# MAPPING ACTIVITIES OF STAKEHOLDERS ALONG SELECTED VEGETABLE VALUE CHAINS IN VHEMBE DISTRICT MUNICIPALITY, SOUTH AFRICA

**By**

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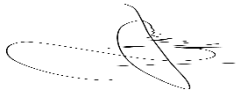
**Student** Mulaudzi R_____Signature 

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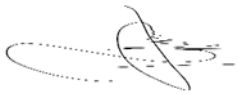
## DECLARATION

I, Rotondwa Mulaudzi, hereby declare that this dissertation for Masters in Rural Development (AGMARD) submitted to the Institute for Rural Development at the University of Venda has not been submitted previously for any degree at this or another university. It is original in design and in execution, and all reference material contained therein has been duly acknowledged.



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## ABSTRACT

Farmer's, transporters and retailers are major key players along the vegetable value chains in South Africa and globally. Their roles and activities along the vegetable value chain are affected by lack of capital, resources, transportation, storage, packaging materials, education and high transactional costs. This is evidenced by high levels of dissatisfactions along the vegetable value chain and is contributing to high loss of jobs in the vegetable industry, shortage and high cost of vegetables and increasing number of vacant farms. Thus, this study was carried out to Map activities of stakeholders along selected vegetable value chain in Vhembe District Municipality, South Africa.

The quantitative research approach was adopted. Stratified simple random sampling technique was used to select 185 respondents. Self-administered structured questionnaire consisting of closed-ended questions was used to collect primary (raw data). A 5-point Likert-type scale ranging from 5 (strongly agree) to 1 (strongly disagree) was also used in the process. The study used descriptive analysis, (mean, median, and mode), range variance, standard deviation and some inferential statistics for the analysis.

The data was analysed using IBM Statistical Package for the Social Science version 28.0.1.1. Atlas t.i version 8 was also used to create diagrams for analysis. Cronbach's alpha was used to ensure reliability and high internal consistency of Likert-type scale. The study shows that players need various sources of assistants as to ensure sustainable vegetable value chain. The study further reflects that though they are faced with various challenges players are striving to ensure food security, sustainable vegetable value chains, good nutrition and to achieve goal 2 (ending hunger, achieving food security and promoting sustainable agriculture) of the SDG'S.

**Keywords:** Small-holder farmer; buyer; retail supermarket; vegetables; satisfaction; horticulture; activities.

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| CAP | Common Agricultural Policy |
| DA | Discriminant Analysis |
| DRDLR | Deeds Registration of the Department of Land Reform |
| EU | European Union |
| FSP | Farmer Support Programme |
| IDP | Integrated Development Plan |
| LDA | Limpopo Department of Agriculture |
| NFSP | National Fertilizer Subsidy Programme |
| UN | United Nations |
| USA | United States of America |
| RESIS | Revitalisation of Smallholder Irrigation Scheme Programme |
| RSSA | Retail Supermarkets South Africa |
| SADC | South African Development Community |
| SDGs | Sustainable Development Goals |
| SMME | Small, Medium Micro-Enterprise |

# CHAPTER 1: INTRODUCTION

## 1.1 Background

In the early 1850s, the Great American Tea Company, controlled by George Gilmen, opened the first fresh produce retail supermarket in the United States of America (USA) (Anderson *et al.*, 2016). Since then, there has been a growing number of small-horticulture farmer's supplying fresh produce supermarkets to ever growing urban population globally. The vegetable production in agricultural subsector has/had potential to provide employment opportunities, generate income, improve food security, fight poverty and provide dietary and good nutrition (Weinberger & Lumpkin 2018).

Diseases associated with imbalanced diets due to insufficient fruit and vegetable consumption is responsible for 8.7 million deaths annually worldwide and is among the top 10 mortality risk factors (Ezzati *et al*., 2019). Malnutrition it is rampant in the tropics, where per capita vegetable consumption averages only 49% of the minimum recommended 73 kg/person/year (Ali & Tsou *et al*., 2021). The vegetable value chain is relevant in ensuring the availability of fresh produce within retail. According to Reddy (2019), the value chain refers to actors conducting various activities in the network to attend to the demands of consumers such as farmers, transporters, and retailers (Reddy *et al*., 2020).

Fresh produce retailing is, thus, an important pillar for the growing urban population worldwide with respect to providing good diet and nutrition as most of them do not have time to produce their own fresh vegetables. The need for fresh vegetables to meet the growing demand of the working class has been fuelling this decision. However, there have been various strategies implemented to ensure the supply of fresh produce becomes a thriving business.

One of the strategies to ensure a constant supply of fresh produce is contract farming, which is an agreement between a farmer and buyer; this form provides conditions regarding the marketing of commodities and conditions on production. There was a concern among small-scale vegetable producers who believed they were denied access to markets. One of the strategies for establishing fresh produce supermarkets was the development of communities around the farming areas. Thus, it is not surprising that large retail supermarket chains have become crucial players in the agro-food sector, as they ensure that there are enough surpluses of fruits and vegetables within communities (Anderson *et al*.,2016). Contract farming, apart from engaging farmers, transporters, and retailers, commits to being gender-sensitive by promoting participation, learning, and ensuring fair treatment within the vegetable value chains. Research in West Africa provides further evidence for women's outstanding role and dominating the vegetable value chains sector (Obuobie et al., 2021).

The other strategy for ensuring a constant supply of fresh produce was the introduction of middlemen (buyers) by retailers; middlemen connected the supply of vegetables from local farms to supermarkets, boosting the growth of both farmers and communities. For example, in Bangladesh, India, Philippines, and Thailand, vegetables were marketed by buyers for retail supply (Pandey *et al*., 2018). Retail supermarkets employ buyers (middlemen) who, thus, connect with a farmer and retails. The buyer seeks and purchases what he declares as satisfying and sells to the retailer; the retail has the final say on the product; either it takes the product or rejects the product. Various dissatisfactions emerge after the rejection of the product by the retail supermarket. Dissatisfactions such as loss of trust, loss of relationship and issues regarding payments.

The European Union agricultural ministers endorsed the Common Agricultural Policy (CAP) reform in Luxembourg in 2003 with the goal of supporting vegetable producer's activities along the value chain (Leat *et al*., 2018; Giha *et al*.,2019). Researchers allude that, policy has been changing in Europe to allow vegetable farmers to be more market-oriented, productive, and competitive while also assuring quality and sufficient vegetable surpluses to meet buyer and customer demands. In 2016, total cabbage production in the United States was expected to be 1,844.9 million pounds, with a national average yield of roughly 39,600 pounds per acre. In South Africa, more than 100,000 cabbages are supplied daily in retail supermarkets, as (Timm et al., 2015) indicate.

The importance of collaboration and satisfaction between vegetable growers and customers within Agri-supply chains has long been recognized (Fischer *et al*., 2011). Since the 1970s, the agriculture sector has used relationship governance to analyse vegetable farmer-buyer satisfaction, defining it as inter-firm governance that includes large relationship-specific assets and a high level of inter-organizational trust (Zhang *et al*., 2014).

Small and medium micro-enterprises (SMMEs) account for 56 percent of retail supermarkets in South Africa, with fruits and vegetable sections accounting for 36 percent of agriculture's gross domestic product (GDP).

The bulk of SMMEs in Limpopo Province are retail businesses (Timm *et al*., 2019). Within the Vhembe District, the agricultural sector is separated into large-scale commercial and small-scale farming. White commercial farmers own 184,830 hectares, which is 76% of the arable land in Limpopo Province, whereas small-scale farmers, mostly black farmers, own 86,927(30%) hectares of arable land (Porter *et al*., 2019). One of the difficulties affecting the small-scale agricultural sector in Vhembe District, as depicted in the Integrated Development Plan (IDP), is high input and a lack of succession plan (Porter *et al*., 2019). In 2014, the Vhembe District had 5373 enterprises, with agricultural firms accounting for (28%), mining

(1%), construction (4%), manufacturing (5%), tourist (16%), and retail accounting for (46%) (IDP, 2021/2022). Furthermore, the Vhembe District has nine different types of businesses: retail (9%), supermarkets (8%), fruit and vegetable production (16%), hair salons (6%), butchery (5%), clothing and dressmaking (4%), liquor stores (3%), and others (49%) (Chauke *et al*., 2017)

Vegetable horticultural farmers and buyers have negotiated a wide range of pre-harvest agreements, arrangements, joint ventures, and pledges known as "contract farming" throughout the last century (Kruise *et al*., 2019). In South Africa, contract farming was established to address farmer-buyer contentment and dissatisfaction. Contract farming has also proven to be a successful instrument for guaranteeing excellent relationships and satisfaction between farmers and buyers in other regions of the world, such as Uganda (Kruise *et al*.,2019).

However, as for Vhembe District, about 95% of the retailers do not sign contracts between farmers and purchasers. In the absence of contract farming, there are high chances for exploitation hence, vegetable growers and consumers might be increasingly dissatisfied with the arrangements. As a result, this research seeks to map the activities of players along the vegetable value chains in the Vhembe District.

### 1.2 Statement of the Research Problem

According to the Deeds Registration of the Department of Agriculture, Land Reform and Rural Development (DRDLR) (2019) 9,157 farms were transferred within the Limpopo Province. However, participation by the small-holder farmers along the horticulture value chains remains low. Evidence also shows high levels of dissatisfaction among small-holder vegetable farmers along the vegetable value chain (Tovin *et al*., 2021). According to Retail Supermarkets South Africa (RSSA), Small-scale farmers supplying Vhembe District retail supermarkets with fresh produce only supply 55.6% tonnage of fresh produce annually instead of the minimum expected 70% of the total tonnage (Gibbson *et al*., 2018).

Food systems in South Africa are sobering and are affected badly by overnutrition, unsustainable agricultural production systems, extreme territorial imbalances, and slow transformation towards inclusiveness; thus, these are challenges on recent developments and enhance difficulties in ensuring the elimination of poverty and reducing inequalities by 2030. The food system remains shaped by inequities rooted in colonialism and exacerbated by apartheid policies.

This is evidenced by high levels of dissatisfaction along the vegetable value chain (Porter *et al*., 2019). The agricultural value chain, as a vertical alliance, thus requires simplicity along the value chain until the product is in the hands of the final consumer. Lack of transport for small-holder farmers to local supermarkets has, thus, shown delivery and agricultural value chain subdued (Baloyi *et al*., 2020). A study in Vhembe District Municipality pointed to what rural male and female vegetable value chain stakeholders perceive as constraints/problems. Male vegetable value chain stakeholders mentioned storage and marketing as major challenges they are facing; thus, women illustrated the non-availability of land credit as one of their major constraints (Ndlovu & Thamaga *et al*., 2021).

Though some regulatory frameworks have been introduced, such as contract farming and operations to facilitate an improved vegetable value chain, good relations between farmers, buyers, and retailers persist. Thus, this study mapped the activities of stakeholders along selected vegetable value chains in Vhembe District Municipality, South Africa, and provided possible recommendations to address the experienced challenges.

### 1.3 Justification/Rationale of the Study

The study ensured that retail supermarkets, customers, farmers, and buyers become aware of the activities that vegetable value chain stakeholders are encountering within the Vhembe District. Students studying challenges within retail supply chain structure will find this study being of interest and will benefit from it, as it will provide information on various activities performed by farmers, transporters, and retailers along the vegetable value chains. Possible interventions to improve activities and address challenges encountered by vegetable value chain stakeholders. Stakeholders within the vegetable supply chain subsector will be able to draw recommendations/interventions on how to halt, minimize, and deal with dissatisfactions within the vegetable value chain. The introduction of contract farming within the study will make some stakeholders aware of how to ensure a consistent vegetable supply chain.

Agri-SA, as the federation of agricultural organizations, would be able to draw their policies, legislations, and frameworks, which may be of assistance to address issues regarding dissatisfaction among vegetable farmers. This will ensure food security, sustainable development, employment growth, and many approaches being developed to fight dissatisfactions and challenges that small-holder farmers supplying formal, informal, and retail supermarkets encounter.

The South African government, through the Department of Agriculture, Land Reform and Rural Development, will enable to draw out mechanisms and laws that will protect farmer's rights within the supply chain structure after going through this study.

## 1.3 Research Objectives

The main objective of the study was to map the activities of stakeholders along selected vegetable value chains in Vhembe District Municipality, South Africa.

Specific objectives that guided the study included to:

(a) Map and analyse activities along the fresh produce market value chains in Vhembe District Municipality.

(b) Critically evaluate the challenges faced by farmers along the fresh produce market value chain.

(c) Suggest possible interventions to improve activities along the value chain.

### 1.4.1 Research Questions

(a) What are the activities along the fresh produce market value chain in Vhembe District Municipality?

(b) What are the challenges faced by farmers along the fresh produce market value chain?

(c) What are possible interventions to improve activities along the value chain?

### 1.4.2 Research hypothesis

(a) There are significant dissatisfactions/challenges along the fresh produce market value chain in Vhembe District.

## 1.5 Theoretical Framework of the Study

The study was underpinned by the value chain theory (Porter,1985) (Figure 1.1). The idea of the "value chain" articulates the whole range of actions required to bring a service or product from conception to various stages of manufacturing and distribution to consumers. The product gets value when it moves from one actor in the chain to another. During the plowing/farming process, vegetable farmers encounter numerous challenges, such as late credit payments from customers (Kangogo *et al*., 2020). These challenges increase unhappiness in the supply chain or procedure. Thus, farmers require sufficient resources to enable successful and profitable inbound operations

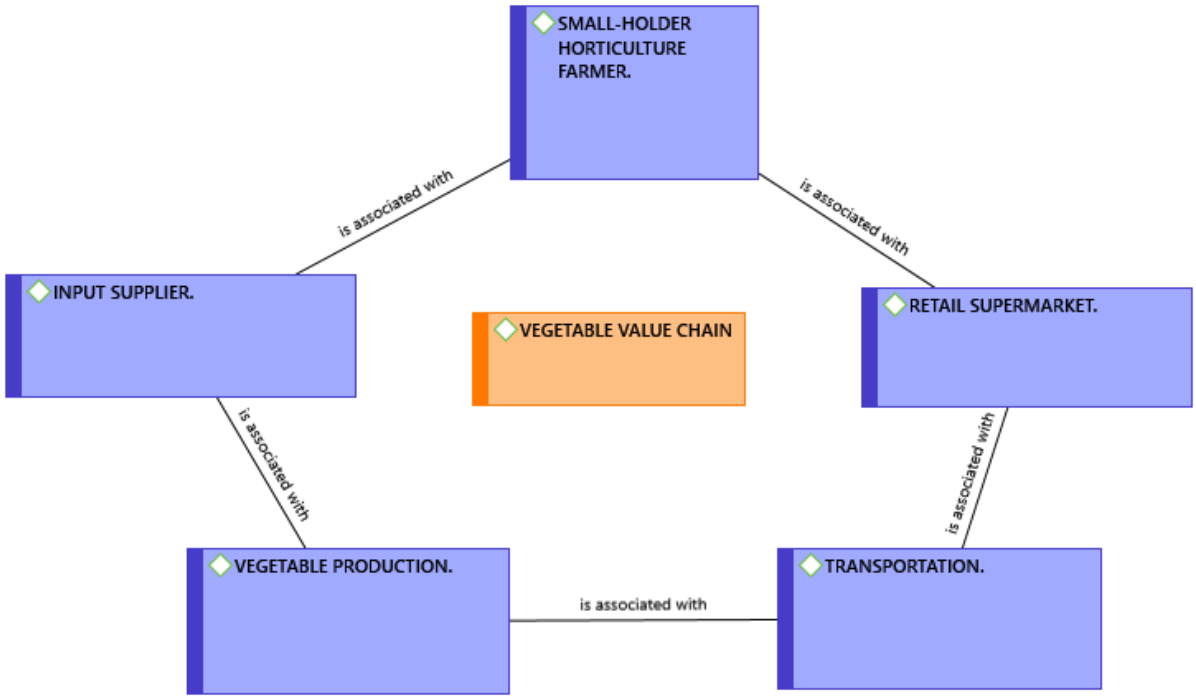


**Figure 1.1 Vegetable value chain conceptual framework**

**Source:** Barnes *et al*. (2018)

for quality and enough vegetable surpluses. Farmers' dissatisfaction with the supply chain process has a negative effect on productivity and on fellow farm workers (Zamora, 2016).

