



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

EVALUATING THE PERFORMANCE OF MARKETING CHANNELS FOR SMALL AND MEDIUM
SCALE PRODUCERS OF SELECTED VEGETABLES PRODUCED USING OLUSHANDJA-
OGONGO CANAL WATER, NAMIBIA

Maija S.N. Shetunyenga

Thesis submitted in partial fulfillment of the requirements for the degree of
Master of Agribusiness Management at the Namibia University of Science and
Technology

Supervisor: Dr Thinah Moyo

Faculty of Health, Natural Resources and Applied Sciences

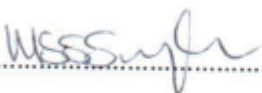
Department of Agricultural Sciences and Agribusiness

Namibia University of Science and Technology

February 2023

Declaration

I, Maija Shagwana Nalitye Shetunyenga, hereby declare that the work contained in the thesis entitled: Evaluating the performance of marketing channels for small and medium scale vegetable producers using Olushandja-Ogongo canal water is my own original work and that I have not previously in its entirety or in part submitted it at any university or higher education institution for the award of a degree.

Signature:  Date: 05.09.2023

Retention and Use of Thesis

I, Maija Shagwana Nalitye Shetunyenga, being a candidate for the degree of *Master of Agribusiness Management* accept the requirements of the Namibia University of Science and Technology relating to the retention and use of theses deposited in the Library and Information Services.

In terms of these conditions, I agree that the original of my thesis deposited in the Library and Information Services will be accessible for purposes of study and research, in accordance with the normal conditions established by the Librarian for the care, loan or reproduction of theses.

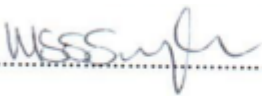
Signature:  Date: 05.09.2023

Table of Contents

List of Figures	vii
List of Tables	viii
List of Acronyms	ix
Acknowledgements	x
Abstract.....	xii
CHAPTER 1: GENERAL INTRODUCTION	1
1.1 Introduction	1
1.2 Problem statement	3
1.3 Significance of the study	4
1.4 Objectives.....	4
1.4.1 Overall objective.....	4
1.4.2 Specific objectives	4
1.5 Research hypotheses	5
1.6 Thesis outline	5
Chapter 2: Overview of vegetable marketing systems.....	6
2.1 Basic Concepts and Definitions.....	6
2.2 Factors affecting length of marketing channels.....	7
2.3 Marketing channels for fresh fruits and vegetables from a broad perspective	8
2.4 Market integration for fruits and vegetables	9
2.5 Marketing channels for small scale farmers in developing countries, a functional approach.	11
2.5.1 The exchange function	11
2.5.2 Physical function.....	14
2.5.3 The facilitating functions	15
2.6 Factors influencing vegetable marketing.....	17
2.6.1 Perishability	17
2.6.2 Price/quantity risks.....	17
2.6.3 Seasonality.....	18
2.6.4 Product bulkiness	18
2.7 Efficient marketing.....	19
2.7.1 Assessment of marketing efficiency	19
2.7.2 The elements of the marketing efficiency formula	20
2.7.3 The total marketing costs	20

2.7.4 The market margin	21
2.7.5 The farmer's share.....	21
2.7.6 The marketing loss.....	22
2.8 Overview of Namibia's vegetable production and marketing system.....	23
2.8.2 Climatic and production aspects	23
2.8.2 Namibian Horticultural Fresh produce (HFP) marketing channels at the national level	23
2.8.3 Marketing channels for producers in Omusati region	25
2.8.4 Marketing characteristics for the dominant vegetables produced in Omusati region	27
2.8.4.1 Tomatoes	27
2.8.4.2 Cabbage	28
2.8.4.3 Onion	29
2.8.5 Governmental initiatives towards improving the horticultural sector	30
2.8.5.1 The Namibian Agricultural Marketing and Trade Policy and Strategy	30
2.8.5.2 The Green Scheme National Programmes	32
2.9 Empirical findings on channel efficiency from various studies.....	33
2.10 Conceptual framework	36
2.11 Summary on literature review	37
Chapter 3: Methodology.....	38
3.1 Introduction	38
3.2 Description of the study area.....	38
3.3 Olushandja horticultural production area	39
3.4 Research design	40
3.5 Sampling.....	40
3.6 Data collection	41
3.7 Data analysis	41
3.7.1 Logit regression analysis.	42
3.7.2 Summary of data analysis by objective	45
3.8 Limitations of the study	45
Chapter 4: Results and discussions.....	46
4.1 Introduction	46
4.2 Choice of marketing channels for vegetables.....	46
4.3 Farmer participation in marketing channels.....	48
4.3.1 Marketing channel participation per crop.....	50

