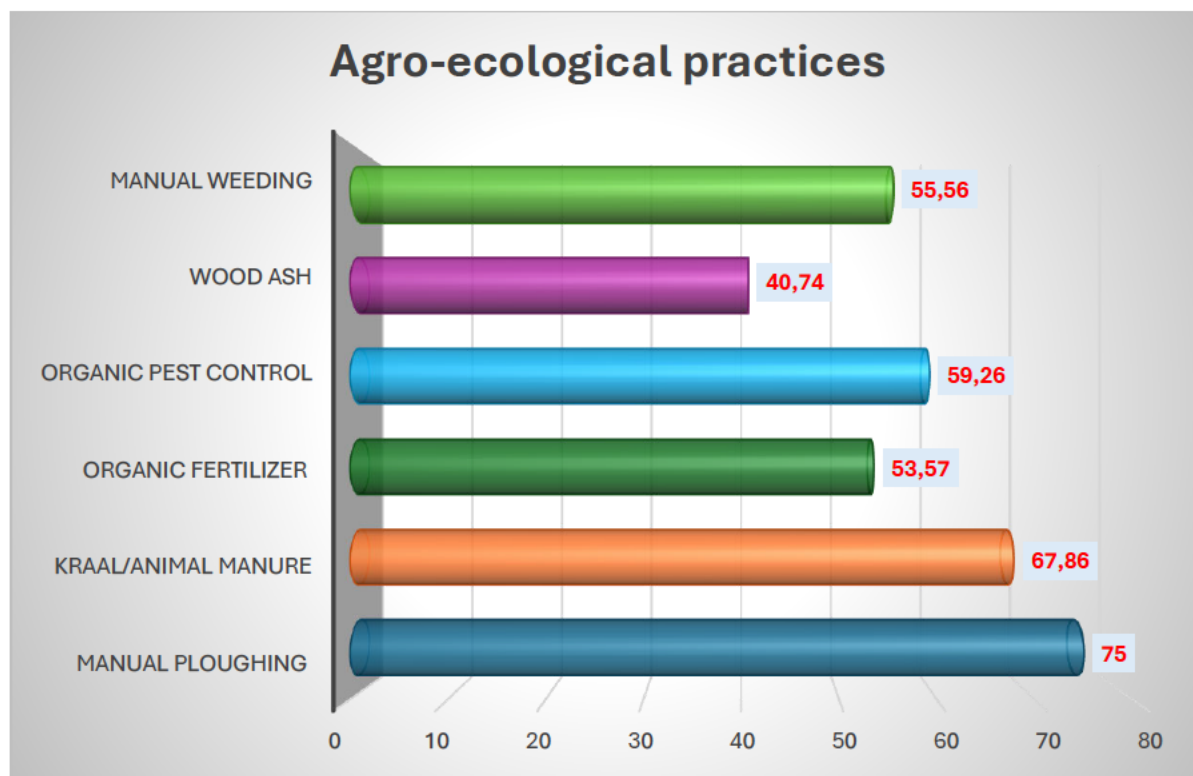


Figure 5.10: Agro-ecological practices

5.5.3 Conventional practices by the farmers

Figure 5.11 illustrates the adoption of conventional practices used by the farmers. The utilisation of fertilisers (62.96%) and tractor ploughing (59.26%) were significantly higher than that of other approaches, such as insecticides (50%), lime (42.31%), and herbicides (38.46%). This indicated that although traditional practices are widespread, their implementation was counterbalanced by an increasing inclination towards agro-ecological methods. The presence of fertilisers and tractor ploughing indicated a reliance on traditional methods, aiding in evaluating the viability of switching to sustainable alternatives.

Fertiliser constitutes one of the most widely utilised conventional practices. The significant percentage suggested that farmers consider chemical fertilisers as a primary approach for improving soil fertility and increasing crop yields. Mechanised ploughing facilitates the cultivation of larger land areas was evident. Herbicides represented the least utilised practice among

conventional methods, possibly due to alternative approaches such as manual weeding and controlling weeding without chemical interventions.