### 1.6 Framework of Value Chain Analysis

Vegetable producer-driven chains differ from vegetable buyer-driven chains in terms of who operates or drives the chain between a vegetable farmer and a buyer input suppliers are important players within the vegetable value chain as they ensure the availability of fertilizers and various materials to ensure successful production (Ndlovu *et al*., 2021). In this perspective, vegetable farmers or small-holder horticulture farmers are supply chain drivers, as they ensure that the chain maintains its rotating capacity by ensuring adequate and consistent vegetable supply under all conditions. Enough credit is required to ensure the product's pleasing worth. Vegetable growers, as small-holder horticultural farmers, face a high entrance barrier because they require a lot of cash, resources, and technology to be successful in the supply chain. Buyers are defined as middlemen in this study because they rely heavily on capital to obtain products for supply and procurement. The capacity of a vegetable grower to flourish and compete is determined by his or her location in the retail grocery chain and the quantity of value that may be created (Zamora, 2016).

#### 1.6.1 The value chains

Michael Porter first proposed and refined the notion of "Value Chain" in 1985. "A 'value chain' in agriculture describes a collection of activities and actors that brought or ensured a basic agricultural product (vegetable) from production or planting to final consumption/procurement, where value is built up to the commodity at each level." The use of fertilizers, insecticides, and other chemicals to ensure a high-quality vegetable product adds value to the finished product. Vegetable processing and packaging necessitate a large amount of cash, and these operations also add value to the product. Storage and delivery of a product to a market or retail superstores also depends on capital. Vegetable production generates farm income, provides employment, and supports agri-business-related services (Hobbos *et al*., 2020).

Every vegetable supply chain structure is a collection of activities that are performed within the farm to the target market or superstore.

### 1.7 Operational Definitions of Key Terms and Concepts

### 1.7.1 Horticulture

It is the act or art of cultivating crops in the garden for food production it is also the science of the propagation, maintenance and cultivation of plants (Pandit and Basak *et al*., 2014).

### *1.7.2 Farmer*

It is a person engaged in agriculture, raising crops and livestock. A farmer is an individual who engages in a combination of raising field crops, poultry, vineyards, and orchards (Hobbos *et al*., 2020).

### *1.7.3 Retail*

It is the activity of selling goods directly to consumers or end-users. Retail buys goods in large quantities from producers to consumers for profit (Anderson *et al*.,2016).

### *1.7.4 Supermarket*

It is a self-service shop that offers a wide variety of food and household products organized into sections. The supermarket typically has various service departments such as fruit and Vegetable, bakery, deli, and butchery department (Rooyen *et al*., 2013).

### *1.7.5 Satisfaction*

It is a pleasant feeling that one gets when one receives something one wants (Trienekens *et al*., 2011).

### *1.7.6 Dissatisfaction*

According to Trienekens (2011), Dissatisfaction is a feeling of not being content or pleased either with transactions, agreements, interactions, arrangements, products, or services offered.

## 1.8 Outline of the Research Proposal

The study was organized and divided into five chapters; the chapters are as follows:

Chapter 1 presents the introduction, the background of the study, the statement of the research problem, the justification/rationale of the study, the research objectives, the research questions/hypotheses, the theoretical framework of the study, the operational definitions of key terms and concepts, and the outline of the research proposal.

Chapter 2 contains the preliminary literature review, which is relevant to the assessment of small-holder horticulture farmers' levels of satisfaction with the vegetable value chain structure in Vhembe District retail supermarkets.

Chapter 3, Research Methodology, this chapter outlines a description of the study area, research design, techniques, sampling procedures, sampling methods, sample size, data collection instruments, and data analysis.

Chapter 4 demonstrated data presentation using IBM Statistical Package for the Social Science (SPSS) version 28.0.1.1., bar graphs, histograms, and pie charts. Data collected was thus, interpreted, tested using various theories and, analysed in this chapter.

Chapter 5 reflected findings, conclusion, and possible Recommendations drawn from presented, tested, and analyzed data demonstrated in Chapter 4.

# CHAPTER 2: LITERATURE REVIEW

## 2.1. Introduction

A literature review is a report that evaluates studies discovered in the literature that are linked to a specific topic. Thus, in this chapter, related literature was reviewed, described, evaluated, clarified and summarized. The research's theoretical foundation and the specific study's inception and scope were established. Furthermore, gaps from past studies were explored and, therefore, assisted in refining the research topic.

The South African Development Community (SADC) treaty came and realise the importance of agriculture in ensuring socio-economic development, economic development, and poverty Alleviation. The South African Development Community Declaration on Food Security and Agriculture (SADCDFSA) was adopted in 2004 and it recognized that food policies, national agricultural policies, and inadequate access to the supply chain with retail supermarkets and high inputs are the most underlying reasons for high unemployment, food insecurity and dissatisfactions among farmers, buyers and retail supermarkets in the Limpopo Region (Hartzeberg *et al*., 2015).

The South African Development Community has tried to address and work on the development of an agricultural policy framework for the Limpopo region, Vhembe District included. The framework for the Limpopo region was hence adopted in 2003. The agricultural policy framework illustrates various challenges which the sector has been facing, such as low land and labour productivity in agriculture. South African Development Community (SADC) trade in agriculture and lastly yields. The main aim of the policy framework is to achieve competitiveness and enhance sustainable agricultural production and productivity. In line with this, Ezzati (2016) is of the view that competitiveness, productivity, and enhancement of sustainable agriculture allow high levels of satisfaction among small-holder farmers, buyers, and retail superstores. Thus, small-holder farmers will be able to access inputs and resources to ensure quality production and a high quantity of vegetable surplus or products to ensure a continuous supply chain with retail supermarkets (Hartzeberg *et al*., 2015).

## 2.3. Awareness of Sustainable development goal 2, in improving small-holder productivity and ensuring satisfying vegetable value chain

Agro-supply chain structure intends to address and achieve sustainable development goal number 2 which is, ending hunger, achieving food security and improving nutrition and

promoting sustainable agriculture. Imbalanced diet and diseases caused by insufficient vegetable and fruit consumption ultimately cause a minimum of 2.7 million deaths in a year worldwide. Malnutrition is growing drastically in the tropics, where per capita vegetable consumption averages below 43% (Ezzati *et al*., 2016).

In 2015, the United Nations agreed on 17 Sustainable Development Goals (SDGs) with the aim of bringing prosperity, peace, and well-being to the people globally. Sustainable development goal number 2 aims to address the global crisis, ensure sustainable supply chains of agricultural products, and provide food security for all. Smallholder horticultural farming for supply within various formal (food retail supermarkets) and informal markets is one of the vehicles that will ensure the achievement of sustainable development goal 2. Smallholder farming is also one of the main sources of food security and source of income for rural livelihoods in several developing countries such as Zimbabwe, Tanzania and South Africa (Uttam *et al*.,2017).

Ezzati (2016) alludes that institutional factors such as access to information proxies, education, regional capital, and access to extension services have influenced small-holder horticultural farmers' awareness of Sustainable Development Goal 2. However, some governments and local planning agencies lack adequate spatial data on smallholder horticultural farmers, and this halt acts as an obstacle in monitoring sustainable Development Goal number 2.

### 2.4 Mapping and analysing activities along the fresh produce market value chain in Vhembe District

Figure 2.1 presents the digitalized vegetable value chain structure analysis for Vhembe District Vegetables. The structure is categorised into 6 processes or steps. These include input suppliers, farm production, processing, transport and distribution, markets and consumers which are presented in detail below:

#### 2.4.1 Input suppliers

Agricultural inputs can be defined as any external sources that are applied to the plants and into the soil for quality and great vegetable quantity. Input suppliers are defined as seeds, fertilizers, insecticides, etc, suppliers for vegetable farm production and managing stored perishable products, as indicated in Figure 2.1. Key constraints identified by the map were access to credit, access to agricultural inputs, water security, soil fertility, storage facilities, packaging, poor infrastructure, asymmetric market information, and price fluctuations. Most

small-holder farmers purchase inputs from input suppliers that are the nearest to them. Some of the farmers receive free inputs from supporting actors such as government extension officers. Input suppliers use a small amount of water as compared to farmers, and they supply inputs to different farmers. They supply inputs such as:

### 4.2.2 Compost as an agricultural input

Compost is the decomposed vegetable and animal refuse that is used for the maintenance of soil fertility, and it has a significant influence on the growth and yield of plants. Compost and poultry manure had a synergistic effect on both fresh and dry weights of tomato shoots and roots compared to other treatments. The use of organic fertilizers, especially in the compost form, has a positive effect on soil health and fertility, which consequently results in increased yield in the long term (Sarhan *et al*., 2011).

### 4.2.3 Biological control as an agricultural input

Biological control is done by use of disease-resistant varieties and biopesticides. These biopesticides can replace the chemical pesticides used for pest and disease control. They are eco-friendly and target-specific. In contrast, chemical pesticides cause great damage to the ecosystem by accumulating to a toxic level, an undefined target that harms the soil and planted crops (Ravneet *et al*., 2016).

### 2.4.4. Farm production

Berdegue & Fuentealba (2011) define a smallholder farmer as one who owns small-based plots of land where he/she grows one or two cash crops and relies mostly on family members for labor. The term ‘smallholder’ is interchangeably utilised and related to small-scale, resource poor and sometimes a peasant farmer. These farmers produce vegetable products for supply into formal and informal markets, hypermarkets, superstores , and upermarkets. The produce moves in different marketing channels, the first being from farmer to the trader that, that is, bakkie trader, street hawkers, and middlemen,traight to the consumer through farm gate purchasing. The produce also moves from the farmers to traders , that is, local tuck shops and retailers,and then to the end consumer for consumption.

The water-usage at each activity of the value chain has been indicated in figure 2.1, from the figure the farm production stage requires and uses the most amount of water. It is then followed by the processing stage whereby water is required for value adding such as washing and cleaning of surfaces as well as other processing activities. The key constraints that farmers are facing are lack of access to credit, inputs, supplementary, and market information

They obtain vegetable inputs from vegetable input markets and from input suppliers. They rely on and utilize huge amounts of water for vegetable production. Some farmers sell their products directly from theirfarmsteads's formal or informal markets without taking their products for processing and packaging. Some farmer, after harvests or when the products are ready for selling, put them into their storages, though storage is still a major concern for the majority of small-holder horticultural farmers (Berdegue & Fuentealba *et al*., 2011).

### 2.4.5 Processing

Most of the vegetable horticultural farmers process (clean and prepare) their own products and ensure storage. Thus, it may result in having products that are of poor quality. Yet, “quality vegetable products within a retail supermarket department of fruit and vegetables are a major requirement (Hirvonen *et al*., 2021). Thus, the lack of storage of post-harvest facilities to process the products constitutes a huge barrier for horticultural farmers. Also, a lack of physical or built infrastructure limits the growth and development of small-holder horticultural farmers, and these may cause high transaction costs for small-holder farmers. Physical infrastructure is critical in ensuring sustainable and satisfying vegetable productivity”. It is the reason that Costa et al. (2014) reveal that the production must respect certain ecologically based problems and harvested crops can be stored but only for a limited period, given that they are perishable.

### 2.4.6. Transport and distribution

The farmers rely more on informal markets to sell their products, and that often results in them being price takers and receiving low market prices. The traders that are involved in the value chain structure are faced with constraints of poor infrastructure such as roads and telecommunication support of Berdegue & Fuentealba et al. (2011) claim that many inner roads to the farms and network coverage are poor within the Vhembe. As a result, farmers in Vhembe District are unable to supply the products to the markets and supermarkets at the desired quality and quantities. In addition, small-holder farmers struggle to hire and pay transport for supply into the markets. However, some retail supermarkets and hypermarkets use middlemen who fetch agricultural products from the farm and transport them to the stores at a cost. This affects farmers negatively in terms of profit and income (Strydom *et al*., 2013).

### 2.4.7 Markets

Market is the final institution or final recipient of the products before selling to consumers and customers. When a particular market is satisfied with the delivery or products from the middlemen or farmer it hence creates its own selling price. However, the expansion markets have created new supply chain which challenges the traditional ways of distribution and value chain structure. Market sourcing, policies and buying practices have influenced and increased small-holder horticultural farmers participation with vegetable supply chain within various Markets (Strydom *et al*., 2013).

Retail supermarket supply chain determines conditions such as volume, packaging requirements, safety standards quality and consistency. Retail superstores views and perceives quality of a vegetable product as a positive correlation. Honesty and timely communications between the retail superstore and a buyer has a huge positive impact on both satisfaction and trust. Signalling, commitment, communications and being able to overcome and provide quick possible alternatives regarding emerged challenges such as wrong deliveries, misunderstanding and disputes seem to be warranted and expected a lot by retails from the buyer. Within a buyer-farmer relationship, conflict, viewed as a challenge of various perceptions of expectations, target, roles and goals are predictable as incorrect deliveries and misperceptions (Dwyer & Schurr *et al*., 2016).

Buyer market satisfaction is basically viewed as the difference between observed and expected value of a product. Buyers further, emphasize personal trust as an indicator of satisfaction more than just a supply chain. Markets scarify their profits in order to generate and maintain partnership relationship with horticultural farmers where they obtain their goods or vegetable products. The reasons of markets cutting and using their profits in ensuring re-occurring supply chain with a particular small-holder horticultural farmer makes both parties (farmer & market) less prone to withdraw from supply chain relationship (Benton & Maloni *et al*., 2017).

Based on the above, the study tried to find out small-holder horticultural farmers value chain dissatisfactions along the value chain process or structure. This information regarding satisfaction of small-holder horticultural farmers along vegetable value chain structure is scanty.