4.4 Analysis of farmers' marketing channel choices.....	51
4.5 Price spread and producer's share	53
4.5.1 Price spread channel 1 (Farmer - Consumer)	54
4.5.2 Price spread channel 2 (Farmer – catering company).....	54
4.5.3 Price spread in channel 3 (Producer - Hawker – Consumer).....	55
4.5.4 Price spread in channel 4 (Farmer – Retailer – Consumer)	57
4.5.5 Price spread channel 5 (Farmer – Wholesaler – Retailer – Consumer).....	58
4.5.6 Association between channel length, marketing margin and producers share.....	60
4.6 Marketing efficiency across marketing channels.....	61
4.6.1 Determinants of marketing efficiency	63
Chapter 5: Conclusion and Recommendations	67
5.1 Introduction	67
5.2 Conclusion	67
5.2.1 Socio economic characteristics of respondents	67
5.2.2 Choice of marketing channel for selected vegetables.....	67
5.2.3 Price spread throughout the marketing channels	68
5.2.4 Marketing efficiency across the channels	68
5.3 Recommendations	69
5.4 Recommendation for further research.....	69
References	70
Appendices	75
APPENDIX 1: FARMER'S QUESTIONNAIRE	75
APPENDIX 2: TRADER'S QUESTIONNAIRE	82

List of Figures

Figure 1 Marketing channels for fresh produce.....	8
Figure 2: Vegetable marketing players in north Central Namibia	255
Figure 3: Conceptual framework for this study	37

List of Tables

Table 1: Summary of data analysis as per objectives.....	45
Table 2 : Socio- economic characteristics of the respondents	476
Table 3: Identified marketing channels of vegetables in the study area	498
Table 4 : Marketing channel participation per crop	49
Table 5: Model fitting information and Goodness of fit	511
Table 6: Multinomial logistic regression results	511
Table 7: Price spread in channel 1	544
Table 8: Price spread in channel 2	555
Table 9: Price spread in channel 3	555
Table 10: Price spread in channel 4	577
Table 11: Price spread in channel 5	588
Table 12: Relationship between channel length, marketing margin and producer's share	60
Table 13: Marketing efficiency across all channels.....	611
Table 14: Model summary-linear regression	63
Table 15: Linear estimates of marketing efficiency for Tomato and Butternut	64

List of Acronyms

AMTA – Agro Marketing And Trade Agency

AU – African Union

CCA – Climate Change Adaptation

FP – Farmer’s Price

FPBH – Fresh Produce Business Hub

FPM – Fresh Produce Market

GDP – Gross Domestic Products

HFP – Horticultural Fresh Produce

MC- Marketing Costs

MEI- Marketing Efficiency Index

MM – Marketing Margin

MSP – Market Share Promotion

NAB – Namibia Agronomic Board

NPF – Net Price Received By Farmer

OHPA – Olushandja Horticultural Produce Association

Acknowledgements

First and foremost, I want to express my thankfulness to the Almighty Lord for his mercy and unending love, who gave me strength to see this study through to completion. I appreciate my supervisor, Dr Thinah Moyo, for her thorough direction, professionalism, and prompt responses to my queries during the course of the study. The completion of this job would not have been possible without her consistent effort.

I would especially like to thank the farmers, traders, NAB and AMTA personnel for patiently answering to my questions. I also want to thank my family for their unwavering support and encouragement; without your tolerance, this task would not have been finished. Last but not least, I want to express my gratitude to my fellow students for their words of support and sense of camaraderie during the course.

Dedication

This study is dedicated to my daughters, Vivian and Vanessa as a commitment we have towards capacitating our tiny family with knowledge and skills.