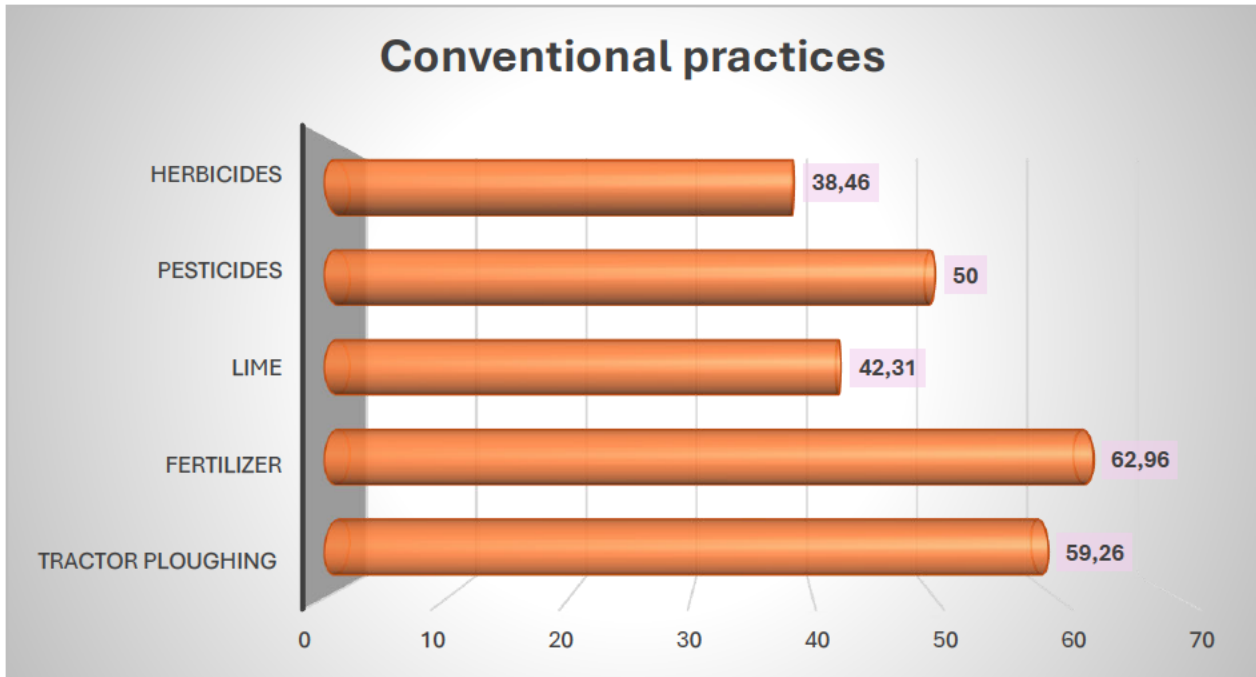


Figure 5.11: Agro-ecological practices

5.5.4 Agricultural practices by the farmers

Figure 5.12 highlights the agricultural techniques adopted among the farmers. Composting is the most widely adopted agricultural technique which is utilised by 45.83% of the farmers, followed by crop rotation at 43.48%, and companion planting at 41.67%. Water and soil conservation techniques are practiced at a moderate rate of 34.78%, while intercropping is utilised by 33.33%, mulching by 30.43%, seed saving by 29.17%, and seedling production by 17.39%. The results showed that farmers know the importance of composting, crop rotation, and companion plants in increasing productivity. Composting enhances soil quality by increasing organic matter and improving its structure, fertility, and moisture retention (Adugna, 2016). Crop rotation helps to mitigate the accumulation of soil pathogens and pests, simultaneously diversifying nutrient requirements throughout growing seasons (Yu et al., 2022). It improves productivity and promotes sustainability. Water and soil conservation techniques are essential for reducing soil erosion and addressing water scarcity, which is crucial for sustaining consistent crop yields (Wolka, Mulder, &

Biazin, 2018). Mulching is essential for moisture retention and weed suppression; its limited application indicated a potential gap in awareness or accessibility (El-Beltagi et al., 2022).

Applying these techniques enhances productivity and leads to increased yields that can substantially elevate the income levels of smallholder farmers (Wolka, Mulder, & Biazin, 2018). This reduced the requirement for chemical inputs through organic practices and composting which decreases production costs, thereby improving profitability (Chen, Zhang, & Yuan, 2020).

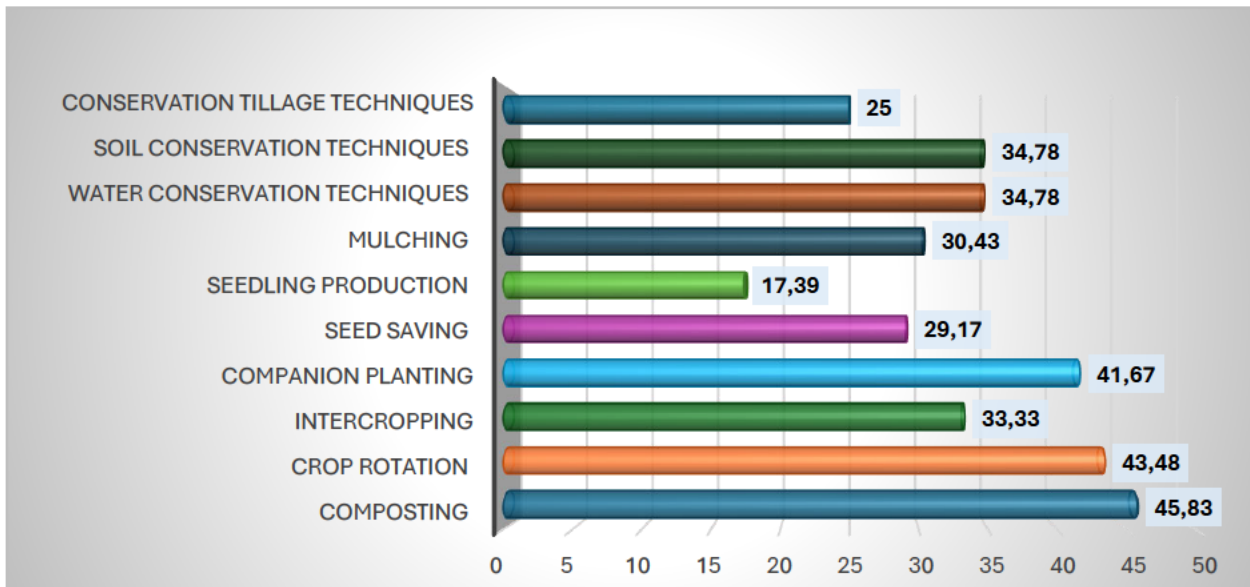


Figure 5.12: Agricultural practices

5.6 Perceived importance of various stakeholders in supporting smallholder farmers

Figure 5.13 illustrates the perceived significance of different stakeholders in aiding smallholder farmers, including the Umbumbulu Agri-Hub. Among the stakeholders, the Agri-Hub is recognised as the most important stakeholder, with 71.43% of the farmers categorising it as "Very Important". This highlighted its essential function in delivering resources, training, and market access for smallholder farmers. Extension officers are ranked second by 64.28% of the farmers, which showed their crucial role in transferring technical expertise and practical knowledge to the farmers. The third-ranked institution is academic institutions, with 57.7%. It contributes significantly to agricultural development through research and innovation. The other stakeholders

were government agencies, private organisations, NGOs, and community or fellow farmers, and thus revealing the collective value of policy support, funding, and peer collaboration.

The findings highlighted the essential role of core stakeholders, including the Agri-Hub, extension officers, and academic institutions in enhancing productivity and sustainability for smallholder farmers. The low perceived importance of engineering committees and traditional leaders indicated a potential deficiency in integrating infrastructural and cultural components within the area. It is crucial to maintain investment in key stakeholders while also developing strategies to engage those other groups, such as irrigation scheme committees, to enhance the agricultural support ecosystem comprehensively.