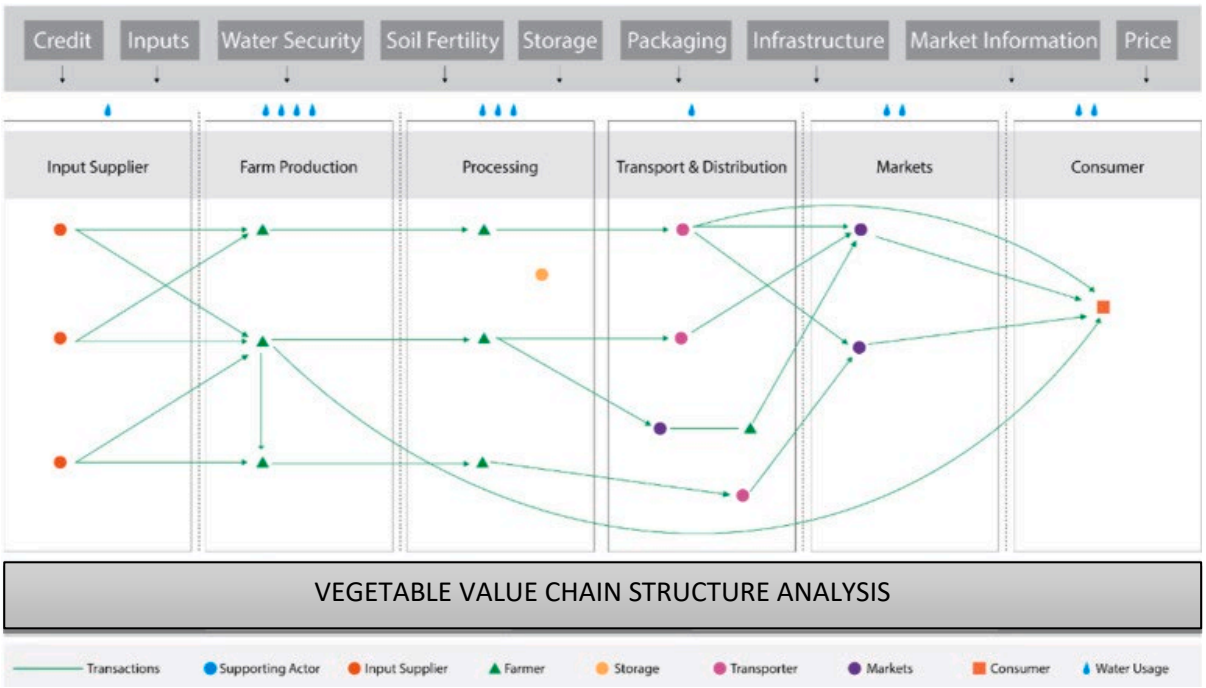


**Figure 2.1 Analysis for Vhembe District**

**Source**: Ndlovu *et al.*, 2021.

## 2.5. Challenges faced by small-holder farmers along the value chain

### 2.5.1 Climate change

Montgomery (2017) stated that extreme climate events such as droughts and heavy rain result in decreased crop yields and cash flow shortages, particularly in the pre-monsoon period". As a result of washing away crops and ploughed seeds, heavy rains and drought have a severe impact on value chain structure. Acid rain is also a restraint or impediment to crop production and the manufacturing of high-quality vegetable products (Pandit & Basak *et al*., 2014). High weather occurrences like heavy rains resulting in floods, severe droughts, and extreme heat waves in South Africa and beyond during the twentieth century has caused extensive harm, including job losses, food insecurity, rising inflation, loss of suet and more farms are being transferred and unoccupied, resulting in a growing shortage of access to markets (Mirza *et al*., 2011).

Gornall *et al*., (2010) claim that continued climate change may have severe and uncontrollable consequences for agriculture productivity and the agricultural value chain. In support of this, Bale *et al*., (2002) argue that climate change is most likely to influence insect pests, as well as the connection between the host and the bug, resulting in lower crop productivity. Consequently, under the effect of climate change and global warming, some crops that are thought to be insect pest resistant may become vulnerable and respond positively to pest harm as Reddy *et al*., (2013) indicated.

### 2.5.2. Insect Pests

Most countries, including South Africa, consider the bagrada bug (Bagrada hilaris) to be a detrimental pest. It is thought that this bug originated in Asia (Halbert & Eger *et al*., 2010). This bug has been discovered to have spread to native countries including Zimbabwe (Darcy, *et al*., 2013) and Botswana (Obopile *et al*., 2008). However, little is known about the bagrada bug's host preferences, and its distribution and harm in South Africa (Huang *et al*., 2014).

For effective action, this insect is frequently activated by high temperatures. Bagrada bug locomotion and mating are affected by high temperatures (Huang *et al*., 2014). Darcy *et al*., (2013) revealed that this pest feeds successfully on brassica crops in the afternoon and even in the evening if the temperature is high.

Bagrada bugs prefer to eat cruciferous and brassica crops like cabbages, mustard and kale (Bundy *et al*., 2012). Cabbage within the Limpopo Province retail supermarkets is the most selling vegetable and most produced product within small scale farms (Reed *et al*., 2011). Reed *et al*., (2011) revealed that in the United States of America (USA), this beetle feeds on crops from different families including Zea Mays L, Sorhgum bicolor , sunflower (Helianthus annuus), and cotton (Gossypium hirsutum). Bagrada bug is considered as one of the most dangerous pests, posing a significant threat to vegetable production and affecting the small-holder vegetable value chain (Huang *et al*., 2014).

### 2.5.3. Effects of natural habitats and wildlife on vegetable supply chain

Kwaslema (2015) crop destruction by wild animals, human-wildlife conflict is a serious issue for conservationists, resulting in local farmer economic losses, worsening poverty, job loss, food insecurity, poor fresh produce surplus and more abandoned farms.

In Tanzania crop damage was caused by animals, which was exacerbated by commercial farmers encroaching on protected areas and damaging wildlife habitats. In northern Tanzania, a number of small-holder farmers reported losing 383 kg of crops every year (Kwaslema *et al*., 2015) due to wild animals.

Some small-holder farmers suffer higher losses because of carelessness and lack of knowledge about the type of environment they want to create with their plantings. Small farms near the Tarangire and Lake Manyara National Parks in Tanzania, for example, suffered significant losses due to crop destruction. Issues raised above are also applicable to horticultural farms in the Vhembe District, where crops are devoured by wild animals such as monkeys, birds, scavengers, squirrels, grasshoppers among others.

### 2.5.4. Shortage of water

Noemi & Donatella *et al*., (2015) agriculture is the world's greatest water user and a major source of water pollution from fertilizers, pesticides, and other toxins, which can result in huge social, economic, and environmental costs if not properly managed. Thus, farmers should improve agricultural output while conserving and increasing natural resources such as water in order to boost local food supplies on a long-term basis.

Water has been a significant problem on the international agenda for decades as the most crucial resource for life. Water scarcity is a problem in many parts of the world today (Ortmann

& King *et al*., 2017). Higher food consumption is forecast in the future, owing to the projected increase in the world population growth rate, which would have a direct impact on agricultural water usage. There is a significant relationship between a country's water resources and its ability to produce food. Thus, estimating irrigation needs is critical for water resource planning in order to meet food demands while avoiding excessive water usage (Noemi & Donatella *et al*., 2015).

Smallholder farmers, their families, and laborers play an increasingly important role in sustaining agricultural productivity development. Small-scale horticultural farmers are at the heart of every natural resource change process, and they should be supported and aimed to protect natural ecosystems and biodiversity while minimizing the harmful impact agriculture can have on the environment by suitable incentives and governance procedures (Noemi & Donatella *et al*., 2015).

### 2.5.5. Challenges faced by small-holder horticulture farmers in South Africa

#### a) Low levels of literacy and education

Small-holder farmers' progress is hampered by a lack of information about appropriate agricultural methods, a lack of capacity to comply with market and regulatory standards, and new issues of conformity assessment and traceability. Market knowledge, production practices, government financing initiatives, government support programs, and finance institutions are among the types of information that agricultural small-holder farmers supplying diverse markets require (Ortmann & King *et al*., 2017).

Rooyen (2013) he emphasized that, farmers' access to information and awareness of SDG2 are significantly aided by education. Some smallholder farmers within the Vhembe District are unprepared financially, marketing-wise, and managerially. Smallholder horticultural farmers' growth, progress, and graduation to commercial farmers are often limited because of lack of knowledge. Rooyen *et al*., (2013) argue that farmers whose managerial and financial abilities are limited, will find it difficult meet marketing criteria (quality requirements) and financial needs (capital and productivity/production levels).

#### b) Limited access to technology

Lack of technological skills is a serious barrier to accessing useful information from institutions that provide support, finance, and disseminate technological information. However, it is still

unclear whether agricultural food systems will be sustainable for a long-term transition that will sustainably ensure food needed at a required volume, while small-holder farmers continue to struggle to obtain modern techniques and equipment. At the same time, farmers are confronted with climate change, which can be detrimental to their productivity (Ortmann & King *et al*., 2017).

**c) High transaction costs**

Trienekens (2011), describes transaction costs as those that include search costs, information, contract enforcement, contract monitoring, and coordination. In support of this Murthy & Meena *et al*., (2010), reveal that the cost of searching for information is the most significant transaction cost faced by small-holder horticulture growers. This is because the smallholder farmers are mostly found in remote places far away from information, financing institutions, and lucrative markets. The farmers also lack knowledge and education which are powerful tools when negotiating for contracts. This becomes a hurdle, resulting in high transactional expenses. Negotiation abilities are lacking.

Transaction costs are also linked with negotiations with possible purchasers, and these expenses have a detrimental influence on the participation of small-holder farmers in the value chain. The absence of formal market access and their lack of knowledge within the supply chain with multiple markets have a significant impact on small-holder horticulture producers' bargaining (negotiations). Searching expenses include the costs of looking for a buyer, and if the farmer has difficulty and takes a long time looking for a buyer, the cost of searching increases, as do transaction costs. Small-holder farmers are forced to sell their vegetable goods at very low prices at the farm gate due to high searching and transaction costs and these lower their profit margins. The ability of smallholder farmers to capture value determines their participation in the value chain (Trienekens*et al*., 2011).

**d) Lack of inputs such as herbicides and fertilisers**

Small-scale farmers' ability to benefit from opportunities in agricultural markets is hampered by a lack of input resources, particularly in terms of the number of products exchanged, as well as the quality and quantity of those items. Producing for the market necessitates the use of production resources such as land, water, and farm infrastructure, as well as labour, money, and resource management (Trienekens *et al*., 2011). Small-holder farmers pose covariant risk due to different reasons such as poor weather conditions, anti-selection, and moral hazards, thus insurance companies and financial institutions. This makes the loan providers hesitant to aid them (Sjauw *et al*., 2012)

e) **Limited access to capital**

Limited access to capital is a roadblock that prohibits small-scale farmers from joining the value chain. Financial institutions frequently ignore the smallholder sector and refuse to lend them money. This is because of a significant default risk and the inherent risk of agricultural output (Trienekens *et al*., (2011). Small-holder farmers are also identified as lacking suitable collateral assets by the financial intermediaries. Their household income is also uncertain because of the unpredictability in output. Resultantly, small-holder farmers are more likely to fail on interest repayments as Sjauw *et al*., (2012).

In order to meet high-value-added supply chains, smallholder farmers must invest in equipment and technology. According to Trienekens (2011), small-holder farmers must meet many prerequisites to capture economic rents, such as having the infrastructure to get their products to market. Smallholder farmers require financial support to construct and improve their infrastructures to reduce transaction costs. Although, as described by (product, packaging, functional upgrading, and inter-chain upgrading), the functional value has traditionally adhered to diverse forms of upgrading. Thus, finance contributes to the functional value (Trienekens *et al*., 2011).

Sjauw (2012) stated that China is an outlier, with nine hurdles in the value chain structure of vegetable production. The most significant barrier in the vegetable value chain was a lack of knowledge, information, and advisory services. For most agricultural farmers, limited selling prospects, a lack of sufficient water sources, and significant post-harvest losses are also major obstacles. The expense of seeds, fertilizers, and pesticides, as well as the time commitment and heavy labour necessary, were all mentioned as restraints for the structure of the vegetable value chain (Fan *et al*. 2019).

## 2.6. Quantifying impacts caused by dissatisfactions along the value chain

As the world's population approaches 11 billion small-holder farmers become more affluent, agricultural value chains are under growing pressure to ensure sustainable food production, distribution, and consumption while also preserving finite natural resources (Gómez *et al*., 2020). Dissatisfaction along the vegetable value chain has resulted in increasing poverty rates, households' food insecurity, and slow-growing commercial agriculture. Dissatisfaction within the vegetable value chain has resulted in job losses due to an un-profitable supply chain and un-productive farming.

**a) Postharvest and vegetable losses**

Post-harvest losses substantially limit horticultural productivity, particularly in hot, wet tropical climes, limiting profitability for farmers and processors and resulting in job losses in vegetable markets and small-scale vegetable farms. Horticultural crops are frequently perishable, limiting growers' capacity to store them to weather price swings. Vegetable postharvest losses vary widely by commodity, producing area, and season, but it is estimated that 20 to 50 percent of crops are lost in the many phases from farmer to consumer (Ezzati *et al*., 2016).

A study in Northwest province discovered that between harvest and consumption, fruit and vegetables lost an average of 200 grams per person each day. Diversification into vegetable production would be less hazardous and more appealing for small-scale farmers if post-harvest losses were reduced. Minimizing post-harvest losses necessitates the cooperation of several components, each of which includes complex and frequently expensive solutions. Handling, packing, storage, and transportation can all necessitate expensive equipment as well as substantial study into areas like controlled environment storage and quality assurance (Hobbos *et al*., 2005).

**b) Loss of access to formal markets**

Horticultural producers lose access to formal markets and retail stores because of poor vegetable production for formal market supply. The absence of access to formal markets is an increasingly unacknowledged key reason why those farmers who produce high-quality, large-quantity vegetable surplus goods stay locked in poverty. Farmers are compelled to sell their products to purchasers at whatever price the buyer specifies. They commit this deed out of fear of losing more money because they have spent more resources and efforts into the merchandise. Small-holder horticultural farmers who are already part of the supply chain are sometimes forced to sell their goods to purchasers at a price determined by the buyer to stay in the supply chain.

This act has an impact on the development of horticulture growers as well as the loss of trust among their customers. Due to a lack of and difficulty in reaching official markets for supply, purchasers often take advantage of the situation by purchasing items at a lower price than the cost of producing the crop. For the sake of the products, resources used, and wages paid to employees, small-holder farmers are forced to accept the demand (Reardon *et al*., 2019).

Because of the rising poverty rate, small-holder farmers produce veggies for supply though they lack storage space for their products, particularly perishable ones. Farmers lose more

money because of their urgency to participate in formal supply chain structures (Barbara *et al*., 2020).

Satisfaction with supply chain relationships is important for increasing morale, commitment, and trust, as well as reducing litigation and effort to terminate the partnership (Reardon *et al*.,2019). In addition, the retail supermarket's expectations for the core vegetable product and the ability to provide an efficient supply chain. Retail supermarkets look for attributes like dedication, conflict resolution, and communication to ensure a successful cooperation and supply chain relationship.

**c) Loss of employment**

Dissatisfactions along the value chain and in the supply chain structure led to job losses in a variety of industries. Some agricultural laborers lose their jobs due to a lack of or low revenue, resulting in irrigating poverty. Formal markets rely significantly on farmers for processing and supplying various supermarkets, which implies that if there is no food or if the surplus is of low quality, formal markets will be unable to supply, and as a result, retrenchment is likely to occur. The same is true in supermarket fruit and vegetable departments; without increased stock, there will be no additional personnel, and retrenchment is imminent. Within the supply chain, good manufacturing leads to increased employment and tends to achieve SDG 2 of eradicating poverty, ensuring food security, and reducing malnutrition (Barbara *et al*., 2008).

**d) Vacant farms**

According to the Department of Rural Development Land Reform 2019 report on Deeds Registration, 9157 farms were transferred due to dissatisfactions in the value and supply chain. Many farms are abandoned because of poor output and dissatisfactions within the value chain and supply chain, reducing food production and agricultural producers producing for supply (Kruise *et al*., 2019).

**e) Loss of customers**

Many farmers rely on gate selling, in which people come to their farms to buy their crops. For the most part, they rely on selling inside their farms to survive and support their families. Poor production because of a shortage of inputs, fertilizers, insecticides, and unfavourable climatic change leads to dissatisfaction with the items produced. Every person or customer wants to buy things that are pleasing to their eyes. If the farmer's products are inadequately produced, he or she is more likely to lose clients.