Abstract

Namibia has achieved a significant improvement in local supply of fruits and vegetable throughout the country from both commercial and communal areas. However, vegetable marketing is still a challenge to farmers particularly the small to medium sized. This study evaluated the performance of marketing channels used by small-medium scale vegetable producers utilising Olushandja - ogongo canal water. Using a random sampling procedure, a sample of 53 vegetable producers from the study area was drawn. A survey consisting of a structured questionnaire was used to conduct face-to-face interviews with the vegetable producers. The study focused on the 5 dominant crops grown in the study area, which were; Tomato, Cabbage, Butternut, Onion and Green pepper. Descriptive statistics, logistic regression and marketing efficiency measures were used to analyse data. All vegetable producers under study were involved in informal market channels although there was a reasonable number of producers who also used formal markets, in addition to informal markets. Transport, storage facilities, membership to a marketing association and access to marketing information all had a significant positive relationship with choosing mixed marketing channels when informal markets served as a baseline group through logistic regression. There was a strong correlation between channel length, producer's share and marketing margin. The study tested for relationships between variables in case of Tomato and butternut which were the most dominant crops. In tomato, the study found a significant relationship when marketing efficiency was regressed against channel length, farmer's price, marketing cost and marketing margin. On the other hand, channel length and marketing costs had a significant relationship with marketing efficiency in Butternut. Transport cost was the highest marketing cost incurred by producers. The study found that the direct channels had high marketing efficiency with over 100% as compared to intermediated channels. An intermediated channel that involved wholesalers had the least marketing efficiency index. Crops that had high efficiency measures in most channels were Cabbage and Green pepper while Tomato and Butternut had the least efficiency measures. The study calls for marketing bodies to help organise farmers in terms of production and linking them to the markets.

Keywords:

Agricultural marketing, Marketing channels, Marketing Efficiency, Informal market, Formal market

CHAPTER 1: GENERAL INTRODUCTION

1.1 Introduction

The economic development for most developing countries is depended on agriculture. About 80% of the world's rural population works mainly in farming to reduce poverty, raise income and improve food security (The World Bank, 2023). As a poverty alleviation strategy, members of African Union (AU) have allocate more than 10% of their annual budget towards developing agricultural sector (Annual symposium of the bank of Namibia, 2017). Namibian agriculture is also very important for its economic prospect as about 70 percent of its population is dependent on agriculture for food, income and livelihood (Annual symposium of the bank of Namibia, 2017).

The current national strategies towards reducing poverty are pointed to agricultural sector. The development of the agricultural sector would result into socio-economic development and improvement in livelihood for most Namibians. Despite many challenges facing the agricultural sector, agriculture and forestry's contribution to the national gross domestic product (GDP) increased from N\$ 3,6 billion in 2015 to N\$ 3,7 billion in 2016 (Annual symposium of the bank of Namibia, 2017). The crop sector contributes merely 1.2% towards GDP however, the sector employs a large number of people more especially in rural areas (Nangolo & Alweendo, 2020). The 2016 National Labour Force Survey identifies about 135 832 people who are employed in this sector. This translates into 20.1 percent of the entire labour force (Annual symposium of the bank of Namibia, 2017).

Poor rainfall and access to appropriate technology, finance and limited technological expertise pose threats to the success of agricultural sector of the Namibian agricultural sector. As a result, Namibia imports about 70 percent of its food commodities (Annual symposium of the bank of Namibia, 2017). High level of importation has exposed the country to high levels of inflation which is unsustainable for the country and this necessitated the need for increased local production to ensure sustainable availability of food (Panda, 2012).

Namibia demands about 74 000 tons of horticultural products per year and only about 24 000 tons is locally produced, the rest (about 50 000 tons) is imported mainly from South Africa (Annual symposium of the bank of Namibia, 2017). Based on that demand, the government has intervened with various

programs that seek to strengthen local capacity in terms of production and marketing. Currently, Namibia is experiencing an increased availability of locally grown vegetables in its supermarkets and at road stalls. This is an indicator of an increased demand for locally grown food.

In 2015, Namibia introduced Market Share Promotion (MSP) which seeks to promote marketing of locally produced fresh products. In the earlier years, MPS required importers to buy 5% of local produce before they were allowed to import similar produce (Namibian Agronomic Board, n.d.). The MSP intervention has significantly attracted many producers into horticultural sector. Therefore, the Namibia horticultural sub-sector has for the past 10 years grown significantly and the local Horticultural Market Share currently stands at 47% (Namibian Agronomic Board, n.d.). There is a significant improvement in local supply of fruits and vegetable throughout the country from both commercial and communal areas. The Namibian main horticultural production zones include Orange River, Karst, Central, South, North Central, Kavango, and Zambezi. The North central zone is dominated by small scale farmers and Omusati region (Olushandja area) where this study is based has more than 80 horticultural producers (Namibia Agronomic Board, 2020) . An increase in a number of horticultural producers has also been observed along Ruacana-Oshakati water canal.