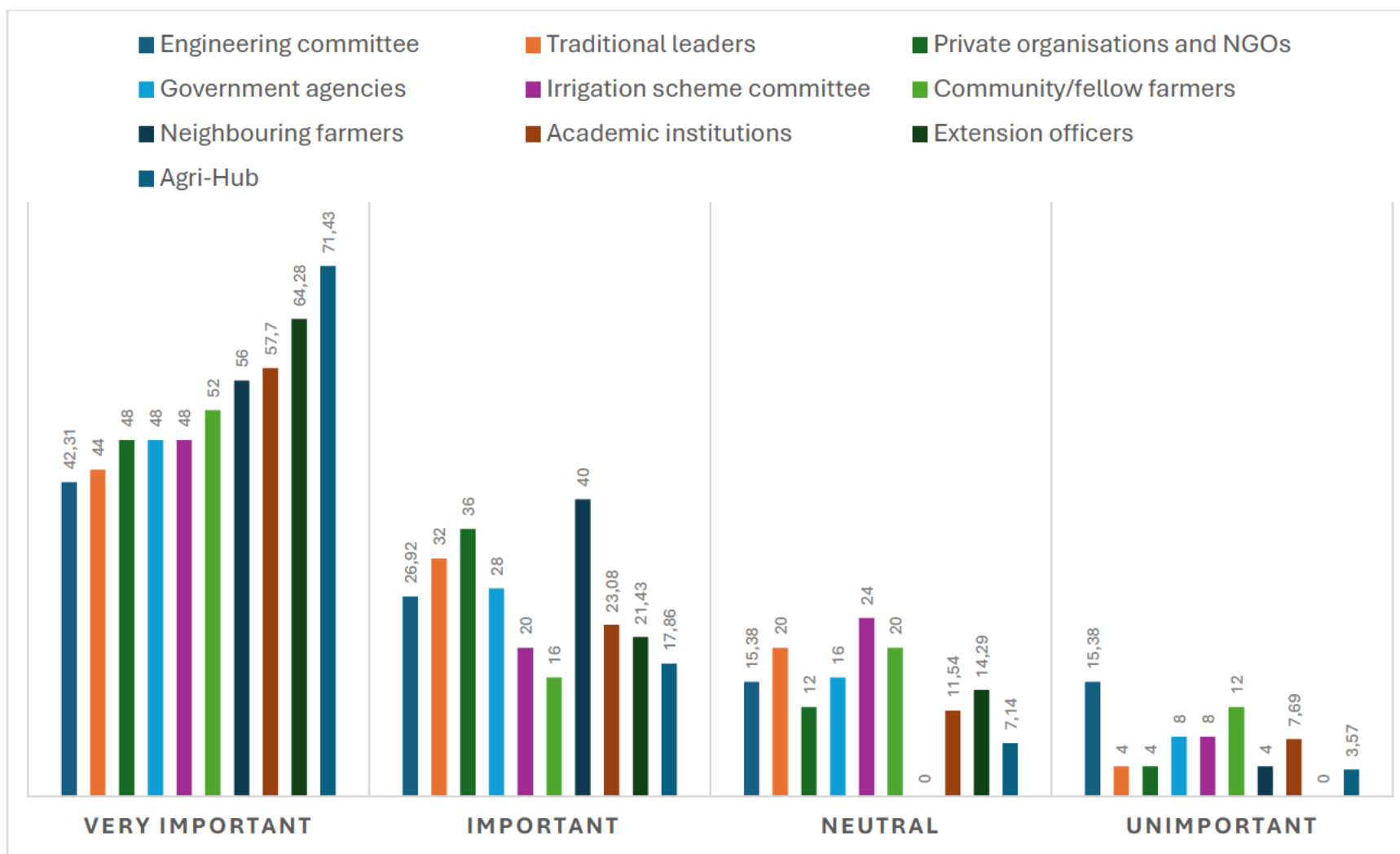


Figure 5.13: Perceived importance of various stakeholders in supporting smallholder farmers

5.7 Impact of Umbumbulu Hub on yield, quality, and market

Seventy percent of the farmers indicated improved crop yields and quality following support from the Umbumbulu Agri-Hub, as shown in Figure 5.14. This indicated that the Hub has improved agricultural methods through training, access to superior inputs, such as fertilisers, seeds, and equipment, and upgraded farming methodologies. These enhancements can increase productivity and superior quality produce, making their harvests more competitive. Increased productivity, specialization, and revenue are directly correlated with the commercialization of small-scale, resource-poor farmers. These results, in turn, have the potential to greatly enhance household food security, alleviate poverty, advance agriculture, and boost the economy as a whole. Coordination of the hub enhanced ties with output markets and better connections for the delivery of inputs and services, which is consistent with other research findings (Jaleta et al., 2013; Kilelu et al., 2013).

Approximately 48.15% of the farmers reported an enhancement in market sales, which was attributable to the Hub's support. This outcome underscores that nearly half of the respondents continue to encounter obstacles to market access, despite the Hub's assistance. This difference may arise from structural difficulties, such as insufficient market links, competition, or restricted demand for their products. The majority of research on farmer organizations highlights the importance of their horizontal coordinating function, which supports group efforts to lower the transaction costs associated with entering input and output markets (Ha et al., 2013; Kilelu et al., 2016). All of these services and inputs raise the producers' overall marketing expenses, which include handling and transactions in person, among other things, and result in significantly higher unit costs for the services provided. However, the Hub model suggests that if these inputs are provided and the services are linked, marketing costs might be significantly reduced. It may also be possible for cash-constrained producers to purchase inputs and services on a credit basis, whereby the input suppliers and service providers are reimbursed through the Hub through deductions from the producers' returns, if there are interconnected or interlocked transactions in an integrated input supply, service provision, output marketing, and processing (the hub model).



Figure 5.14: Impact of Umbumbulu Hub on yield, quality, and market

5.7.1 Assess the feasibility of the Umbumbulu Agri-Hub model

The feasibility of the Umbumbulu Agri-Hub model can be evaluated by its training initiatives, perceived advantages, and operational involvement with farmers.

5.7.2 Level of agricultural training

Figure 5.15 reveals that 58.62% of the farmers received Level 1 training, while 37.93% received Level 2 training, and 31.03% received Level 3 training. The training programmes emphasise basic agricultural skills, with the highest percentage of farmers enrolled in Level 1, which includes soil, water, and gardening management training. However, Level 2 – advanced theoretical knowledge, and Level 3 – enterprise development training, are lower. This signified that the Hub is efficient and meets the fundamental requirements of farmers, facilitating short-term viability. Despite this, the evident lack in advanced training may impede long-term sustainability, as these elevated levels are essential for promoting innovation, expanding operations, and transferring farmers to commercial agriculture.