### f) Trust

High degrees of trust are built by both sides' honesty and dependability (famer, buyer and retail). When a manufacturer begins to create low-quality goods and the consumer refuses to buy or buys at a lower price than agreed upon, trust is harmed. Disagreements between the farmer, the buyer, and the retailer arise because of high levels of unhappiness along the value chain. The buyer will try to buy from the farmer, but if the items are of low quality, the buyer may refuse to buy them, resulting in disagreements and unhappiness between the buyer and the farmer.

The study's second objective (quantify losses due to dissatisfaction along the value chain) will be to clearly show what is the most common loss among all small-holder horticultural producers along the value chain process. Losses have been indicated, but they are very restricted and not directly stated, but no single study or source has addressed the subject of what small-holder horticulture farmers lose, or what dissatisfactions result in the most. Some farmers have lost personnel, capital, clients, purchasers, farms, and the confidence to continue with agricultural productivity, according to the researcher's assumptions. The study will hence give out what small-holder farmers within the Vhembe District have lost severely along the value chain structure.

## 2.7. Suggested possible interventions to improve activities along the vegetable value chains.

### 2.7.1. Government intervention in halting dissatisfactions

The Limpopo Department of Agriculture project faced several obstacles, including a lack of infrastructure on farms. The Revitalisation of Smallholder Irrigation Scheme (RESIS) program established in 2005 by the Limpopo Department of Agriculture was used to remedy the slow rate of implementation. The Limpopo Department of Agriculture contributed R84 million to the (RESIS) initiative. The LDA also installed water-serving technology fields on 23 irrigation projects.

One of the schemes where water-saving irrigation systems were installed was the Makuleke Irrigation Scheme. The "turnkey" technique (including building and design of irrigation technology by one of the service providers) was utilized to implement the RESIS programme to speed up the installation by one of the service providers. The Limpopo Department of Agriculture provided over 20 centre pivots as well as bulk infrastructure such as a pump house,

perimeter fencing, fertiliser mixing equipment, and extension services (Maepa & Makombe *et al*., 2014).

To address and improve small-holder horticulture farmers in Ghana, as well as to ensure efficient involvement in high-value supply chains, in 2008, the government launched the "National Fertilizer Subsidy Program." The National Fertilizer Subsidy Program (NFSP) was established to give subsidized fertilizers to small-holder farmers and farmers to help them increase vegetable yield and ensure household food security.

In the early 1980s, South Africa created the Farmer Support Programme (FSP) to address the issues that smallholder farmers face in their homelands. The programme provided funding and ensured that farmers could acquire loans to help them expand their farming businesses. The project also built several organizations to help people in reclaiming their stolen farms, as well as attempting to integrate small-holder farmers into various fruit and vegetable supply chains (Maepa & Makombe *et al*., 2014).

### 2.7.2. Addressing poor extension services by the government towards farmers effectiveness within the supply chain structure

Extension services are important because they transmit information from financing projects and South African government support programs to farmers. The lack of agricultural information is a significant obstacle that often inhibits farmers and agricultural progress. All farmers should have access to information such as marketing tactics and measures to ensure high output. Awareness, programmes, projects and organizations should be introduced by the government in order to educate small-holder horticultural farmers on how to produce various quality vegetable products. Small-holder farmers should have access to agricultural information regarding various products and how they can be produced better using small number of resources (Rooyen & Masuku *et al*., 2013).

Small-holder horticultural farmers within the Vhembe District should formulate a group of small-holder farmers, commercial farmers and experts within the farming and vegetable supply chain industry. Within this platform farmers would be able to know how to access various agricultural markets and supply chain structures.

### 2.7.3. Introduction of contract farming as a remedy for farmer, buyer and retails dissatisfactions

According to Rooyen & Masuku (2013), contract farming played a key role in securing a good supply chain in some locations. A pre-harvest agreement between farmers and purchasers

(for example, processors, exporters, and wholesalers) that specifies the price, quantity, quality, and/or other production-related features of the product to be provided is known as contract farming. Some scholars distinguish between out grower systems (managed by government) and contract schemes (managed by the private sector) (Maepa & Makombe *et al*., 2014). Contract farming is often regarded as a valuable strategy for farmers in poor nations to mitigate market failures (Otsuka *et al*., 2016).

According to Otsuka (2016), farmers, buyers, and stores all have obstacles in the supply chain process. Food security is harmed, hunger is increased, and agricultural progress is halted because of supply chain disputes and withdrawals. Contract farming is an agreement between parties in a supply chain connection that governs, monitors, and directs them through the supply chain process. Agreements between a farmer, a buyer, and a retailer are written on a sheet of paper and must be followed. When arguments, dissatisfactions, or disagreements emerge, all parties turn to and use the contract to resolve the issues. Due a large percentage of farmers, buyers, and retailers who do not use contract farming, supply chain dissatisfactions and disputes are rapidly growing. Joining, i.e., building strategic alliances of agricultural producers, is one strategy to increase retail trade volume. Strategic alliances are agreements between two or more businesses or farms to build a plan together that must result in synergy; else, it is pointless.

A vertical strategic alliance is a grouping of enterprises involved in the value generating process. Because of the tendency to minimize costs in the distribution chain, this is a highly typical sort of supply chain alliance and create partnerships between customer and supplier (Fitcher-Wei *et al*., 2021).

In the retail trade of agricultural products, vertical strategic alliances are common (fruits and vegetables). Vertical strategic alliances are partnerships between participants in distribution networks, such as customers and suppliers, buyers and producers, and producers and suppliers. As a result, any combination of players in a value chain is feasible. Vertical strategic alliances provide cost coordination, which is critical for farmers in the face of technical advancements and foreign competition for lower-cost agricultural and food products. Specialization and competitiveness in similar areas could help them achieve cost effectiveness (Tossin *et al*., 2022).

"The agricultural value chain is a vertical alliance of firms combining to obtain a more profitable position in the market," according to Alberta Agriculture and Food Council. Agribusiness is integrated from the manufacturing stage to the processing stage to the marketing stage, till the products are in the hands of the consumers, according to the term "vertical alliance." In

the supply chain, producers, processors, and marketers become interdependent and collaborate to discuss difficulties and share information (Oppen *et al*., 2011).

Understanding what small-holder farmers are embarking on or doing among themselves to combat dissatisfactions with the value chain will be the gap that the study will address towards possible recommendations in halting dissatisfactions along the value chain. There hasn't been a clear indication of any possible advice or solutions. What has been highlighted is how and what the South African government, as well as other governments, are assisting small-holder horticulture farmers in combating dissatisfactions along their vegetable value chain structure.

## 2.8. Summary of the literature review chapter

The chapter has shown the steps, parties and resources involved along the value chain process or structure. Their linkages and how one relies on the other has been clearly shown in figure 3.1. For a vegetable product to be regarded, declared and seen as a satisfying product it involves a lot of resources, effort and labour. A product gains its value through the value chain structure and what it took to produce it. There are various challenges and dissatisfactions within players activities along the vegetable value chains, some of the challenges have been shown within the study and how those challenges can be well addressed.

Through the completion of the study's main objectives, small-holder horticultural producers' satisfaction with the vegetable value chain structure was determined. Answering these main objectives filled research gaps in this study: (a) analysing the structure and arrangements of horticulture value chains, as well as challenges along the value chain structure, (b) quantifying losses due to dissatisfaction and analysing the level of dissatisfactions along the value chain, and (C) suggesting possible solutions to address dissatisfactions along the value chain. Even though some gaps have yet to be found, the study identified and addressed concerns and questions such as what the major losses along the value chain structure are, are small-holder horticultural farmers satisfied along the vegetable value chain and what are the possible or steps are they taking in order to halt or fight experienced dissatisfactions along the value chain structure.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1 Introduction

In the following section the research methodology was explained in detail. Methodology is the study of various research methods and is a specific procedure of identifying, selecting and analyzing data about a specific research topic. This section consist of the description of the study area, research design, population & sampling procedures, data collection methods/ techniques and the ethical considerations.

## 3.2 Description of the Study Area

Area of the study or unit of analysis is the juristic person or subject from which the social science researcher collects data. According to (Aliaga & Gunderson, 2016), area of the study is referred to as a place or juristic person whereby the researcher could often visit in the process of data collection for research purpose. The study was conducted in Vhembe District Municipality with small-holder horticulture farmers governed by supermarkets value chain as research subjects (Figure 3.1). According to Vhembe District IDP Review (2021/22), Vhembe District is situated in the northern part of Limpopo Province South Africa and shares borders with the following African countries Botswana and Zimbabwe in the north-west and in its southeast, there is Mozambique through the Kruger national park. The Limpopo River forms the border between Vhembe District and Zimbabwe. In Venda language “Vhembe” means Limpopo River. Before the settlement of Venda people after their migration from Matebeleland South in Zimbabwe the District was hence settled by Khoisan people. It comprises of 4 local municipalities which are Makhado, Thulamela, Musina and Collins Chabane Municipalities. Its head offices are in the town of Thohoyandou. It covers an area which is predominantly rural.

Vhembe District total population in 2016 was 1393 948, Thulamela Municipality with 497 237, Makhado Municipality with 416 728, Collins Chabane with 347 974 and Musina Municipality with 132 009 people. Female members of the district accounted for 54% (757 501) of the population with the rest being the male members. The higher segment are people under the age of 19 years thus, black Africans dominating the district with 99% (IDP Review., 2021/22).

According to the Vhembe District IDP (2021/22), HIV/AIDS, TB and lower respiratory infections are described as top causes of death among people within the district.


**Figure 3.1 Analysis of Vhembe District**

**Source (Girlly *et al*., 2017) travel behaviour analysis of Vhembe District. Google**

According to Vhembe District statistics 788 514 people were reported leaving in poverty thus, the number of people with metric increased from 25 736 to 55 648 and those with bachelor's degrees increased from 2 669 to 26 563 improvement. The district hence suffers from water shortage though it has 39 water supply schemes. Climate change poses a threat not only within the Vhembe District but globally. To address the issue of climate change, the district prioritized the development of Climate Change Vulnerability Assessment and Climate Change Response Plan.

Community services sector in 2019 was the largest in terms of the Gross Value Added (GVA) of the Vhembe District economy accounting 33% and following trade by 18%. The agricultural sector contributes least to the economy with 3% of Gross Value Added. Among the total population of 1402779, 60 400 people were reported unemployed within the district. In 2009, 4373 enterprises were recorded within the district. Agricultural enterprises accounted (28%), manufacturing (5%), mining (1%), construction (5%), retail (45%) and tourism (16% (StatsSA Community Survey., 2016).

Major horticulture crops grown within the Vhembe District are maize, citrus, mango, avocado and banana. Vhembe District has 13145 hectors of maize production with 157740 tons in a season. The total monetary value of maize in the district is estimated to R237 million (R1500/ton) (StatsSA Community Survey., 2016). Production of citrus within the district covers R4431 hectors with yield estimated of 155 085 tons in a year. Citrus monetary value is estimated to R388 million (R2500/ton). Production of mango covers 4122 of hectors with yield of 103067 tons per year/season. Monetary value of mango is R309 million (R300/ton) in the district. Production of banana covers hectors of 2158 with yield estimated of 64755 per year/season with 648 million monetary values of (R10 000/ton). 1670 are hectors covered with avocado production with 16703 tons per year/season, estimated monetary value of Avocado is R134 million (R8000/ton). Major producers of above major crops within the Vhembe District are white commercial farmers thus, they own 174 830 hectors of arable land of which is 70% of arable land. Black small-scale farmers own 30% of arable land which is 74927 hectors of arable land (StatsSA Community Survey., 2016).

### 3.3 Research Design

A research design is a plan or strategy which moves from the underlying philosophical assumptions to specifying the selection of respondents, the data gathering techniques to be used and the data analysis to be done (Maree *et al*., 2017). Bless & Higson-Smith (1995) defined the research design as the plan of how to proceed in determining the nature of the

relationship between variables. The study used quantitative research approach to investigate observable phenomena using systematic empirical investigation through the packaging of quantifiable data and making use of statistical, computational and mathematical techniques. Quantitative approach allowed the researcher to predict, explain and investigate relationships and describe current conditions and examine possible impacts on designated outcomes. Quantitative approach allowed the development of hypothesis that pertain to the study phenomenon.

The data were quantitative and was analyzed to achieve the objective of the phenomenon which is being researched on. The approach allowed the selection of a large sample size from the total population that used to come up with generalizable findings for the total population. The study made use of survey to collect primary quantitative data from the respondents themselves instead of the use of already existing data. The survey design was utilized to take advantage of the existing groups involved in the value chains. Survey research method typically included questions that allowed all respondents to answer similar questions to get responses that ensured similar numerical data collection.

## 3.4 Population and Sampling Procedure

The population of the study may be defined as the group that have attributes the researcher wants to use in order to make generalization (Vogt, Gardner & Haeffele *et al.*, 2012). On the other hand, Maisel & Persell (2019), defined population of the study as a collection of items (for example, persons, organizations, states, or other units) about which information is sought. Population of the study was stakeholders in the vegetable value chains within the Vhembe District. There were 11200 vegetable value chains stakeholders within the Vhembe District. There were 330 vegetable farmers supplying Vhembe District retail supermarkets (StatsSA Community Survey., 2016). The population of the study was 233 . Out of this, there were 130 farmers, 55 transporters and 45 retailers.

### 3.4.1 Sampling, Sampling technique & method

Maree (2017) defines sampling as the process used to select a portion for the study in such a way that the individuals represent the larger group from which they were selected. The study used the probability stratified random sampling technique which is also referred as proportional random sampling. The stratified sampling technique is usually applied on the population which is homogenous where sub-populations can be able to be isolated. The technique involves dividing population thus, ensuring that the population is in homogenous sub-groups and then simple random each subgroup. The sub-groups are called strata. Strata

were formed based on common characteristics such as job title within vegetable value chains players.

The study was conducted under Thulamela, Musina, Collins Chabane and Makhado Municipality. Among 230 documented vegetable value chains around Vhembe District, out of this there are 130 farmers, 55 transporters and 45 supermarkets fruit & vegetable supervisors in Vhembe District. The sample size of farmer, transporters and retailers was decided as per the formula given by Krejcie and Morgan (1970) and then the perspective respondents were selected by using the random number table. The study used Krejcie and Morgan (1970) table when determining the sample size. The population consisted of 230 respondents was applied on heterogenous population (130 farmers, 55 transporters and 45 supermarkets fruit & veg supervisors) and the total sampled size was 185 selected from each category/population using Krejcie & Morgan (1970), farmers were 97, transporters 48 and 40 retailers. Internet sample size calculator method of Krejcie & Morgan (1970) table was referred to and utilized when determining the sample size using SRS (stratified random sampling). For example:

The increasing need in empirical research for a representative statistical sample has led to the demand for valuable and effective method for determining the size of the sample. In addressing the existing gap Krejcie & Morgan (1970) established a table for sample size determination for a given population in case for easy reference (see Table 3.1).

**Table 3.1: Formula for determining sample size**

| **Formula for determining sample size.** |
|---|
| S= X 2NP (1-P)/ d2 (N-1) + X2P (1-P)<br>s $X^2$NP (1-PX$d^2$ (N-1) +X2P(1-P) s required sample size= the table value of chi-square for one degree of freedom at the desired confidence level |
| N the population value |

**Source**: Krejcie &Morgan (1970)

Table 3 below illustrates major stakeholders/respondents within the vegetable value chains. The population consist of 230 stakeholders thus, from the indicated population 185 strata/respondents where drawn out using the Krejcie and Morgan (1990) sampling tool.

Farmers engaged or participated in the study were 97 farmers, 48 transporters and 40 retailers sampled from the Vhembe District Municipality.