Shapi (2017) indicates that horticultural sector being infant is characterised by farmers who face challenges such as access to inputs, credit and output markets. In addition, lack of infrastructure, transport, price, limited market choices and contractual obligation pose threat to profitable and efficient marketing (Shapi, 2017). Panda (2012) also indicates that rural farmers do not have enough information on marketing hence they are resistant to changes as a result they suffer from high marketing costs and hardly participate in formal market.

Another governmental intervention that contributed to growth of horticultural sector was the establishment of physical marketing facilities known as Agro -Marketing and Trade Agency (AMTA) hubs. The country has two hubs which are currently running, one in Rundu and another one in Ongwediva (Namibia Agronomic Board, 2020). The hubs were established to create market access for poor farmers who lack cold facilities necessary to handle fresh produce in their perishable nature (Thomas & Vink, 2020).

The Namibian government's interventions into horticultural sector have brought about an increase in production. This has however generated new problems of marketing which need immediate solutions if the country is to attain agricultural prosperity. Despite the existence of marketing hubs, Shapi (2017) indicates that Namibian farmers are still facing marketing challenges as their produce still get spoiled at AMTA's hub and at other markets.

Fresh produce lose value soon after harvesting. The fast marketing of fresh produce from producer ultimate consumer is crucial in determining profit of the produce (Xaba & Masuku, 2013). This calls for speedy and efficient marketing operations while the produce still holds its freshness. The performance of marketing channels is affected by factors such as demand, supply and transactional costs hence it is important that farmers understand these aspects and be able to choose channels that are efficient and offer optimum returns (Hardesty, 2014). Thomas et al. (2020) indicates that northern farmers in Namibia sell their produce at spot markets, contractor- centred agents, wholesale-centred agents and commission-centred agents. In light of the above, this study assesses the performance of the marketing channels available to farmers around Olushandja dam and those farming along the water canal between Olushandja and Ogongo. This study expected to inform the Namibian horticultural value chain actors and development agencies about the status of vegetable marketing systems by small and medium scale farmers to enhance appropriate interventions.

1.2 Problem statement

Accessing markets for small-medium vegetable producers continues to be a challenge despite the establishment of AMTA hubs, existence of various retail stores and various road stalls (Thomas & Vink, 2020). In addition, farmers in the northern part of Namibia complain about high transport, high facility costs and low prices paid for the produce at the hub (Thomas & Vink, 2020). Shapi (2017) states that there is an oversupply of fresh produce from the North central area which results in farmers' produce getting spoiled at the hub. The Olushandja Horticulture Association (OHPA) observed of a lot of produce from the farmers that goes to waste (van Wyk, 2017). During the preliminary visit to the study area, it could be noted that marketing of fresh produce is still a challenge as vegetables are seen losing value at retail shops and at vegetable stalls.

Previous studies identified numerous markets that exist for vegetable producers in Northern Namibia but literature on performance of various channels is limited. Through informal interviews, farmers

indicated that the hub and retailer shops are refusing to absorb significant amounts of their produce hence the produce go without a market. Due to ongoing marketing problems, the researcher is concerned whether farmers have an understanding of the performance dynamics of the formal and informal channels, the profitability of the marketing channels and the marketing arrangements linking demand and supply within channels. In light of the above, this study analysed the performance of various market channels given the diversity of marketing choices that farmers in the study area face. The study fills the gap in literature in terms of channels efficiency and add to the body of knowledge on the performance of marketing channels in the study area.

1.3 Significance of the study

The study generated information relevant to the developmental interventions towards improving the efficiency of vegetable marketing. Small scale farmers and traders will benefit from information about which marketing channels to target, the risks associated with each channel and how much of the produce to sell in the various markets. Government and non-governmental organisations that have interest in improving situational analysis of vegetable marketing will be the main users of the findings. Information established in this study may also serve as literature for future studies in the area of vegetable value chains.