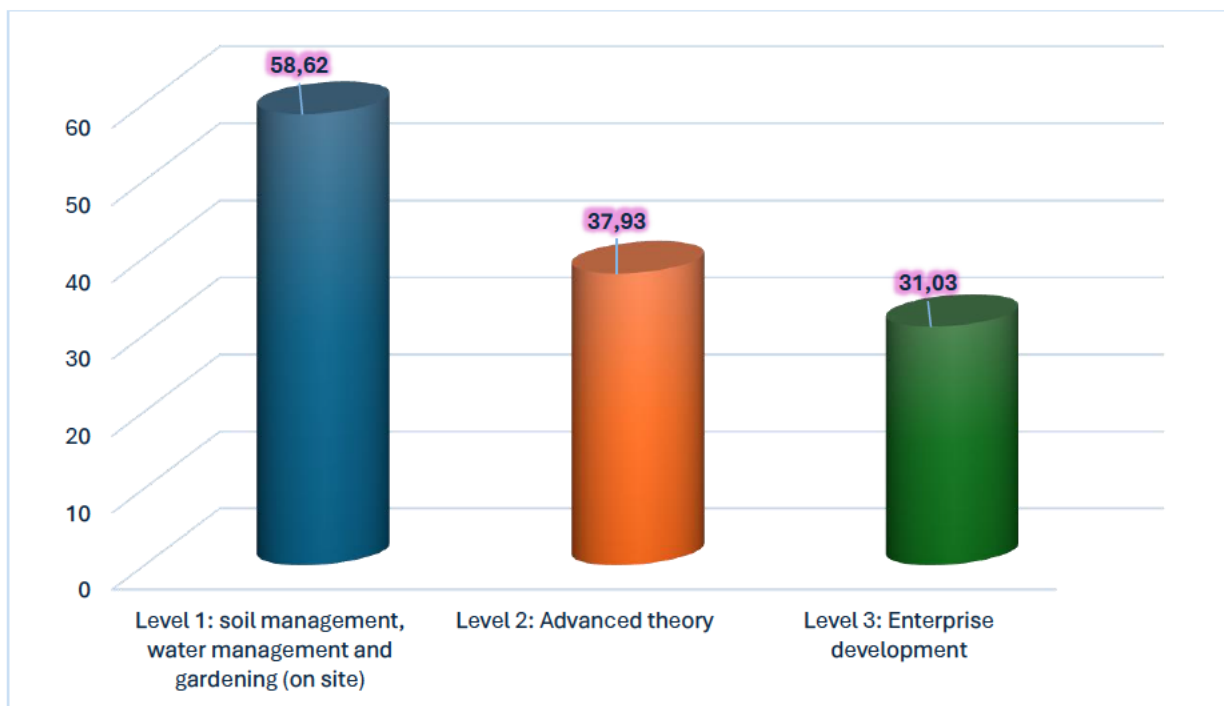


Figure 5.15: Level of training received

5.7.3 Perceived benefits of training received

Figure 5.16 illustrates the assessments of the training usefulness at the Umbumbulu Agri-Hub across three levels, namely, Level 1 – basic on-site skills, Level 2 – advanced theoretical knowledge, and Level 3 – business development. Farmers were instructed to evaluate the benefit received from the training on a scale from 0 to 3, where 0 signifies not beneficial, 1 represents poor, 2 represents average, and 3 denotes good. The findings revealed diverse perspectives regarding the efficacy of the training, with significant variations contingent upon the levels and kind of training provided. In Level 1 training, which emphasised basic agricultural skills, including soil and water management, approximately 52.94% assessed it as "good", indicating its pertinence in tackling essential agricultural issues. This suggested that fundamental training effectively corresponded with the urgent requirements of farmers in enhancing on-site agricultural operations. However, 35.29% of the respondents classified it as "not beneficial", indicating that although the basic themes are essential, some participants may already have these abilities and find minimal value in the training.

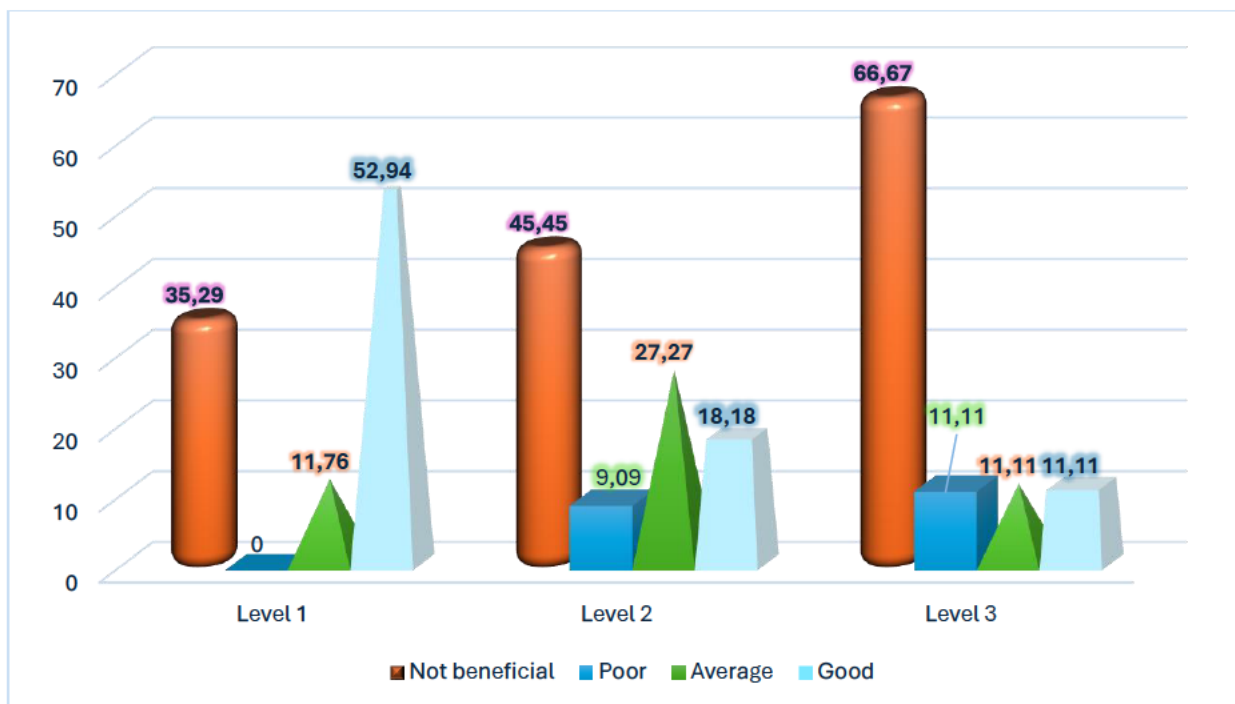


Figure 5.16: Perceived benefits of training received

Level 2 training prioritised advanced theoretical knowledge and garnered a more unfavourable assessment, with merely 45.45% ranking it as "not beneficial". Approximately 27.27% deemed it "average", while 18.18% classified it as "poor", underscoring a deficiency in disseminating advanced knowledge to farmers. This suggested the necessity for tailored content or a more interactive approach to guarantee that training addresses the practical issues encountered by the participants. Level 3 training centred on enterprise development and received the lowest benefit ratings, with 66.67% of the participants deeming it "not beneficial". A mere 11.11% ranked it as "good", indicating a necessity to reevaluate the component's relevance and delivery methods. The absence of perceived advantages may arise from restricted market connections and inadequate readiness for transferring farmers to commercial enterprises.

The findings suggested that although Level 1 training is advantageous for most individuals, there are considerable deficiencies in the perceived efficacy of higher training levels. To enhance the efficacy of the training programmes, the Agri-Hub should customise advanced and enterprise-level training to meet the distinct requirements of farmers and ensure that theoretical knowledge and enterprise skills are effectively applied to practical and market-driven results.