Table 3.2 Sample size determined using Krejcie and Morgan (1970).

| **Strata** | **Population** | **Sample Size** |
|---|---|---|
| Famers | 130 | 97 |
| Transporters | 55 | 48 |
| Retailers | 45 | 40 |

Table 3.3. Krejcie and Morgan table for determining sample size.

| Table for determining sample size of a known population | | | | | | | |
|---|---|---|---|---|---|---|---|
| N | S | N | S | N | S | N | S |
| 10 | 10 | 100 | 80 | 280 | 162 | 800 | 260 |
| 15 | 14 | 110 | 86 | 290 | 165 | 850 | 265 |
| 20 | 19 | 120 | 92 | 300 | 169 | 900 | 269 |
| 25 | 24 | **130** | **97** | 320 | 175 | 950 | 274 |
| 30 | 28 | 140 | 103 | 340 | 181 | 1000 | 278 |
| 40 | 36 | 160 | 113 | 380 | 191 | 1200 | 291 |
| **45** | **40** | 170 | 118 | 400 | 196 | 1300 | 297 |
| 50 | 44 | 180 | 123 | 420 | 201 | 1400 | 302 |
| **55** | **48** | 190 | 127 | 440 | 205 | 1500 | 307 |
| **Note: (n) is population size & (s) is sample size source: Krejcie & Mogarn (1970)** | | | | | | | |

**Source**: Krejcie & Morgan (1970)

After generating random numbers, the researcher used random numbers to sample within the strata using simple random sampling.

**Random numbers generated for the different strata (97, 48 & 40 random numbers from a population of 130, 55 & 45)**

Table 3.4 Random numbers table representing population size of 130 farmers.

| **97 farmers sample size will be random selected from 130 population of transporters** |
|---|
| 74 36 75 37 25 128 51 62 70 59 20 63 102 77 125 64 45 95 99 48 92 84 11 86 109 79 81 7 24 116 55 126 3 16 97 2 88 93 38 127 66 10 28 100 9 129 110 117 68 30 106 6 69 35 82 124 58 96 98 54 34 107 90 115 32 4 57 21 44 87 104 101 15 130 14 120 113 121 83 112 71 72 105 41 19 123 65 26 89 108 111 122 52 56 29 5 13 |
| This table of 130 random numbers is produced according to the following specifications. Numbers are randomly selected from the range of 1-130. Duplicate numbers not allowed. |

Table 3.5 . 103 random numbers table representing sample size of 48.

| **48 transporters will be selected using random simple sampling from 140 population of transporters** |
|---|
| 63 31 44 128 28 66 118 15 137 100 117 96 116 70 2 131 26 81 12 79 138 101 13 102 112 42 111 83 55 33 60 36 85 124 41 40 87 52 18 11 76 43 65 20 106 86 69 80 110 51 91 94 113 95 14 77 17 103 49 3 75 129 84 139 99 127 130 34 121 107 22 59 122 62 120 105 53 21 46 97 71 61 1 4 25 50 114 45 88 6 73 125 126 39 58 93 24 109 27 92 115 37 136 |
| This table of 140 random numbers is produced according to the following specifications. Numbers are randomly selected from the range of 1-140. Duplicate numbers not allowed. |

Table 3.6. 85 Random numbers representing sample size of 40.

| **40 Retailers will be selected using random simple sampling from 85 population of retailers** |
|---|
| 81 72 62 64 5 84 22 45 24 85 80 49 47 57 23 65 10 17 75 70 43 74 51 69 15 12 16 18 68 58 11 7 67 31 1 54 53 78 76 52 27 59 61 36 77 39 42 66 37 34 83 48 44 19 38 21 82 63 20 25 28 56 6 14 3 79 9 4 73 30 |
| This table of 85 random numbers is produced per the following specifications. Numbers are randomly selected from the range of 1-85. Duplicate numbers not allowed. |

### 3.5 Data Collection

Data collection is the process of gathering and measuring information on variables of interest in an established systematic fashion that enables one to answer stated research questions, test hypothesis and evaluate the outcomes (Riley *et al*., 2018). Survey method was utilized in collecting data. The method was useful in gathering data from defined strata in order to obtain an idea of the situation among the study case. Standardized self-administered questionnaire instrument as data collection tool with closed-ended questions was used when collecting data. The questionnaire included ranking scales and checklists. Face-to-face interviews and telephone interviews as data collection techniques was used in ensuring data collection. The study thus, utilized structured interviews with pre-determined questions.

### 3.6. Data analysis

Data were coded and stored in the IBM Statistical Package for Social Sciences (SPSS) version 28.0.1.1. After cleaning to remove outliers, frequencies of responses relating to demographic variables, arrangements of along value chain, challenges, unsatisfactory impacts caused by dissatisfactions and proposed recommendations to address small-holder farmers dissatisfactions along the value chain were computed. Validity and reliability of the questions was checked using correlation, item-total correlation and Cronbach's alpha test in ensuring internal consistency of a scale. Cross-tabulation was used to Quantify unsatisfactory impacts caused by dissatisfactions along the value chain and when analysing arrangements of the value chain.

Assessing surveys often asks respondents to rank order their levels with services or conditions along the value chain (Fowler *et al.*, 2009). The study thus, used descriptive analysis, frequency (median mode) as the data were tested and found that it was not normally distributed. Graphics representation of data were used such as tables. The IBM (Statistical Package for the Social Science) SPSS version 28.0.1.1. data analysis tool was used for analysis. In checking relationships between variable cross-tabulation was utilized.

Table 3.8. Summary of research methodology

| **Objectives of the study** | **Design** | **Type of data** | **Research design** | **Sampling** | **Data analysis & tools** |
|---|---|---|---|---|---|
| 1. Map and analyse activities along fresh produce markets value chain | -Survey | -Primary data<br>-Ordinal data<br>-Likert-type scale | Quantitative | Stratified simple random sampling | -Descriptive analysis<br>-Correlation<br>- Tools: IBM SPSS version 28 |
| 2. Critically evaluate challenges faced by farmers along value chain | Survey | -Primary data<br>-Descriptive data<br>-Ordinal data<br>-Ordinal scale | Quantitative | Stratified simple random sampling | -Correlation & regression<br>-Tools: IBM SPSS version 28 |
| 3. Suggest possible interventions to improve activities along the value chains | Survey | -Primary data | Quantitative | Stratified simple random sampling | Descriptive statistics<br>-IBM SPSS version 28 |

### 3.7 Ethical considerations

According Neuman (2011) the word “ethics” has been derived from the Greek word “ethos” meaning one’s character or manners. The ethical consideration in research is of growing importance. It is critical that any researcher understands the ethics in research and its basics when conducting research or collecting data. The following are set of ethics the researcher considered when conducting research and collecting data from respondents.

The researcher followed the following ethical considerations:

### 3.7.1 Informed consent

The first ethic the researcher considered was informed consent. The informed consent ethic ensured that respondents fully and completely understand the purpose of the research as well as methods the researcher used in the study. The informed consent allowed respondents to be aware of the risks which they might encounter while engaging in the data collection process. Due to informed consent consideration respondents had the rights to know how long they are going to engage in the data collection process. Respondents were also made aware that data that was collected was going to be confidential and not accessed by anyone else except the researcher/student supervisors.

### 3.7.2 Right to withdraw

Sampled respondents had rights to withdraw before or during the data collection process. The researcher did not enforce any responded in engaging on the data collection process thus, engagement on data collection process was not compulsory but guided by willingness of the respondent. Respondents were free from making any decisions regarding their engagement within the data collection process.

### 3.7.3 Protection from harm

The researcher ensured that respondents were well protected from all sorts of humiliation, embarrassments, physical, emotional, spiritual and psychological harm. Harm in the context of research ethics is defined as extreme physical pain with factors such as embarrassment, depression, psychological stress or humiliation that may affect the respondent in various significant ways. “No harm” is a fundamental ethical rule in research (Babbie *et al.*, 2007).

### 3.7.4 Confidentiality

Confidentiality in the context of research refers to keeping data confidentially or in a confidential manner. The data that was collected from respondents was kept safe and not accessed by anyone. Agreement between the researcher and the respondent was prioritized and ensured limit regarding personal and private matters. The researcher ensured that respondents identities such as name, contacts or any personal details regarding the respondent are not revealed anywhere and data collection tools with data were held in a confidential manner.

### 3.7.5 Privacy

Respondent had the rights of privacy and rights for respondent to make any decision regarding, when, where and how data collection was to be conducted. Beliefs of the respondent were protected, respected and held privately or shared based on agreement between the researcher and the respondent. Respondent were made aware before collecting data that their participation was voluntarily and kept private.

# CHAPTER 4: RESULTS, PRESENTATION AND DISCUSSION

## 4.1 Introduction

In this chapter, the results drawn from the case study survey conducted in Vhembe District are presented. The study encompassed activities of stakeholders along the vegetable value chain in Vhembe District.

## 4.2 Characterization and demographic details of players along the vegetable value chain

Table 4.1 presents the demographic distribution of respondents along the vegetable value chain in the Vhembe District Municipality, showcasing the number and percentages of individuals based on their gender and educational levels within each category of farmers, transporters and retailers. The results revealed that out of the 97 farmers who participated in this study, 61% of them were female. Transporters and retailers had relatively more male respondents than female, i.e. 62% and 80% respectively. A diverse educational background was observed among farmers, with a significant portion having completed tertiary education (36%) and almost an equal representaion at matric (30%) levels. A higher percentage of transporters have completed matric (52%), followed by tertiary education (25%) while the majority of retailers have completed matric (50%) or tertiary education (42%).

**Table 4.1: Characterization and demographic information of respondents along the vegetable value chain in Vhembe District municipality**

| **Demographic information** | **Respondents n=185** | | |
|---|---|---|---|
| | **Farmers (%)** | **Transporters (%)** | **Retailers (%)** |
| **Gender** | | | |
| Male | 38 (39%) | 30 (62%) | 32 (80%) |
| Female | 59 (61%) | 18 (38%) | 8 (20%) |
| **Educational level** | | | |
| primary | 12 (12%) | 4 (8%) | 0 (0%) |
| secondary | 21 (22%) | 7 (15%) | 3 (8%) |
| Matric | 29 (30%) | 25 (52%) | 20 (50%) |
| tertiary | 35 (36%) | 12 (25%) | 17 (42%) |

This means that majority of farmers are female farmers. according to Strydom (2013) he emphasised that, in much of the world, female are the face of farming and are the ones economically and socially active in the least developing and rural areas. The results further revealed that 62% and 80% were transporters and retailers respectively. The majority of male in retailors can be associated with the need for man power within the retail or fruit and vegetable department.

Over a quarter (36%) of the farmers 36% had tertiary education. This might mean that, from the tertiary education they have acquired skills and knowledge regarding farming and thus, enhance simplicity on them for startup. Slightly half of the transporters (52%) had obtained matric certificate. This might be due to recent decades dominant companies procedures that they hire people with matric. About 50% of the retailers had obtained matric certificate. This might have been influenced by the fact that the majority of retails hire  people with matric.

In most countries of sub-saharan and developing countries, farmers who produces more cash vegetables are males and hence female farmers produces more crops or vegetables for household feeding. The perception of gender in vegetable production and differences in accessing markets and resources remains underexplored. Production of leafy vegetables by females has been seen as weaker than of male counterparts (Fischer *et al*., 2018). Other studies findings shows that male counterparts are dominant within the cash crop or vegetable value chain, wherelese the findings of the study reflects females as the one's dominating the vegetable value chains in Vhembe District.

4.3 Activities along the fresh produce value chains

Table 4.2 presents a breakdown of activities and the resulting values created at the farmgate by farmers for different crops, namely, cabbage, tomatoes, spinach and butternut. For the purpose of this study, activities included were irrigation, pest control, fertilizers, seedlings and labour. For instance tomatoes require costs for pest control, fertilizers, irrigation, seedlings and labour while spinach andbutternut also involve specific activities, each incurring different costs. Thus each activity creates or has its own value (total cost spent) and selling price (value at farmgate).  For example, for the cabbage head, irrigation activity within the farm costed (R1.00), pest control (R1.00), fertilisation (R2.00), labour (R1.00) and harvest (R4.00) which amounts to R9.00 of the total value at farmgate. The markup of cabbage head and tomatoes (loose) per kg was 25% while 20% was the markup for butternut (loose) per kg.

**Table 4.2: Activities and value created at farmgate by farmers**

| Crops | Activities | Total cost spent | Value at farmgate |
|---|---|---|---|
| Cabbage per head | irrigation | R1.00 | R9.00 + R2.25 (25% markup = R11.25 per head |
| | Pest control | R1.00 | |
| | Fertilizer | R2.00 | |
| | Seedlings | R1.00 | |
| | Harvest | R4.00 | |
| Tomatoes per kg | Pest control | R3.00 | R13.00+R3.25 (markup 25%) = **R16.25 per kg** |
| | fertilizers | R3.00 | |
| | Irrigation | R2.00 | |
| | Seedlings | R2.00 | |
| | Labour | R2.00 | |
| Spinach per bunch | Pest control | R1.00 | R6.00+R1.20 (markup 20%) = **R7.20 per bunch** |
| | Labour | R2.00 | |
| | Transport | R1.00 | |
| | Fertilizers | R1.00 | |
| | Irrigation | R1.00 | |
| Butternut per kg | Irrigation | R1.00 | R10.00+R2.00 (markup 20%) = **R12.00 per kg** |
| | Pest control | R2.00 | |
| | Fertilizers | R3.00 | |
| | Seedlings | R1.00 | |
| | Labour | R3.00 | |

In this study a markup of 25% per cabbage head was used. Thus, the total cost of cabbage head at the farmgate was R9.00+R2.25 (markup 25%) which gave the total value of R11.25 per cabbage head. Majority of farmers sold 400 cabbages at the farmgate, supplying retails/supermarkets of which they made a profit of:

400 x R9.00 = R3600.00 (total cost spent)

400 x R11.25= R4500.00 (including markup)

R4500.00 - R3600.00

**Profit = R900.00 per 400 cabbages delivery**

At the farmgate, farmers used the markup of 25% for tomatoes per kg thus, from the Table the total cost of tomatoes per kg was R13.00+R3.25 (markup 25%) which gave the total value created of R16.25 per kg. At the farmgate one crate of tomatoes weighs 18kg (R234.00 total cost+R58.50 markup=R292.50 total selling value including markup) thus, 1 ton of tomatoes was equal to 907.18kg meaning that 1ton was 50 crates of tomatoes.

50 crates x R292.50 (total value created including markup)= R14625.00

Profit= R14625.00 - R11700.00

= **R2925.00 profit per 1 ton of tomatoes**

Regarding spinach, farmers used the total markup of 20% per spinach bunch. As illustrated on Table 4.2, spinach bunch total cost including markup was equals to R7.20 with R1.20, thus when farmers sold 300 bunch of spinach at the farmgate they made a profit of :

400 x R7.20 = R2880.00

R2880.00 - R2400.00

**Profit = R480.00 per spinach delivery from from farmgate**

For butternut, farmers used the markup of 20% per butternut kg. As indication on Table 4.2 for butternut, the total value created including 20% markup was R12.00. Butternut (loose) 1 ton was equals to 907.18kg. This indicated that 907 bags of butternut per kg was equals to 1 ton. The total profit a butternut farmer made at the farmgate was:

R12.00 x 907 (1kg bags) = R10884.00

R10884.00 - R9070.00 (total cost excluding 20% markup)

**Profit = R1814.00 per ton of butternut per kg from farmgate**

The study findings identifies that vegetable value chain commences and begins from the farmgate and therefore farmgate involves activities such as crop production, maintenance, harvest, storage and packaging. Most of labor is applied at the farmgate and maturity and readiness of the product is ensured/declared at the farmgate. The results from this segment clearly identifies that majority of activities such irrigation, pest control, preparation of field, sowing, bedding, crop treatments and pruning are practiced and executed at the farmgate.