1.4 Objectives

1.4.1 Overall objective

The overall objective of the study was to evaluate the performance of existing marketing channels for dominant vegetables (i.e. Tomato, cabbage, butternut, onion and green peppers supply chains) for farmers around Olushandja area and other farmers along the portion of Olushandja-Ogongo water canal in Namibia.

1.4.2 Specific objectives

The main objective was attained through the following specific objectives;

- To assess marketing channel choices for the dominant vegetables produced in the study area,
- To estimate producers' share and marketing margin in the marketing channels used, and
- To determine marketing efficiency for the marketing channels used.

1.5 Research hypotheses

In assessing the marketing channel choices made by farmers, the following hypotheses were tested.

- H_a: Storage facilities, marketing information and members to marketing association are likely to influence farmers towards using multiple channel choices
- H_a: There is a relationship between channel length, producer's share and marketing margin
- H_a: Channel length, volume handled, farmer's price, marketing cost and marketing margin have influence on marketing channel efficiency

1.6 Thesis outline

The thesis is presented in six chapters. Chapter 1 provides the background information that informs this research study. Chapter 2 narrates a broad overview on horticultural dynamics. Chapter 3 provides an overview of the Namibian Horticultural sub-sector. Chapter 4 presents the methodology used in the study including a detailed profile of the study area. Chapter 5 presents and discusses results of the study. Chapter 6 provides the conclusions and recommendations based on the study findings.

Chapter 2: Literature review

2.1 Basic Concepts and Definitions

2.1.1 Agricultural marketing

A market is not a geographical place but an arrangement between a seller and a buyer in which the seller agrees to supply the goods or the service which the buyer agrees to pay the price (Babita, 2017). Agricultural marketing is defined as agriculturally oriented marketing and entails all processes and structures involved in the flow of farm produce from the farms to the consumers (Bizikova, et al., 2020). Fruits and vegetable marketing systems have distinct layers due to the perishable nature of the product, seasonal production, and bulkiness hence, horticultural crop marketing is highly complicated and risky. The spread in pricing from producer to consumer, which results from supply and demand in transactions between different intermediaries is also unique for fruits and vegetables. (Kesavalu, Asokan, & Abdul Raheem, 2019).

2.1.2 Marketing channels

Marketing channels are routes through which agricultural products move from producers to consumers (Babita, 2017). Marketing channels are interdependent organisations involved in the process of making products or services available for use or consumption by consumers or business users. The length of the channels differs depending on the commodities, quantity, consumers' demand and the degree of specialisation by channel participants. Hence certain commodities flow through longer channels than other commodities (Bhat, Kachroo, Singh, & Sharma, 2015).

2.1.3 Marketing efficiency

Marketing efficiency refers to flow of products and services from the point of production to final consumers at minimal cost (Xaba & Masuku, 2013). Ways of improving marketing efficiency are mainly by increasing operational efficiency and pricing efficiency. Operational efficiency, relates to reducing costs of performing certain marketing functions without affecting the level of output. Mechanisms to reduce crop losses, storage costs and transportation costs are considered as mechanisms to increase operational efficiency (Ayinde, Ibrahim, & Salami, 2017).

Pricing efficiency aims at improving the pricing aspect in marketing so that it fits the consumers' demand. It involves pricing goods at each level of the marketing channel based on the marketing function that is performed (Bunce, 2020). As marketing functions such as transportation, processing and storage are performed, value is added to the product and the new price is set. It is influenced by marketing costs and competition.

2.2 Factors affecting length of marketing channels

In agricultural marketing, a marketing channel is a vertical structure where food commodities flow from the producer to the consumer (Farrel, 2019). It consists of firms that have partnered and depend on each other to perform specific marketing functions for that common good. Channels involve a series of intermediaries through which products pass from producers to consumers (Xaba & Masuku, 2013). Intermediaries who are also known as actors such as (producers, wholesalers and retailers) are critical in performing various marketing functions which enable products to flow from producers to consumers.

Market functions like grading, consolidations, packaging and processing determine the destination of produce and the length of the channel. When it comes to post-harvest management, packaging is absolutely essential, and if it is neglected, farmers experience significant yield loss. Finally, it is determined that vegetable produce packaging makes it possible to handle the produce safely and easily, preventing rotting. By using superior packaging techniques, a significant portion of postharvest losses can be decreased (Bisen, Patel, Kundu, & Sanjay, 2018).