5.7.4 Purpose and benefits of Agri-Hub visitation

The feasibility of the Umbumbulu Agri-Hub model is demonstrated by its significant contribution to supplying essential agricultural support and resources to farmers, alongside its capacity to address basic farming requirements. As shown in Figure 5.17, about 81.48% of the farmers receive visits from the Hub, while 78.57% actively participate by visiting for various services. An estimated 81.81% visited the Hub to collect seedlings, 72.72% sought advice, and 22.72% ordered inputs, while other reasons include the sale of produce (4.5%) and training (4.5%). This demonstrates the Hub's significance in tackling the practical challenges encountered by farmers. The significant engagement indicated the Hub's feasibility regarding accessibility and utility for farmers in Umbumbulu. Research revealed that the Hub effectively facilitates technology transfer and service delivery to small and marginal farmers in remote areas. Structuring smallholders can significantly enhance producing and aggregating high-quality crops from underprivileged regions. It enhances adherence to quality standards.

The benefits of the Hub were identified as its strategic location, increased crop yields, and improved market access, with support from 85.19%, 70.37%, and 48.15% of the farmers, respectively. This highlighted its capacity to promote agricultural sustainability. However, its sustainability would improve with a greater focus on enterprise-driven activities, market linkages, and advanced skill development to assist farmers in transitioning from subsistence to semi-commercial or commercial farming. Expanding advanced training, promoting market access, and tailoring services to meet the evolving needs of farmers are recommended to improve the feasibility and sustainability of the Umbumbulu Agri-Hub model.

These findings corroborate those by Gilmore and Chasomeris (2015), which demonstrate that farmers received assistance ranging from general agricultural guidance to more focused training on organic farming techniques, composting, permaculture, garden preparation, soil and water management. Farmers indicated a need for additional support measures, which encompass advanced training, bedding preparation, crop rotations, ploughing services, and fencing requirements. The study found that 95% of the respondents indicated a need for additional support measures to ensure the growth and sustainability of their farming businesses.

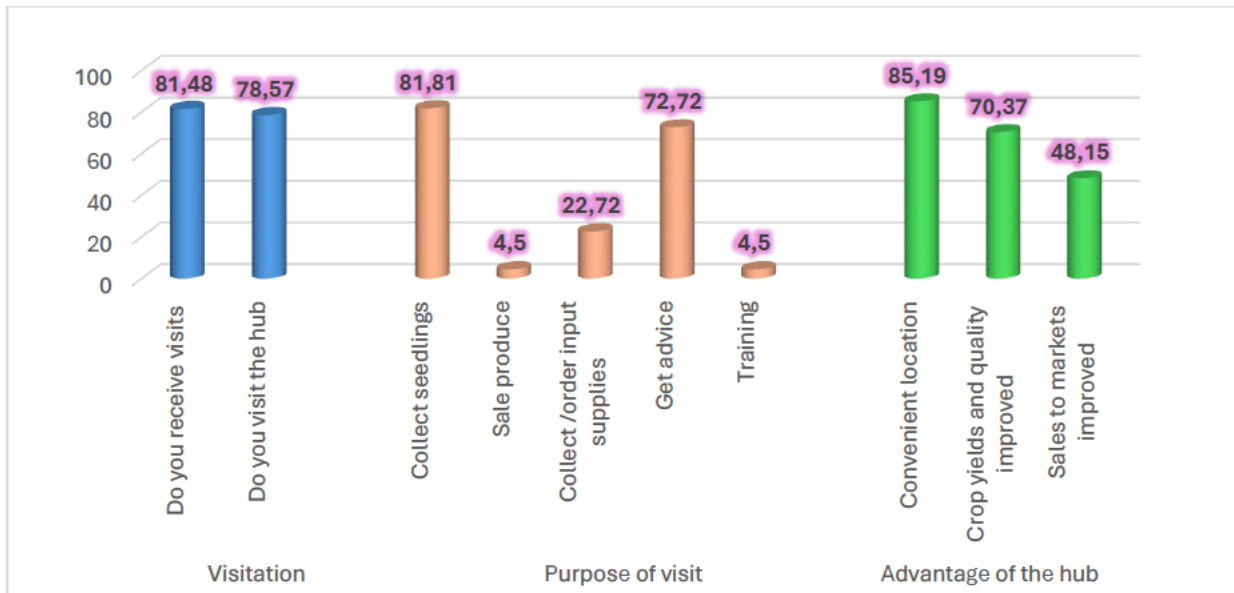


Figure 5.17: Purpose and benefit of Agric-Hub visitation

5.8 Conclusion

This chapter presented the results and analysis of the quantitative data. The results were systematically analysed to identify patterns, trends, and connections within the dataset between the dependent and the independent variables. In order to ensure the accuracy and reliability of the results, significant statistical techniques were applied. Furthermore, a comparative perspective on the study's contributions was provided by interpreting the results in light of the body of current research. Discussions of any trends, connections, or differences revealed served as a basis for additional research.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This study evaluated the role and sustainability of the Umbumbulu Agri-Hub as a model to support smallholder farmers in the eThekweni Municipality region. The research evaluated the model's institutional setup and determined the extent to which it addressed the needs of the smallholder farmers; examined the impact of Hub on the income levels of the smallholder farmers in the eThekweni region; assessed the impact of Hub on the productivity and the yield of crops; and assessed the feasibility and sustainability of the Hub model.

The mixed-methods approach was adopted to gather and analyse qualitative and quantitative data, ensuring a thorough understanding of the Hub's impact. Quantitative data were collected through semi-structured questionnaires which distributed to 29 smallholder farmers who are engaged in the Hub's activities. The respondents were primarily subsistence or semi-commercial farmers. The study employed regression modelling to ascertain significant determinants of farmers' income. The determinants in the model included gender, age, type of farming, and frequency of hub visits. Qualitative data were collected through semi-structured interviews with the Hub's management, Municipal officials, and KZN Department of Agriculture representatives. The interviews yielded information regarding the institutional framework, services provided, and obstacles encountered by the Hub.

This chapter presents a summary of the results and findings, conclusions based on the study's objectives, recommendations, and a discussion of the limitations and areas for future research.

6.2 Summary of results and findings

The results indicated that the Umbumbulu Agri-Hub functions on an "open-source" small-scale business model designed to address the requirements of resource-limited smallholder farmers. The Hub's offerings, encompassing training, subsidised inputs, technical assistance, and market facilitation, have markedly enhanced agricultural yields and quality for most farmers. Regular visits to the Hub correlated positively with increased income levels, which highlighted the significance of active participation in its services. Gender disparities were noted, as male farmers earned less than their female counterparts and possibly attributable to focused

initiatives to improve women's productivity in small-scale agriculture. The Hub is significantly dependent on external funding from the municipality, rendering it susceptible to financial volatility. Furthermore, its provisional infrastructure constrains its service delivery capability and diminishes the farmers' faith in the programme. Environmental issues, including water scarcity and extreme weather, further limit output, while the absence of certifications, such as the South African Good Agricultural Practices (SA-GAP), hinders market access for several farmers.