Crop preparation, manure application and harvesting are done within the farmgate which clearly indicxates that farm gate plays a vital role in vegetable production and to the vegetable value chains **.** In support to the findings of the study, most vegetable growers use various methods in growing vegetables or crops within the farmgate, some use traditonal skills for example they apply chemical fertilizers in different ways for example, some farmers apply fertilizers before harvesting and hence this practice according Wang (2019) reduces the storage life of produce or vegetables (Reddy *et al*., 2020).

4.4 Activities and value created by transporters to retail shops

Table 4.3 presents the activities and values created by transporters to retail shops. The farmgate transporters performs various activities in ensuring accurate value chain of crops indicated in Table 4.3. Transporters ensured that they transported, stored, bulk packaging and insure cabbage during the value chain process. The total cost in transportation was (R2.00), storage (R1.00), bulk packadging (R1.00) and insurance cost (R1.00). The total value at farmgate was R5.00 excluding markup. Vegetable transporters often used the total markup of 25% when delivering cabbage, tomatoes and butternut. Thus, they made 20% markup for spinach bunch.

**Table 4.3: Activities and value created by transporters to retail shops**

| **Crops** | **Activities** | **Total cost spent** | **Value at farmgate** |
|---|---|---|---|
| Cabbage per head | Transportation | R2.00 | R5.00 + R1.25 (25% markup = **R6.25 per head** |
| | Strorage | R1.00 | |
| | Insurance | R1.00 | |
| | Bulk packadging | R1.00 | |
| Tomatoes per kg | Transportation | R2.00 | R7.00+R1.25 (markup 25%) = **R8.75 per kg** |
| | Storage | R2.00 | |
| | Insurance | R1.00 | |
| | Bulk packadging | R2.00 | |
| Spinach per bunch | Transportation | R2.00 | R3.00+R60c (markup 20%) = **R4.60c per bunch** |
| | Storage | R1.00 | |
| | Insurance | R0.00 | |
| | Bulk packadging | R1.00 | |
| Butternut per kg | Transportation | R3.00 | R8.00+R2.00 (markup 25%) = **R10.00 per kg** |
| | Storage | R2.00 | |
| | Insurance | R1.00 | |
| | Bulk packadging | R2.00 | |

From farmgate to retail shops, cabbage transporters created their own values. Values were created looking at cabbage transportation, storage, insurance and cabbage bulk packadging. Table 4.3 indicates four types of crops and their created values. Cabbage from farmgate to retail shops costs R6.25 including transportation total markup of 25%. The total profit transporters made when supplying 400 cabbages to retail was :

400 x R6.25 (cost including markup) = R2500.00

R2500.00 - R2000.00 (cost excluding 25% markup)

**Profit = R 500.00 (per 400 cabbage delivery)**

From the farmgate to retail shops, tomatoes transporters/transportation had its own value created. This included transport, storage, insurance and bulk packadging. Tomatoes per kg from farmgate to retail shops costed R8.75 per kg including 25% markup. About 1 ton of tomatoes was equals to 907.18 kg, thus, 1 crate of tomatoes weighs 18kg this made 1 ton to be equal to 50 crates of tomatoes. One tomatoes crate was equal to R157.50. The total profit of tomatoes transporters with values of various activities included was:

R157.50 (value per crate) x 50 (crates) = R7875.00

R7875.00 - R6300.00 (cost of 50 crates excluding 25% markup)

**Profit = R1575 (per 1 ton of tomatoes to retail shop)**

From the farmgate to retail shops, transporters of spinach created their value looking at various activities such, transportation, bulk packadging and storage. The total cost of spinach value including 20% markup was R4.60c. Transporters ensured a profit from each delivery from farmgate to retail shops when supplying 300 quantities of spinach bunch. The profit is shown below:

300 (spinach bunch)xR4.60c (spinach value including 20% markup) = R1380.00

=R1380 - R1200 (cost excluding 20% markup)

**Profit = R180.00 (per 300 bunches delivered)**

From the farmgate to retail shops, butternut transporters had their value created from various activities that transportation/transporters ensured. The activities included transportation, bulk packadging, insurance and insurance thus, 1 ton of butternut was equal to 907.18 kg. The cost of butternut including markup was R10.00 per kg, this means that the total value of butternut 1 ton was R9071.80. Butternut transporters made use of 25% of markup per delivery. The total profit that butternut transporters made was :

R10.00 (cost including 25% markup) x 907.18kg = R9071.80

R9071.80 - R7257.44 (cost excluding 25% markup) = R1814.36

**Profit = R1814.36 (per 1 ton delivery of butternut)**

From the study findings transportation plays an important role in ensuring existence and procurement of vegetables within the retail sector. Farmgate relies much on transportation in order to sell-off fresh produce into various retail stores. According to Silem (2022), vegetable transportation across continents more especially in African countries has become a norm, customers love to purchase fresh vegetables/produce at any time and expect the produce to be ripe and unspoiled by the time they are purchasing.

The freshness of produce also depends on transportation ( Silem *et al*., 2022). Silem (2022), supports the findings from Saghareishvili (2021) " portions of exported vegetables in Georgian are primary produce which have shorter lifetime period which needs to be delivered/transported in time. Lack of developments in vegetable transport system enhences impossible and un-sustainable vegetable value chains. In addition to the activities perfomed by transporters and the value created by transporters into retails was also discussed by Vigneault (2017). Vigneault emphasized that , "most fresh produce are transported from farmgate receiving/dispatching facilities into retails in refrigerated vehicles. Vigneault (2017), further stated that" In the North American, highway trailers primarily transport perishable produce/vegetables, while marine containers and air freight transports off-shore produce (Vigneault *et al*., 2017).

4.5 Activities and value created by retailers to customers

Table 4.4 presents the activities and values created by retailers and customers. Retailers performs different activities in ensuring procurement/selling of cabbage, tomatoes per kg, spinach bunch and butternut per kg. In ensuring cabbage sales the retailers ensured the displays of the product (R2.00), pre-packings (R2.00) and storage (R1.00). The total value cost was R5.00 and retails used 20% of markup on cabbage, tomatoes and butternut. Retailers on spinach they used 15% of markup.

**Table 4.4: Activities and value created by retailers to customers**

| **Crops** | **Activities** | **Total cost spent** | **Value at farmgate** |
|---|---|---|---|
| Cabbage per head | Display | R2.00 | R11.25 + R6.25 **=R17.50+R3.50 (20% markup) =R21.00 selling price per head** |
| | Pre-packings | R2.00 | |
| | Store/refridgerate | R1.00 | |
| Tomatoes per kg | Display | R1.00 | R16.25+R8.75 = **R25.00+R5.00 (20% markup) per kg =R30 selling price per kg** |
| Spinach per bunch | Pre-packings | R2.00 | R7.20+R4.60 |

| | | | |
|---|---|---|---|
| | Store/refridgerate | R2.00 | R11.80+R1.77 (15% markup) **= R13.75 selling price per bunch** |
| | Display | R2.00 | |
| | Pre-packings | R2.00 | |
| Butternut per kg | Display | R1.00 | R12.00+R10.00 = **R30.00+R6.00 (20% markup) per kg =R36.00 selling price per kg** |
| | Pre-packings | R1.00 | |

From the farmgate, transporters and retailers have values created from different activities that took place. The retail is the final recipient of various produced crops by farmers before sold out by customers.Cabbage, tomatoes, spinach and butternut have their own values created. Table 4.4 shows total value created by farmers from farmgate and transporters to retail shops. Retail shops including their markup they have their own total value of each delivered product including the selling prices of each product.

Major retail shops used 20% markup on vegetable products and 15% on spinach bunch. For 400 cabbage delivered within the retail shop the total profit they generated was:

Cabbage head

400 x R21.00 (including 20% markup) = R8400.00

R8400.00 - R7000.00( excluding markup)

**Profit = R1400.00 (per 400 cbbage heads delivered)**

For 1 ton of tomatoes delivered into retail shop, below was the total profit generated from the delivery .

Tomatoes per kg

Delivering 1 ton (907.18 kg of tomatoes)

1 ton = 907.18 kg

907.18kg x R30.00 (including 20% markup)=R27215.40

R27215.40 - R22679.50 (excluding markup)

**Profit = R4535.90 (per 1 ton of tomatoes delivered)**

For 300 bunches of spinach delivered to a retail, below was the profit margin the retail generated:

Spinach bunch

Delivering 300 spinach bunch

300 x R13.57 = R4071.00 (including 15% markup)

R4071.00 - R3540.00 (excluding 15% markup)

**Profit = R531.00 (per 300 spinach bunch delivered)**

When the retail shop receives 1 ton of butternut, below was the profit marging that the retails made:

Butternut per kg

1 ton of butternut delivered to a retail shop

1 ton = 907.18

907.18 x R36.00 (including 20% markup) = R32658.48

R32658.48 - R27215.40 (excluding 20% markup)

**Profit = R5443.08 (per 1 ton (907.18 kg) of butternut delivered to a retail shop)**

The retail segment is the last recipient of the fresh produce before the retail customer. The retail asesses morely the quality of the product and therefore, if the produce is of a poor quality the retail has all the right to reject or negotiate with the transporter and the farmer on how to go about with the produce. The are a number of activities that the study identified to be implemented within retail sectors, activities including displaying of the products, packaging, storage and pre packaging of vegetable products.

Following findings has been discovered and illustrated by Zoss (2021) of which the study did not address, the scholar stated that “there are a number of activities that vegetable retails must ensure, for example ensuring well lit shopping spaces, clean cold storage for vegetables, packaging which is convenient, fair bundles of vegetables and fair prices”.

## 4.6. Challenges faced by farmers, transporters and retailers along the fresh produce value chains

Table 4.5 presents the results of the challenges faced by farmers, transporters and retailers along the fresh produce value chain. The results of the current study revealed tha the majority

of farmers (97%). Complained about climate change while only 58% were worried about wastage and spoilage. About 71% of the transporters faced challenges related to delays in loading and offloading. This was followed by 65% of them who mentioned delay in payments as one of the challenges they faced. The results further revealed that 79% of the retailers in the current study worried about the delivery of poor quality products while 74% of them complained about high cost of packadging materials.

This results are motivated highly by lack of proper storage for produced vegetable products thus, proper and sufficient storage facilities would minimize the effects of climate change into fresh produce. Accurate and appropriate storage would also ensure that fresh produce stored products do not get rottern very fast. Lack of inputs such as fertilizers and pesticides is mostly caused by lack of capital, lack of input selling markets, lack of information and lack of knowledge amongst vegetable farmers or producers. Lack of capital is the major cause of above mentioned challenges and results amongst fresh producers/farmers.

This means that sufficient storage facilities, proper road infrastructures and availability of capital can minimize and reduce the following challenges, lack of agricultural machineries for farming, dissatisfactions with farming tools, lack of access to inputs, lack of access to irrigation, climate change, wastage and lack of irrigation equipments.

**Table 4.5: Challenges faced**

| **Challenges by farmers** | **Percentage (%)** | **Ranking** |
|---|---|---|
| Lack of agricultural machineries for farming | 73% | 5 |
| Dissatisfactions with farming tools | 89% | 2 |
| Lack of access to inputs e.g., fertilizers | 86% | 3 |
| Lack of access to irrigation | 83% | 4 |
| Climate change | 97% | 1 |
| Wastage and spoilage | 58% | 7 |
| Lack of irrigation equipment's | 59% | 6 |
| **Transporters** | | |
| Delays in payments | 65% | 2 |
| Small/ less quantity orders | 60% | 3 |
| Poor road infrastructure | 52% | 4 |
| Delays in loading and offloading | 71% | 1 |
| **Retailers** | | |
| Poor quality delivered | 79% | 1 |
| Late deliveries by transporters | 64% | 3 |

| | | |
|---|---|---|
| High cost of packadging materials | 74% | 2 |
| High cost of storage | 62% | 4 |

4.6.1 Challenges faced by farmers within the farmgate

Of 86% of farmers lack of access to inputs such as fertilizers/seeds is challenge amongst them because it lowers and affects their levels of production and affects their vegetable value chains. Lack of inputs also contributes to high un-employment rate and loss of trust from their customers due due to poor quality produced and insufficient vegetable surplus. The study shows that 83% of farmers are affected by lack of access to irrigation such as drip, sprinkler, center pivot, lateral move, sub and manual irrigation.

This contributes to low levels of productivity and hinders sustainable vegetable value chains. Waistage and spoilage has also been identified as a major challenge amongst farmers by 58% of farmers. Waistage and spoilage is influenced by short of proper storage. Out of 86% of respondents, they faced challenges with access to inputs such as fertilizers, pesticides e.t.c. Lack of inputs hinder's the development of vegetable agriculture and vegetable value chains thus, access to inputs ensures sustainable vegetable value chains, employment, food security and more vegetable production (Otsuka *et al*., 2016). 83% of respondents lack access to irrigation, the application of water into crops assist growing of crops and irrigation has been descriped as a crucial in ensuring vegetable production and sustainable vegetable value chains.

Climate change has been identified as the major concern and contributes a lot of dissatisfactions along vegetable value chains. Shortage of water, flooding, acid rain and windy has been morely described as major problems affecting vegetable value chains badly. 58% of respondents illustrated that spoilage and wastage of produced crops is a serious challenge their encountering and thus, it affcets their vegetable value chains. Spoilage and wastage contributes a tremendous loss amongst all vegetable players. Of 59% respondents described lack of irrigation equipments as one of the challenge that contributes difficulties in ensuring steady vegetable value chains.

The results from the study indicates that the Vhembe District farmers, vegetable transporters and retailers are highly affected by lack of farming tools and bad climate change. Lack of financial assistance is a core resulting in occuring shortage of farming tools among vegetable

farmers. The study differs with other studies, because factors such a late payments, insufficient payments are not yet elaborated and researched on into detaills. Shortage of farming tools and inputs has led to a number of lost employment and increasing vacant farms (Baloyi *et al*., 2020).

### 4.6.2 Challenges faced by transporters in the vegetable value chains

From 65% of transporters, they faced challenges with delays in payments this is after and before delivering in respect of the agreement between the the transporter, farmer or retail. Delays in payment ensures a lot of dissatisfaction with the vegetable value chains. To ensure sufficient fluel, fleet, valuable cold chain/storage requires non delay of payments. Most companies have defunct due to delays in payments and loss of employment have occurred.

Out of 60% of transporters, they emphasized that small/less quantity orders that has to be delivered ensures dissatisfactions because it is costing to supply few products from warehouse/market or farmgate to a retail shop. 52% of transporters find poor road infrastructure as a challenge within the vegetable value chains. Poor road infrastructure is associated with late deliveries and increases dissatisfactions amongst transporters within the vegetable value chains. According to Oppen (2011), vegetable transporters within the sub-sahara find delays of loading/offloading vegetable products is a major challenge that needs serious attention and needs to be addressed within the vegetable value chains sectors.

Above results are caused by late payments before and after delivering are caused by late deliveries, delays in invoicing, in-correct invoices, in-correct invoiced amounts and poor delivered fresh produce products. Poor communication also lead to delayed payments and ensures dissatisfactions within the vegetable value chains. Poor road infrastructures plays a huge role in ensuring distractions and un-sustainable vegetable value chains and affect the vegetable transport sectors.