Market conditions for agri-food processors are provided by the demand for finished food products. They in turn promote circumstances for demand that benefit agricultural producers. The customer and the processor both play a role in shaping the market environment. Agricultural products undergo more processing before they are delivered to their end customer, which raises the cost of these services. By altering and enhancing the form in which the product is ready for consumption and increasing the variety of goods available to consumers from agricultural raw materials, agri-food processors respond to preferences and needs for saving time on food consumption (Bezat-Jarzębowska & Rembisz, 2016).

2.3 Marketing channels for fresh fruits and vegetables from a broad perspective

The diversity of marketing channels for horticultural produce are different depending on the type of produce, the country, farm scale and the time. In addition, the size and scope of farming operation, the farmers' experience, the demographics of the area in which it is located, and the farmer's personal preferences determine whether the farmer distributes produce through direct or indirect marketing channels (Cornell Cooperative Extension of Tompkins County, 2014).

Farmers must choose between moving large quantities of product through wholesalers at comparatively cheaper pricing and seeking better prices through direct market channels at the risk of having unsold produce. Therefore, it is critical to understand the potential volume of output and the typical prices paid in order to evaluate the prospective returns of a channel (Cornell Cooperative Extension of Tompkins County, 2014). For the small to medium sized fruit and vegetable operation, choosing the appropriate market channel is just as crucial as choosing the appropriate production strategy. On a general note only a small quantity of produce is sold directly to consumers through road side markets and farmers' markets while large quantities of produce move through intermediaries (Bidogeza, Afari-Sefa, Endamana, Endamana, & Kane, 2016).

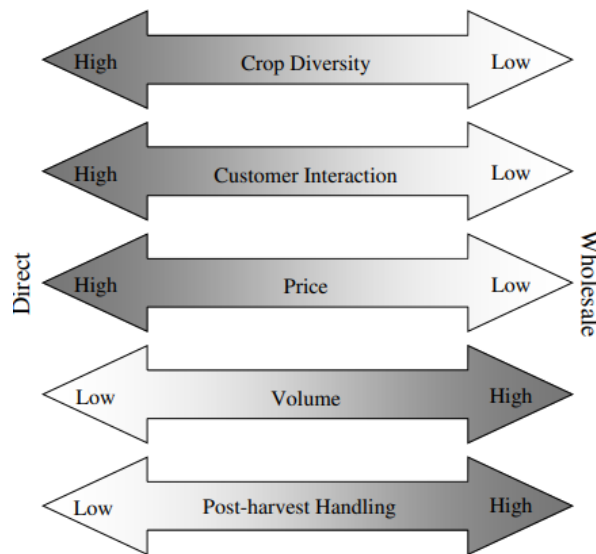


Figure 1: Generalizations about Wholesale and Direct Marketing Channels.

Source: (Cornell Cooperative Extension of Tompkins County, 2014)

Compared to wholesale channels, direct channels' volume is more influenced by location, weather, and consumer numbers (Cornell Cooperative Extension of Tompkins County, 2014). The direct channels involve the flow of products from the producer to the consumers in an absence of middleman/intermediary. In rural marketplaces, trading is defined by direct sales of a small quantity of production made by the producer to the village trader or consumer, (Babita, 2017).

Large volumes of agricultural commodities often pass through intermediaries via the indirect route from producer to consumer in channels. The marketing channel may involve assemblers, retailers, brokers and wholesalers (Babita, 2017). A farmer sells his produce at these rural wholesale markets, but he may also buy from his neighbouring farmers (Mutayoba & Ngaruko, 2015).

Despite lower costs, high-volume channels have the advantage of enhancing the productivity of harvest and post-harvest labour. Furthermore, once a relationship has been built, wholesale purchasers can acquire substantial quantities in only a short time (Cornell Cooperative Extension of Tompkins County, 2010).

Perishable crop sales must be maximized by combining flexible channels that can handle erratic volumetric demands. Retailers and wholesale wholesalers typically purchase big volumes at once. Community Supported Agriculture (CSA) can also consume a sizable proportion through direct marketing. If a certain crop is abundant, it is always feasible for CSA members to receive more in their share, but this does not result in more profits; rather, it only results in less food being wasted and possibly happier customers. (Cornell Cooperative Extension of Tompkins County, 2014).