The Umbumbulu Agri-Hub operates as a vital agricultural support system within the eThekweni Municipality region and focuses on addressing the needs of smallholder farmers in the southern region. Its institutional setup integrates internal municipal departments, primarily agribusiness and agroecology, while leveraging limited external partnerships. The Hub provides critical resources, including training, mentorship, and infrastructure such as storage, fencing, and irrigation systems. However, operational challenges such as inadequate staffing, limited infrastructure, and insufficient funding hinder its effectiveness. Additionally, floods, political instability, and the COVID-19 pandemic have disrupted operations and revealed vulnerabilities in its logistical and governance systems. Despite these constraints, the Hub remains a key player in addressing food security and supporting farmers through innovative, practical approaches tailored to their literacy levels and capabilities. The feasibility of the Hub is supported by its ability to provide essential services, although limitations in infrastructure, resource availability, and marketing efforts constrain its operational potential. The Hub's sustainability is further challenged by a dependency on Municipal budgets, a lack of evaluation mechanisms, and limited stakeholder engagement. Strengthening partnerships, addressing resource gaps, and implementing systematic evaluations are critical to ensure its long-term viability and impact.

6.3 Conclusions related to each objective

6.3.1 Objective 1: To evaluate the model's institutional setup and determine the extent to which it addresses the needs of the smallholder farmers

The Umbumbulu Agri-Hub's institutional framework, defined by its integrated and open-source approach, effectively met the requirements of smallholder farmers by offering essential services, including training, subsidised inputs, technical assistance, and market facilitation. An

assessment of the Umbumbulu Agri-Hub's institutional framework revealed that, although the Hub significantly addressed the immediate requirements of smallholder farmers, its structure is hindered by staffing shortages, insufficient infrastructure, and limited collaboration with external organisations. The Hub's central location and cooperation with municipal departments establish a solid foundation. However, more robust institutional structures and resource allocations are required to improve its efficiency and scalability.

6.3.2 Objective 2: To examine the impact of the Umbumbulu Agri-Hub on the income levels of smallholder farmers in the eThekweni region

The Agri-Hub has enhanced farmers' income by facilitating market access, providing technical assistance, and offering subsidized inputs. Farmers who consistently interact with the hub, especially via regular visits, indicated increased income levels. However, obstacles in market access, such as certification, land size, farming knowledge, and market demand fluctuations, hinder income growth for some farmers. Mitigating these obstacles can further augment the hub's influence on agricultural income.

6.3.3 Objective 3: To assess the impact of Umbumbulu Hub on the productivity and the yield of crops

The Umbumbulu Agri-Hub has markedly enhanced crop yields and quality for numerous farmers by offering training, resources, production input and specialized technical assistance aligned with their needs. However, environmental problems, including extreme weather and water scarcity, were found to constrain total productivity. Investments in adaptable agricultural methods and irrigation infrastructure could alleviate these effects, enhance output and assist in ensuring the long term sustainability of the Umbumbulu Agri-Hub.

6.3.4 Objective 4: To assess the sustainability of the Umbumbulu Agri-Hub model

An evaluation of the Umbumbulu Agri-Hub model's sustainability indicated that it depends on municipal funds, which are inadequate to satisfy the growing demands of the farmers. The centre has advanced food security and aided subsistence farmers, yet insufficient staffing, resource shortages, and an absence of systematic evaluations jeopardise its sustainability. To guarantee sustained survival, the Hub should diversify its financial sources, enhance external partnerships, and implement continuous assessment and strategic modification procedures. By

rectifying these shortcomings, the centre can maintain its transformative influence on the region's smallholder agriculture and food security.

The Hub has proven its capacity to provide essential agricultural services, such as training, mentorship, and resource allocation. However, infrastructural constraints, logistical barriers, and the lack of a clear marketing strategy impede its capacity to adequately satisfy the farmers' increasing demands. Infrastructure enhancement and partnership development would augment the Hub's operational expansion feasibility by mitigating these challenges.

6.4 Recommendations

Recommendations were formulated to address each research objective based on the findings from the study. Primary recommendations encompassed building infrastructure, diversifying funding streams, improving market accessibility, and advocating climate-resilient agricultural methods. Furthermore, long-term sustainability methods were suggested, including forming partnerships with private sector organisations, implementing cost-sharing models, and establishing comprehensive monitoring and evaluation frameworks. Recommendations specifically associated with each objective are as follows:

6.4.1 Objective 1

Improve the hub's institutional framework by investing in permanent infrastructure and increasing service delivery capacity. This encompasses constructing specialized training centers, storage facilities, and demonstration farms to sustain operational stability and boost farmer confidence. Increase cooperation between government agencies, corporate partners, and farmer cooperatives to enhance service delivery.

6.4.2 Objective 2

Facilitate access to profitable markets by assisting farmers in acquiring certifications (e.g., SA-GAP) and establishing collaborations with institutional buyers such as educational institutions, healthcare facilities, and retailers. Promote the growth of value-added agricultural processing in order to boost revenue. This would facilitate the establishment of reliable revenue sources for farmers and enhance their market access.

6.4.3 Objective 3

Implement climate-resilient agricultural techniques and increased irrigation systems to mitigate environmental issues impacting crop yield. Training in conservation agriculture and facilitating access to drought-resistant seedlings can further alleviate losses resulting from climate variability. Strengthening farmers' training and capacity building, by providing mentorship and provide tailored training based on each farmer's challenge, level of farming, and education to ensure farmers can successfully implement contemporary methods.

6.4.4 Objective 4

Formulate a comprehensive sustainability strategy that incorporates rigorous monitoring and evaluation systems. Utilise the findings from this study to modify services perpetually, illustrate the impact to stakeholders, and obtain sustained public and private support. Increase financing sources by establishing strategic alliances with private sector organisations, NGOs, and foreign benefactors. Investigate novel finance strategies, including cost-sharing models and agricultural cooperatives to improve the Hub's financial viability.

6.5 Limitations and future research

The study sample comprised 29 farmers and a small number of stakeholders from the Hub. This may have resulted in the failure to fully capture the varied experiences and challenges experienced by all smallholder farmers in the region. The study did not thoroughly examine the external factors that could affect the Hub's operations and influence its sustainability, including the farmers' performance. These factors include policy changes, market dynamics, and global economic trends.