In support to the findings of the study Makyao (2023) stated that, lack of cold storage, poor road infrastructure, small items ordered and delays in loading and offloading of fresh produce is a growing challenge within the vegetable value chains transportation sector. Makyao (2023) identified lack of market, financial assistance and lack of marketing strategies as factors affecting the vegetable transport segment. The study has identified factors such as late offloading and delays in loading as a challenge faced by most retailers. Furthermore, more research regarding challenges encountered by vegetable transportation sector is recommended.

Scholars such as Alulu (2023), indicated that the level of distance when delivering vegetables into retails and agricultural markets is an issue that needs special attention within the vegetable value chains, it interacts with quality of produce, profit efficiency and transport costs. Further research in the area of transportation of vegetables is recommended. The above findings were also supported by Saghareishvili (2021) " portions of exported vegetables in Georgian are primary produce which have shorter lifetime period which needs to be delivered/transported in time. Lack of developments in vegetable transport system can enhence impossible un-sustainable vegetable value chains.

### 4.6.3 Challenges faced by retailers in the vegetable value chains

From 79% of respondents, they illustrated that poor product quality is a major challenge amongst retailers within the vegetable value chains. 79% of retailers emphasized that poor quality products is associated with lack of sales within the retail level, loss of profit and loss of customers. 64% of respondents also identified late deliveries by transporters as a challenge they encounter within the vegetable value chains. From 74% of retailers, they indicated that high cost of packadging materials is a challenge as reflected on above table 4.3.3. Storage has also been identified as a challenge by 62% of retailers within the Vhembe District vegetable value chains.

The a number of challenges that the retail segment encounters, the challenges includes high cost of packaging materials, late deliveries, high cost of storage, poor quality delivered, lack of access to markets, lack of marketing strategies and lack of financial assistance. Above results are caused by lack of capital, shortage of markets and lack of marketing strategies. More markets enhences more competition in terms of services offered and quality of products delivered.

The higher the number of markets the higher quality vegetable products will be produced and delivered. Late deliveries is a challenge within retail vegetable value chain and has been identified as one of the major challenge affecting the vegetable value chain and the retails. Late deliveries lead to loss of good quality of produce and affects retails in ensuring sales and ensuring good turnover (Saghareishvili *et al*., 2021).

## 4.7 Possible interventions for farmers, transporters and retailers to improve activities along the vegetable value chain

The respondents of the study proposed various interventions that could be used by farmers, transporters and retailers to improve the activities along the vegetable value chain within the Vhembe District Municipality (Table 4.6). The results revealed that 99% of the farmers needed financial assisstance to ensure satisfactions within the vegetable value chains. This was followed by 97% who wanted agricultural training and learning to improve their vegetable value chains activities. Similarly, 99% of the transporters require financial assisstance while 94% proposed marketing strategies as possible strategy to improve activities along the vegetable value chain. About 97% of retailers also required financial assisstance, with 96% of them who needed access to market to improve their activities along the vegetable value chain.

The findings illustrate that financial assistance amongst farmers, transporters and retailers is needed in order to halt dissatisfactions within the Vhembe District Municipality vegetable value chains. The Revitalisation of Smallholder Irrigation Scheme (RESIS) program established in 2005 by the Limpopo Department of Agriculture was used to remedy the slow rate of implementation. The Limpopo Department of Agriculture contributed R84 million to the (RESIS) initiative (Maepa & Makombe *et al*., 2014). This shows that finacial assistance from the government or from various initiatives can reduce the challenges encountered by playuers within the fresh produce value chains.

The Great American Tea Company, controlled by George Gilmen, opened their first fresh produce retail supermarket in the United States of America (USA) (Anderson *et al.*, 2016). After seeing emerging and increasing number of vegetable markets that would be able to supply them with the fresh produce, there started an increasing number of of vegetable supermarkets, producers and vegetable suppliers. This means that availabilty of access to markets, marketing strategies, farming insurance, financial assisstance and availabilty of agricultural training and learning can ensure improvements on farmers, transporters and retailers activities along the fresh produce value chains.

### 4.7.1 Possible interventions for farmers to improve activities from the farmgate

Table 4.6 indicates that 99% of Vhembe District farmers need financial assistant in order to maintain and keep vegetable value chain sustainable. 91% of farmers emphasized that they need farm/farming insurance in order to secure their vegetable value chains/productivity and their farms. Of the 97% farmers they illustrated that they need agricultural learning and training in order to improve their vegetable value chains activities. Agricultural learning and training is

likely to ensure satisfactions within the vegetable value chains, improve food security and fight hunger as indicated by Hartzeberg *et al*., 2015.

In addition to the findings of the study, Santacoloma (2021) believes that proper cultivation can mitigate bad environmental impacts of vegetable productions using planting cover crops and can serve as an intervention in improving activities and vegetable production within the farmgate. Santacoloma further emphasized that ensuring vegetable greenhouses can protect plants from pest pressures and bad climate while ensuring proper usage of water.

Stringer (2020), the issue regarding providing platforms for farmers to discuss their challenges, how to manage activities within the farmgate, sharing knowledge regarding vegetable production and vegetable value chain, share knowledge on how to access more markets and possible alternatives to halt the challenges permanently are ways disscused by Stringer of which the study did not address on the study findings.

### 4.7.2 Possible interventions for transporters to improve activities along the vegetable value chain

Table 4.6 also indicates that 92% of Vhembe District Municipality transporters need markets in order to ensure satisfactions within the vegetable value chains. More markets enhances more profit, more employments and sustainable vegetable value chains. With more markets goal 2 of the SDG'S of ending hunger, achieve food security, improving nutrition and promoting sustainable agriculture will be achieved and ensure reduced number of people dying of hunger in South Africa. 94% of transporters have also emphasized that acquiring marketing strategies would be a remedy or possible solutions to halst dissatisfaction within the vegetable value chains. 99% of transporters also emphasized that financial assistants would be a great remedy or solution to ensure greatre satisfactions within the vegetable value chains.

The Growth of the American Tea Company in the United states was influenced by obtained and learned various marketing strategies. Marketing literacy place an important role within the business sector and poor marketing strategies can lead to un-sustainable value chains. Vigneault (2017) in addition to interventions on how to improve transportation of vegetables he illustrated that in South Africa vegetables should be kept on conditions that are optimum during transportation, adequate air circulation and adequate temperature in ensuring that quality of perishable produce is preserved (Vigneault *et al*., 2017).

4.7.3 Possible interventions for retailers to improve activities along the vegetable value chain

From 96% of Vhembe District Municipality retailers stated that they need markets in order to ensure sustainable vegetable value chains and competitive in terms of quality vegetable products. More markets will ensure that they will always be enough products for selling to customers and enhance more volume of customers. Retailers also emphasized that they need marketing strategies in order to ensure more availability of food and ensuring food security in South Africa. From 94% of Vhembe District retailers have emphasized that they need marketing strategies in order to ensure the expansion and sustainable vegetable value chains. 97% of retailers have also illustrated that financial assistants is needed in order to ensure greater storage and valuable vegetable value chains. All above mentioned possible interventions to improve activities of retailers along the vegetable value chains are crucial and are likely to ensure sustainable vegetable value chains in South *Africa, more employment,* more vegetable farms, food security and likely to chieve SDG's goal2 of ending hunger and ensure food security.

Other studies illustrated that saturation, growth and sustainable produce retails in developing countries is ensured through various factors such the flood of Foreign Direct Investment (FDI) and the market liberation. Sulaiman (2018), further emphasized that the greater the availability of logistics technology, the greater the availability of procurement and declining transport costs ensures valuable and sustainable retails selling fresh produce (Sulaiman *et al*., 2018). Zhang (2016) in addition to the interventions on how to reduce challenges faced by retails along the vegetable value chain, Zhang (2016) stated that, the implementation of fresh electricity supplier built logistics distribution system from a market/farmgate to the specific retail store can assist in reducing the damage rate of vegetables and can ensure an increase of customers satisfaction.

# CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This chapter presents the conclusions from the key findings and then suggest recomendations and possible interventions to improve activities of players along the fresh produce value chains

## 5.2 Conclusions on characterisation of players along the fresh produce, transport and retail segment

The study shows that majority of farmers are females with 61% while male farmers comprise of 39%. The conclusion that can be drawn here is that the, dominance of female farmers could possible be related to gender roles as the majority of women have to take up home makers chores that limit their involvement at activities at farmgate.

This somehow is despite the government commitment of women empowerment after obtaining the democracy. The other key finding is that the vegetable value chains with the Vhembe District is dominated by farmers with tertiary level education, implying that they are better positioned to make informed farming decisions as well as interprete value chains data.

### 5.2.1 Conclusions from key findings along the transportation segment

The study established that male transporters (62%) dominate the transportation segment along the vegetable value chains in the Vhembe District wherelese female transporters consitute 38%. In this case participation by female transporters is hindered by gender roles and culture. Culture pescribes gender roles for women which pescribes that they are bound to be at home during the evening taking care of children hence majority could not venture into transportation as it takes them away from home from extended periods. Moreso, majority of female farmers do not have assets to use a scollateral to procure trucks hence being limited to farmgate activities. Majority of those are logistics or transportation segment have above secondary education which is also not surprising that the segment is male dominatedas previously fewer women had access to education compared to to male members of the community.

5.2.2 Conclusions from key findings along the retail segment

The study shows that majority of retailers are males with 80% and females with 20%. Majority of retails more especially under the vegetable section or department supervision are dominanted by males however, most retails seek to ensure more man power within the department. The dominance of males within the retail Vegetable sectiondepartment is ensured by need for man power within the department. The activities include dragging of pallet Jack's and packing heavy potatoe bags, butternut and onion bags thus, this activities or tasks seem difficult for females to action.

**5.3. Challenges faced by players along the fresh produce value chain**

5.3.1 Farmgate segment

The study illustrates that 97% of farmers described climate change as a major challenge the encounter. Climate change has been and is still a major challenge among farmers globally thus, climate change is associated with drought, floods, temperature risings e.t.c. this conditions contributes more dissatisfactions within the vegetable value chains. Dissatisfactions with farming tools has also been identified as a challenge by 89% of farmers. Lack of sufficient tools is a major challenge within the farming sector and this is associated with low production and un-sustainable vegetable value chain. The climate change and lack of sufficient tools affect sustainable vegetable production and nagatively affects thevegetable value chain. As a result farmgate segment would not be able to operate accurately if there is lack of farming tools and bad climate change. Farmgate relies more on tools for sustainable fresh produce and re-curring crop production.

5.3.2 Transportation segment

The study established that 65% of transporters find delays in payments as a challenge along the fresh produce value chains. Delays in payments affects the vegetable value chains badly because transport sectors requires timely access to finance in order to render delivery of products and in order to ensure them. More so, 71% of transporters find delays in offloading and loading as a challenge thus, transporters end up finding it difficult to manage time in ensuring that all the deliveries are rendered and delays also reduce the quality of products to be delivered.

The study also shows that 60% of transporters experience contracts to deliver orders of small quantities which becomes uneconomic. Poor road infrastructure has also been identified as a challenge by 52% of transporters. Poor road infrastructure ensures late deliveries and affects the quality of produce for example, lettuce which quickly looses its quality.

5.3.3 Retail segment

Of all the respondents in the retail segment 79% find poor quality delivered as a major challenge along the fresh produce value chains. Most of vegetable products are perishable and quickly lost quality. Furthermore 74% of retailers find high cost of packadging materials as one of the challenges with 64% find late deliveries by transporters as the other challenge that causes dissatisfactions along the vegetable value chains. Late deliveries are caused by poor road infrastracture and poorly planned deliveries. Of the study 62% of retailers find high cost of storage as a challenge. Most retailers find it hard to purchase or obtain appropriate storages that can accurately maintain good quality of produced products.

Poor quality vegetable deliveries is a major challenge experienced by a number of retails thus, retails are sometimes forced to receive poor quality produce due to shortage of stock and poor quality produce often gets rotten very fast. This affects the retail sector and have negative impacts on suppliers as well as trust get reduced. High cost of packaging and high cost of storage facilities affects retailers negatively thus, profit is affected and which can lead to no employments and retrenchment.

**5.4 Suggestions to improve activities along the vegetable value chain**

5.4.1 Farmgate segment

The South African government should invest much of farming mechanisations and female preferencial treatment to access financial support by female farmers. The contract farming should be introduced in order for female farmers to produce more valuable vegetables that will increase the value of their activities at farmgate. Contract farming can also empower farmers at the farmgate segment to be better organised and use better equipment hence create more value.

5.4.2 Transportation segment

There is need for stakeholders to find sustainable engendered logistics financial products for the segment. The products should be such that there is more participation by female

participants within the logistics segment. The introduction of contract farming is also being recommended to enable transporters to enable to plan forward and setting targets.

The government and private companies should develop softwares and technologies that will enhance simplicity for women to engage more in the transport sector. Women should be provided with various sorts of assistants for them to engage more in the transport sectors through various gender equality within transportation.

5.4.3 Retailers segment

It is being recommended that there is engendered financial packages to enable sustainability along the retail segment. Majority of retails within the Vhembe District are dominated by males in their vegetable section/departments. Retailers experience a number of challenges along the fresh produce value chaimns such as, lack of storage, poor quality delivered and late deliveries which affects their value chain and their sales. However, they need financial assistanst, access to markets and marketing strategies in order to ensure improvement in their vegetable value chains activities.

Implementation of contract farming between farmers, transporters and retil can play a vital role in addressing the challenges faced by retails within the Vhembe District. Contract farming will enhence sustainable vegetable valuie chains and assist in governing the value chains. The introduction of contract farming will also ensure and maintain trust between three parties which is the farmer, transporter and retail.

## 5.6 RECOMMENDATIONS

5.6.1 Farmers segment

Farmers plays a very important role in ensuring fresh produce vegetable value chains. Most of activities takes place within the farmgate by farmers. In order to ensure improvements in activities of farmers along the vegetable value chains in the Vhembe District, the South African government should establish or ensure that there are inspections between farmers, supermarkets and vegetable suppliers (transporters). The inspections should assess challenges faced by farmers within the Vhembe District Municipality and provide best strategies to improve vegetable activities within farmgate. Lack of inputs, agricultural tools,

storage and water is a huge challenge amongst the farmers within the Vhembe District Municipality as indicated.

The study also demonstrated that farmers within the Vhembe District Municipality struggle with irrigation and climate change. The South African national and local government (Vhembe District Municipality) should establish various mechanisms and alternatives to ensure availability of water for irrigation, inputs, proper road infrastructure and assistants both to farmers, transporters and retails. The Vhembe District Municipality should ensure to have a budget for boreholes, man-made dams or structures that will ensure accurate and reliable storage of water for farmers. Vegetable farmers within the Vhembe District should create their own collective investments/schemes where they will save money and use it if natural disasters occurs such as flooding, drought or bad climate change.

### 5.6.2 Retailers segment

Retails must ensure the introduction of contract farming thus, it will assist with fighting the out of stocks and ensures more sales within the retail. Contract farming includes conducts, rules, laws and agreements amongst parties concerned thus, this will assist in ensuring good and accurate vegetable value chains. There should be unions or parties created that will ensure that there is fairness and good governance of fresh produce value chains between farmers, transporters and retails. This will ensure rapid growth of food security, access to food and minimize hunger/starvation.The implementation of contract farming will ensure sustainable and good vegetable value chains. Contract farming should entitle laws and agreements between three parties namely farmers, transporters and retailers. The contract farming is an eligible criterion which will ensure farmers, transporters and retailers satisfactions, improvement in vegetable activities, food availability, more jobs, easy access to inputs (pesticides, fertilizers) and enough surplus for selling.