This study suggests that future research should investigate on how changes in agricultural policies, subsidies, and regulatory frameworks influence Umbumbulu Agri-Hub's operations and the farmers' performance. This would provide insights into aligning the hub activities with policy shifts for better sustainability.

The study concluded that the Umbumbulu Agri-Hub is essential for enhancing smallholder farmers' productivity, income, and market access. However, its sustainability hinges on mitigating financial risks, overcoming infrastructure limits, and preventing market barriers.

Implementing the recommended recommendations will enable the Hub to amplify its impact and function as a replicable model for other rural agricultural communities. This thorough evaluation offers practical insights for parties seeking to enhance agricultural centres as a means of rural development.

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Appendix A: Ethical clearance certificate



16 September 2024

Peacemaker Tumelo Motloung (210503911)
Grad School of Bus & Leadership
Westville Campus

Dear PT Motloung,

Protocol reference number: HSSREC/00007591/2024

Project title: Examining the role and sustainability of the Umbumbulu Agri-Hub as a model to support smallholder farmers

Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 26 August 2024 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted FULL APPROVAL.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

Incidents of adverse events and serious adverse events (AEs and SAEs) should be reported in writing to HSSREC, the study sponsors, and any regulatory authority (where appropriate), within 7 working days of the occurrence for local sites and 14 days for all other South African sites.

This approval is valid until 16 September 2025.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,



Professor Dipane Hlalele (Chair)
/nng

Humanities and Social Sciences Research Ethics Committee

Postal Address: Private Bag X54001, Durban, 4000, South Africa

Telephone: +27 (0)31 260 8350/4557/3587 Email: hssrec@ukzn.ac.za Website: <http://research.ukzn.ac.za/Research-Ethics>

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

INSPIRING GREATNESS

Appendix B: Informed consent letter

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL
For research with human participants

INFORMED CONSENT RESOURCE TEMPLATE

Information Sheet and Consent to Participate in Research

Date:

Dear Sir/Madam

You are invited to consider participating in a study, Examining the Role and Sustainability of the Umbumbulu Agri-Hub as a Model to Support Smallholder Farmers. The aim and purpose of this research is to Examining the Role and Sustainability of the Umbumbulu Agri-Hub as a Model to Support Smallholder Farmers, and the objectives are :

1. Evaluate the model's institutional setup (Model) and determine the extent to which it addresses the needs of the smallholder farmers
2. Examining the impact of Umbumbulu Agri Hub on the income levels of the smallholder farmers in the eThekweni region.
3. Assess the impact of Umbumbulu Agri Hub on the productivity and the yield of crops.
4. Assess the change in the expenses of the Agri Hub over the past six years.

The study is expected to enroll five (30) participants, reflecting a representation of farmer who are the members of the Agri-Hub. all the farmers that make use of the hub will form the main population of the study. A list of the farmers will be obtained from the eThekweni Municipality who contain a database of such farmers. A simple random sampling technique will be used in selecting 30 farmers from a database. Questionnaires will be completed by farmers through means of several focus group sessions. This method will allow the researcher to clearly explain the questions given the low levels of literacy of the farmers. A combination of closed and open ended questions will be asked to farmers in order to solicit answers on the benefits they have derived in making use of the hub.

Ensuring that the model is functioning to it optimally will assist the municipality in addressing 4 of it sustainably development goals. In an effort to protect the participants, personal identifiers such as names/ email addresses will not be reflected anywhere as part of the study, instead each participants will be assigned a unique code. This coding system ensures that individual participants cannot be identified from the collected data.

No costs will be incurred by participants as a result of participation in this study and there will be no incentives or reimbursements for participation in this study.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number _____).

In the event of any problems or concerns/questions you may contact the researcher at 210503911@stu.ukzn.ac.za, [REDACTED] or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban, 4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

CONSENT

I _____, have been informed about the study entitled, Examining the Role and Sustainability of the Umbumbulu Agri-Hub as a Model to Support Smallholder Farmers, by Tumelo Motloung.

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at 210503911@stu.ukzn.ac.za, [REDACTED]

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview YES / NO

Signature of Participant

Date

Signature of Translator
(Where applicable)

Date

Appendix C: Questionnaire

Topic: Examining the Role and Sustainability of the Umbumbulu Agri-Hub as a Model to Support Smallholder Farmers

Area: Umbumbulu Town within the eThekweni Municipality, KwaZulu-Natal

Please could you participate in the study by filling out the questionnaire? Through your participation we hope to understand the impacts that the Umbumbulu Agricultural Hub has had on farmers. The results of the questionnaires are intended to contribute towards examining the role of the agri-hub as a model to support smallholder farmers and recommendations on the ways of improving the model, it will also contribute towards a knowledge base and theory that would be of value to other municipalities. Nowhere on the questionnaire will you be asked your name, therefor the information you provide is totally anonymous and will be used with the strictest confidentiality.

Q. No:

Section A: Household demographics

1.1 Household head and number of household members

Member the Umbumbulu Agri-Hub?	1=Yes	2=No
Member gender	1=Male	2=Female
Member age		

1.2 Please indicate the member's details (circle):

1.2.1 Marital status	1.2.2 Education level	1.2.3 Sources of income
1=Single	1=None	1=Fulltime employment
2=Married	2=Primary	2=Part-time employment
3=Divorced	3=Secondary	3=Social grants
4=Widowed	4=Tertiary	4=Farming
5=Living with partner		5=Remittances
		6=Own enterprise (eg. Spaza, hawking)
		7=Other, specify

Section B: Agricultural activities

2.1 How long have you been farming? (Indicate your answer in years and months)

2.2 What type of farming are you practicing?

Subsistence Use	Semi-commercial	Commercial

If semi-commercial, please indicate how much produce you consume.

Adopted from Gilmore and Chasomeris (2015)

2.4 What farming activities are practiced by your household, and what is the main purpose of the farming activities?

Farming activity	Tick	When it started (year)	Size of land (ha)	Main purpose: 1= Household consumption only 2= Household consumption and selling 3= Selling only	1= Main source of food 2= Main source of income 3= Extra source of food 4=Extra source of income 4= Hobby/leisure activity
Vegetable production					
Field crop production					
Communal gardening/project					
Other, specify:					

2.5 Which vegetable and field crops do you normally produce in winter and summer?

Winter crops

Summer crops

2.6.1 Is your crop production irrigated or rain-fed?	1=Irrigated 2=Rain-fed
2.6.2 If irrigated, does the household pay for the irrigation water?	1=Yes 2=No

2.7 Please indicate production practices currently made use of:

Type of production practices	Production practices	1=Yes 2=No	Reason for choice: 1=Available 2=Affordable 3=Sustainable 4=Other, specify
Agro-ecological practices	Manual ploughing (eg, hand hoe)		
	Kraal/animal manure		
	Organic fertilizer (eg. Liquid manure, green manure)		
	Organic pest control		
	Wood ash		
Conventional practices	Manual weeding		
	Tractor ploughing		
	Fertilizer		

Adopted from Gilmore and Chasomeris (2015)

	Lime		
	Pesticides		
	Herbicides		
Agricultural techniques	Composting		
	Crop rotation		
	Intercropping		
	Companion planting		
	Seed saving		
	Seedling production		
	Mulching		
	Water conservation techniques		
	Soil conservation techniques		
	Conservation tillage techniques		

2.8.2.1 Do have plans on expanding land size:	Yes		No	
If no, reason (please circle one):				
1= I have enough planting land				
2= I do not have access to land				
3= I cannot afford to produce on more land than I currently have				
4= I cannot work on more land (labour constrained)				
5= Other, specify:				

5.4 Please rank the following institutions on usefulness to the farming activities and state their function to your farming household.