### 5.6.3 Transportation segment

Transporters should have their own organization of which will provide platform for discussions, regarding their challenges within the vegetable value chains. The platform can ensure sharing of information regarding accessibility of sponsorships, funds and education on how to ensure good transportation and maintain quality of vegetable products along transit. The transport sectors should establish mechanisms, applications, softwares and apps that will enhence accurate governance of vegetable productions. This will also fight issues regarding late

deliveries and issues which causes disruptions within the transport sector. The introduction of various mechanisms to ensure simplicity will also contributes to more females being part within the transport industry as it is mostly dominated by males.

## 5.7 Areas for further investigation

Scholarly articles regarding which and what types of financial packages can deepen participation by female farmers along the vegetable value chain can provide a huge positive impact and enrich more knowledge. Investigation on how to monitor and improve decision making on transportation and logistics of vegetable cold chains is imperative and can assist in developing strategies to halt dissatisfactions within the farmagate, transportation and retail segment. Investigations on technologies that can enhence simplicity and ensure sustainable transportation of produce can play a vital and important role within the vegetable value chains.

Investigations on contractual arrangements that can improve value creation, quality of products and services along the vegetable value chains can have a huge positive impact on the vegetable value chains. Investigation on challenges faced by horticultural, small-scale, subsistence and commercial farmers will ensure more access to knowledge regarding what farmers and which challenges farmers encounters. Access to logistics information and how vegetable markets or warehouse operates can provide fundamental information and assist in addressing challenges within the vegetable value chains.

## 5.8 Limitations of the study

The study was limited due to lack of enough writtern articles, researches, books and journals discussing or illustrating the vegetable value chains. There is lack of information regarding the vegetable value chains context. It was difficult to obtain the right sample sizes that will represent and ensure that the study well illustrates the issues around the Vhembe District Municipality vegetable value chains system.

Time was a constrain and limited the study. There was not enough time to analyse data due to late approvals from the ethics committee. The study required a number of assistants in order to enable to cover a large number of stakeholders around the entire Vhembe District. A number of stakeholders unexpectedly and withought notice withdrawn from the study thus, the withdrawals affected the data collection process badly and tempered with time for completion.

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## APPENDICES

## APPENDIX A : INFORMED CONSENT

**RESEARCH ETHICS COMMITTEE**
**Informed Consent**

### LETTER OF INFORMATION

**Title of the Research Study**: **MAPPING ACTIVITIES OF STAKEHOLDERS ALONG SELECTED VEGETABLE VALUE CHAINS IN VHEMBE DISTRICT MUNICIPALITY, SOUTH AFRICA.**

**Co-Investigator/s/supervisor/s** : Prof J Zuwarimwe (Supervisor).
: Dr A Mathaulua (Co-supervisor).

**Summary of introduction and purpose of conducting the study:** My name is Rotondwa Mulaudzi, Student no: 14000230. I am doing master's degree in Rural Development under the faculty of science, engineering and agriculture at the University of Venda. I will be conducting my research with the aim of mapping activities of stakeholders along selected vegetable value chains in Vhembe District Municipality, South Africa. **The purpose of the study is**: To map activities of stakeholders along selected vegetable value chains in Vhembe District Municipality, South Africa.

**Outline of the Procedures** : (*Responsibilities of the respondent, interview/ consultation/survey details, inclusion/exclusion criteria/venue details, explanation of tools and measurement outcomes, any follow-ups, any placebo or no treatment, how much time required of participant, what is expected of participants, randomization/ group allocation*).

Take note of the following:

- Provision/participation within this survey is voluntary.
- Its your choice whether to respond or not, no penalty if you chose not to respond
- Thus, completion of instrument is important in ensuring that data is accurately presented and be valuable
- The survey tool/instrument will be confidential and no one will access it
- The survey contains questions that can take 20-25 minutes.
- The survey is conducted with aim of partially fulfilling B.A masters in Rural development.

**Risks or Discomforts to the Participant**: (*Description of possible visible discomforts, health risks and the environment e.g stomach-ache, tooth ache, muscle pains, headache, polluted environment, bad climate/weather, etc.)* **The study will ensure there are no risks on the respondents.**

**Benefits** : (*To the participant and to the researcher/s e.g. Publications*)
Respondents at the end will enable to know activities of stakeholders along selected vegetable value chains and see alternatives or possible solutions to dissatisfactions or issues enhancing low improvement in vegetable value chain activities. The researcher will obtain or gain more

knowledge regarding activities that take place along selected vegetable value. The world will enable to have insight regarding the challenges and activities that take place along the vegetable value chains. The study will enhance new knowledge and information regarding farmers satisfactions with vegetable values chains.

**Reason/s why respondents may be withdrawn from the study**: (Illness, *non-compliance, adverse reactions, etc. respondent has every right to withdraw during or before response.*

**Remuneration** : (*No form of reward/money will be paid to the respondent*

**Costs of the Study** : (*No respondent will be allowed to contribute any form of material/money*

**Confidentiality**: (Collected data will be kept safe and locked until the dissertation is examined and until the results are out. Personal details of the respondent will not be revealed no matter what circumstances. Anonymity, privacy and confidentiality will be assured by using codes as data type.

**Research-related Injury** : (*What will happen should there be a research- related injury or adverse reaction? Will there be any compensation*?) No, the research does not have any research-related injury.

Persons to Contact in the Event of Any Problems or Queries:

(Prof J Zuwarimwe : 0159628812 (Supervisor), Dr A Mathaulula (Core-supervisor) Researcher contacts (0824058562). The University Research Ethics Committee Secretariat (015 962 9058). Complaints can be reported to the Director: Research and Innovation, Prof GE Ekosse (015 962 8313) or Georges Ivo.Ekosse@univen.ac.za

General:

Respondents will be assured that their participation is voluntary. Respondents will be given or explained to them the purpose of conducting the research and consent form or letter which allow the researcher to conduct the research will be issued to respondents. spoken language of the research population

**CONSENT**

Statement of Agreement to Participate in the Research Study:

a) I hereby confirm that the researcher Mulaudzi R, student no: 14000230 has informed me about the purpose of the research, risks that might appear and explained all ethical considerations in detail.

b) I am certain and sure that the researcher has been registered at the University of Venda and pursuing B.A Masters in Rural development.

c) I was made aware that my personal information will not be revealed, and the data collected will be kept safe and treated as a confidential information.

d) I agree that the data can be computed for analysis and serve the purpose of conducting the study.
e) I was made aware that I am free to withdraw before or during the data collection process without prejudice.

f) The researcher gave me the platform to ask anything regarding what I do not understand and regarding the research.

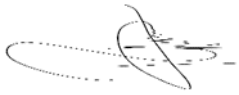
Full Name of Participant Date Signature

**I, ..... ..... .....**

(*Name of researcher*) herewith confirm that the above participant has been fully

Informed about the nature, conduct and risks of the above study.

Full Name of Researcher
**.....** Date**.....**



Signature**.....**

Full Name of Witness (If applicable)
**.....** Date **.....** Signature**.....**

Full Name of Legal Guardian (If applicable)

**.....** Date**.....** Signature**.....**

## APPENDIX B: DATA COLLECTION TOOL

Data collection

Self administered questionnaire which will be used to collect data from players along the vegetable value chains in Thulamela, Makhado, Musina and Collins Chabane Municipality in Vhembe District.

**Appendix B**

**DATA COLLECTION TOOL**

**SURVEY**

**"MAPPING ACTIVITIES OF STAKEHOLDERS ALONG SELECTED VEGETABLE VALUE CHAINS IN VHEMBE DISTRICT MUNICIPALITY, SOUTH AFRICA.**

*Dear Respondent*

*Good day. I will be conducting a research of which its purpose will be to map activities of stakeholders along selected vegetable value chain in Vhembe District Municipality, South Africa. The research will be conducted with the aim of partially fulfiling the requirements of B.A Masters in Rural development at the University of Venda. The information or data which will be drawn from respondents will be treated in a confidential manner, no name or surname of the respondent will be made public or seen by any one else except the researcher and his/her assistants. Note that your participation within the study is voluntary and as a respondent you have every right to withdraw from/during the data collection process if you feel uncomfortable. As a respondent you are free to respond at your own place and time.*

*After reading and understanding the ethics which will be governing the research you can kindly complete the questionnire/sections below. There is no write nor wrong answer but please respond/answer honestly. Your participation within this research will be of importance and highly appreciated.*

**[What is value chain?** (All activities and actors that bring agricultural product (vegetable) from production to final consumption/procurement).

**Researcher**

Date…… Signature_____

**Respondent**

Date…….. Signature……

**SECTION A: Demographic Details**

1. Gender **(**Use X to indicate your answer**)** a) Male ☐ b) Female ☐
2. Age of respondent, choose from the following categories **(**Use X to indicate your answer**)**:
   a. 14-21 years ☐
   b. 22-28 years ☐
   c. 29-35 years ☐
   d. 35-45 ☐
   e. 45-60 ☐
   f. 60-90 ☐
3. Marital status
   a. Single, no children ☐
   b. Single but have children ☐
   c. Divorced ☐
   d. Widowed ☐
   e. Married ☐
4. Highest level of education
   a. None ☐
   b. Primary schooling ☐
   c. Secondary, up to Matric ☐
   d. Matric ☐
   e. Tertiary ☐
   f. Other ☐

5. Employment

   a. Employed, working 1-39 hours per week ☐

   b. Employed, working 40 or more hours per week ☐

   c. Not employed,looking forwork ☐

   d. Not employed, not looking for work ☐

   e. Retired ☐

6. Family and dependants (Number of children parenting (aged 17 or younger) living in your household.

   a. 1 ☐

   b. 2 ☐

c. More than 2 ☐

7. Category

a. Farmer ☐

b. Transporter ☐

c.Retailer ☐

8. Municipality

a. Thulamela Municipality ☐

B. Makhado Municipality ☐

C. Musina Municipality ☐

D. Collins Chabane Municipality ☐

9. Vegetable type of supply

a. Cabbage ☐

b. Mustard ☐

c. Spinach ☐

d. Tomatoe ☐

e. Green peppers ☐

f. Chillies ☐

g. Butternut ☐

h. Beetroot ☐

I. Sweet potatoe ☐

J. Corn ☐

k. Pumpkin ☐

h. Other ☐

**SECTION B: Analysing and maping activities**

Use the scale presented below to indicate the extent to which you agree with each statement in the table:

**1. Strongly disagree 2. Disagree 3. May be 4. Agree 5. Strongly agree**

| Statement | Score |
|---|---|
| a) I am satisfied with my farming tools | |
| b) I find it simple to obtain inputs (e.g fertilizers, pesticides) | |
| c) I do have enough agricultural machines and water for farming | |
| d) I am not struggling with agricultural machines and water for farming | |
| e) I find animals and insects causing dissatisfaction within the value chain | |
| f) I find climate change as a cause of dissatisfaction along the vegetable value chain | |
| g) I produce enough surplus for supplying/selling | |
| h) I don't suffer from rotting stock | |
| I) I am satisfied with my supermarket vegetable value chain | |
| J) I have my own transport | |
| K) I am connected through a buyer | |
| L) I supply formal market(s) | |
| M) I supply informal market(s) | |
| N) I sell at the farm gate/home | |
| O) I am paid enough as agreed when supplying supermakets | |
| P) Retail supermarkets treat me well when am delivering | |
| Q) I struggle with harvesting | |
| R) I have enough irrigation equipments | |
| S) I struggle with transport | |
| T) I struggle with determing selling price | |
| U) I am happy with my selling price | |
| V) I am paid in time | |
| W) I enjoy/satisfied farming for supermarkets supply | |

**SECTION C: Activities engagement**

Use the scale presented below to indicate the extent to which you agree with each statement in the table:

**1. Strongly disagree 2. Disagree 3. May be 4. Agree 5. Strongly agree**

| Statement | Score |
|---|---|
| a) I am still supplying retails supermarkets | |
| b) I am on Contract farming with supermarket(s) | |
| c) I have joined Agricultural/farmers union(s) | |
| e) I am a member of community farming development activities that build ourselves and general community | |

**SECTION D: Possible reccomendations**

Use the scale presented below to indicate the extent to which you agree with each statement in the table

**1. Strongly disagree 2. Disagree 3. May be 4. Agree 5. Strongly agree**

| Statement | Score |
|---|---|
| a) I need financial assistants | |
| b) I need insurance | |
| c) I need agricultural training and learning | |
| d) I need marketing strategies | |
| e) I need markets | |

*Appendix C*

"***Thanks for your participation***"

## APPENDIX C: Ethics Certificate

ETHICS APPROVAL CERTIFICATE

ETHICS APPROVAL CERTIFICATE

**FACULTY OF SCIENCE, ENGINEERING AND AGRICULTURE**
**RESEARCH ETHICS COMMITTEE**

**NAME OF RESEARCHER/INVESTIGATOR: Mulaudzi RB**

**STAFF/ STUDENT NO: 14000230**

**PROJECT TITLE: Assessing Levels of Satisfaction on Small-Holder Horticulture Farmer's with Governance of The Supermarkets Vegetable Value Chains In Vhembe District**

**ETHICAL CLEARENCE NO: FSEA/22/IRD/13/1707**

**SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS**

| NAME | INSTITUTION & DEPARTMENT | ROLE |
|---|---|---|
| Dr. J Zuwarimwe | University of Venda, Institute for Rural Development | Supervisor |
| Dr. A M Mathaulula | University of Venda, Institute for Rural Development | Co-supervisor |

Type: **Student research**

Risk: **Minimal risk to humans, animals, or environment (Category 1)**

Approval Period: **November 2022-January 2024**

**The Faculty Research Ethics Committee (FREC) of the Faculty of Science, Engineering and Agriculture hereby approves your project as indicated above.**

University of Venda

PRIVATE BAG X5050, THOHOYANDOU, 0950λ LIMPOPO PROVINCEλ SOUTH AFRICA
TELEPHONE (015) 962 8504/8313. FAX (015) 962 9060
*"A quality driven financially sustainable, Comprehensive University"*

**General Conditions**

**While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following.**

- **The project leader (principal investigator) must report in the prescribed format to the REC:**
  - **Annually (or as otherwise requested) on the progress of the project, and upon completion of the project**
  - **Within 48hrs in case of any adverse event (or any matter that interrupts sound ethical principles) during the project.**
  - **Annually, research projects may be randomly selected for auditing.**
- **The approval applies strictly to the protocol as stipulated in the application form. Should a change to the protocol be deemed necessary during the project, the project leader must apply for approval of these changes before their implementation. Should there be a deviation from the study protocol, without the necessary approval for the change, the ethics approval is automatically forfeited.**
- **The date of approval indicates the earliest date that the project may begin. Should the project have to continue after the expiry date; a new application must be made, and a new approval received before or on the expiry date.**
- **In the interest of ethical responsibility, the FREC retains the right to:**
  - **Request access to any information or data at any time during the course or after completion of the project,**
  - **To ask further questions; Seek additional information; Require further modification or monitor the conduct of your research or the informed consent process.**
  - **withdraw or postpone approval if:**
  - **Any unethical principles or practices of the project are revealed or suspected.**
  - **It becomes apparent that relevant information was withheld from the REC or that information has been false or misrepresented.**
  - **The required annual report and reporting of adverse events was not done timely and accurately,**
  - **New institutional rules, national legislation or international conventions deem it necessary**

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**ISSUED BY:**
**FACULTY OF SCIENCE, ENGINEERING AND AGRICULTURE RESEARCH ETHICS COMMITTEE**

**Date considered: January 2023**

**Chairperson: Prof. P.O Bessong**

Digitally signed by Pascal O. Bessong
DN: cn=Pascal O. Bessong,
o=University of Venda, ou,
email=bessong@univen.ac.za, c=ZA
Date: 2023.01.25 23:55:16 +02'00'