Institution	Ranking keys 1= Very important 2= Important 3= Neutral 4= Unimportant	Function keys 1= Input supply 2= Extension services 3= Marketing of produce 4= Supply implements 5= Maintenance of resources 6= Loan 7= Legal matters 8= Other (specify)
Agri-Hub		
Traditional leaders		
Private organisations and NGOs		
Academic institutions		
Government agencies		
Irrigation scheme committee		
Community/fellow farmers		
Engineering committee		
Extension officers		
Neighbouring farmers		
Others (specify)		

Section C. Beneficiation Profile

5. Have you attended any training at the hub?

Yes	No

Adopted from Gilmore and Chasomeris (2015)

5.a If your answer is yes above, please tick the type of training received.

Level 1: soil management, water management and gardening (on site)	Level 2: Advance theory	Level 3: Enterprise development	Other

If other, please indicate below.

5.b Indicate if the training received has been beneficial to you by providing a rating between 0 and 3 (0 = not beneficial, 1 = poor, 2 = average, 3 = good)

Level 1: soil management, water management and gardening (on site)	Level 2: Advance theory	Level 3: Enterprise development	Other

6. How often are you visited by the mentors from Umbumbulu hub?

6.a What type of advice do you receive from the mentors?

6.b Are there any other advisory support that you would like the hub to provide?

7. How often do you visit the hub?

7.a For what purpose do you visit the hub:

Collect seedlings	Sale of produce	Collect /order input supplies	Get advice	Undergo training	Other

If other, please describe

7.b In your opinion, is the hub located in a convenient location?

Yes	No

Adopted from Gilmore and Chasomeris (2015)

Please provide reasons.

8. Have your crop yields and quality improved since you received assistance from the hub?

Yes	No

Please explain your answer and provide reasons.

9. Have your sales to markets improved since you received assistance from the hub?

Yes	No

Please explain your answer and provide reasons.

10. Do you have any other comments?

Thank you very much for your time in responding to this questionnaire.

Adopted from Gilmore and Chasomeris (2015)

Appendix D: Interview schedule

Interview Schedule: Municipal Staff

A. Operations and Management

1. In your view, are the current internal institutional (staff compliments) adequate at the hub?
2. What support does the municipality provide to the project?
3. Are there any logistical and administrative challenges in managing the operating company of the hub?
4. Can you describe if the hub is self sufficient or still reliant on operational budgets?
5. Is funding support from the municipality adequate?

B. Partner leveraging and support roles

1. Has the municipality facilitated any leveraging of external support or financial support through donor agencies or partnership roles for the hub?
2. Are you aware if the hub provide support to any other institutions or organisations?

C. Farmers support

1. In your opinion, does the hub provide adequate support to farmers?
2. Are these functions working well?
3. Is the municipal government involved in any way in the marketing of the hub in order to attract farmers to make use of the hub or encourage market interests?

D. Capital Assets

1. Who owns the assets, and how are the hub's assets maintained and managed?
2. Does the location of the hub play a major factor in the support functions it provides?
3. In your opinion, does the hub provide for an efficient model that could be rolled out to other rural parts of the municipality?

E. Sustainability

1. Is the Agri hub feasible?
2. Is the Agri hub sustainable?

Adopted from Gilmore and Chasomeris (2015)

Interview Schedule: Umbumbulu Centre Management

A. Operations and Management

1. In your view, are the current internal institutional (staff compliments) adequate?
2. Does the municipality provide any adequate support to the project?
3. Can you describe if the hub is self-sufficient or still reliant on operational budgets?
4. What systems methodology are you applying in the running of the hub?
5. Is funding support from the municipality adequate?

B. Partner leveraging and support roles

1. Has the hub been able to leverage external support or financial support through donor agencies or partnership roles?
2. Does the hub provide support to other institutions or organizations?
3. How does the Agri hub get the input from the farmers and stakeholders
4. Could you describe any recent adjustment or enhancement that has been made in response to input from the stakeholders

C. Farmers support

1. What support functions does the hub provide to farmers?
2. Are these functions working well?
3. Are there any specific criteria for farmers to receive support from the hub?
4. What marketing strategy does the hub use to attract farmers to make use of the hub?

D. Capital Assets

1. Is the hub infrastructure (buildings) adequate?
2. Does the location of the hub play a major factor in the support functions it provides?
3. What equipment does the hub make use of for its functions?
4. Can you recommend any improvements to the center, both infrastructure and operations-wise?
5. In your opinion, does the hub provide for an efficient model that could be rolled out to other rural parts of the municipality?

Adopted from Gilmore and Chasomeris (2015)

6. Has the hub developed any innovative systems to support its functions?

E. Conditions

1. What was the impact of the July unrest on the Agri hub?
2. What was the impact of the floods on the Agri Hub?
3. What was the impact of Covid 19 on the Agri Hub?

F. Sustainability

1. Is the Agri hub feasible?
2. Is the Agri hub sustainable?

Adopted from Gilmore and Chasomeris (2015)

Appendix E: Editor's certificate



Saigh Scholarly Publishing

EDITORIAL
Certificate

This Certificate is Proudly Presented to

Peacemaker T Mottlouning

"EXAMINING THE ROLE AND SUSTAINABILITY OF THE UMBUMBULU AGRI-HUB AS A MODEL TO SUPPORT SMALLHOLDER FARMERS"

It is certified that the above-mentioned dissertation is edited by professional editors at Saigh Scholarly Publishing for accuracy in language, grammar, style, tone, tense, and punctuation use, including the technical formatting. The certificate attests the fact that the editor did not alter the idea and aim of the researcher. It is further certified that the above-mentioned dissertation, unless further adjusted, or a revised or outdated version is submitted, is of a satisfactory editorial standard.

Sizwe Ndlovu
Managing Director

05.02.2025

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