2.4 Market integration for fruits and vegetables

In an attempt to maximise marketing efficiency, firms integrate their functions. Marketing integration is the expansion of firms by consolidating additional marketing functions and activities under a single management (Chlebicka, Falkowski, & Lopaciuk, 2017). There are three ways in which firms expand their operation. This includes vertically, horizontally and glomeration integration.

Vertical integration is the one in which a firm combines activities which are not its present function but related to them in sequence of marketing activities. It is a coordinated contact method of the successive stages of the production and marketing of agricultural products in the vertical system of the supply chain. Increasing the degree of organization of agricultural production and operation, and closely integrating the production, processing, and sales of agricultural products is conducive to achieving vertical integration and thereby improving agricultural production efficiency (Ayinde, Ibrahim, & Salami, 2017). Vertical collaboration between farmers and agricultural organizations is conducive to saving transaction costs, avoiding market risks, maintaining price stability, and ensuring factor support. This brings a positive effect on promoting farmers' income and sustainable agricultural development (Ao, et al., 2021).

Horizontal integration plays an important role in the socio-economic development of agriculture and rural areas, both in more and less economically developed countries. Similar farms join together to form organisations such as unions and cooperatives. Cooperatives have a role in the overall economic and social development by creating jobs, generating income to their members and reducing poverty (Chlebicka, Falkowski, & Lopaciuk, 2017). Agricultural cooperatives enable direct employment and seasonal work, then they allow farmers to purchase inputs under favourable conditions and to sell the final products on the market, contributing to rural community development, and finally agricultural cooperatives provide income to the rural population, thus promoting additional development (Pawlak, Kołodziejczak, & Xie, 2019).

Glomeration refers to the integration of economic enterprises not functionally interrelated in a production process to diversify their operations and avoid risks of failure. Food manufacturing firms engage simultaneously in industrial manufacturing, transportation and other activities not closely related to the food systems (Xaba & Masuku, 2013). The increasing diversity of function is emphasized by the building and farm equipment dealers. At least 40 percent of their assets now are devoted to non-agricultural business activities. Increasingly, such businessmen will cease to think of themselves as feed dealers, or fertilizer dealers. Instead, they will think of themselves as agribusiness firms providing a broad portfolio of products and services (Farrel, 2019).

2.5 Marketing channels for small scale farmers in developing countries, a functional approach

Vegetable marketing is central for the horticultural sector in developing countries. It improves the livelihood of farmers while providing access of produce to the consumers. Family members are essential parts of small scale farming as they provide most labour, finances and management (Bidogeza et al., 2016). Several researchers stress that fresh produce value chains for small farmers should be improved in order to enhance food security, increase access to quality food and alleviate poverty. It is for that reason that most states in developing countries are trying to develop the agricultural sector by getting the markets that work better in rewarding and maintaining the competitiveness of producers (Halder & Pati, 2011). The functional approach to study market system aims at studying basic activities performed within marketing channels to achieve marketing objectives (Negasi, 2016). In this approach, individual marketing functions are analysed to create an understanding of the costs involved in performing such marketing functions.

2.5.1 The exchange function

The exchange function involves mainly buying and selling (Kohls & Uhl, 1990). Studies show that most of farm produce pass through several institutions known as intermediaries/middlemen before reaching consumers. (Bidogeza et al., 2016). Only a small proportion of food moves directly from the producers to the consumers (Kohls & Uhl, 1990). Intermediaries refers to marketing institutions, agencies and channels that fulfil the needs of consumers in the marketing channel (Wondim, 2021). The functional activities played by several actors within the value chain are complementary to each other to serve the consumers. These functions performed include processing, preservation and payment to the seller (Wondim, 2021). As vegetables pass through intermediaries, a little value is added to bring the produce into preferred forms for the consumers. Channels can only be competitive if all actors hold hands and support each other (Bidogeza et al., 2016).

Small scale farmers exchange small quantities of produce at the market. Each farmer takes full responsibility of finding buyers and getting the right information regarding the demand (Bunce, 2020). Beyond the local market, marketing is facilitated by intermediaries (traders, agents, brokers and facilitating intermediaries) who take products to further markets to fulfil demand there (Castano, 2001).

At this level, small farmers have no influence on the price neither in decisions making since their produce comes in small volume (Castano, 2001). Brokers and agents negotiate on the terms to which traders supply goods to the retailers.

In rural areas, quantity of produce from small farmers do not attract much of intermediaries due to their small quantities hence consumers buy directly from producers, whereas in the urban areas those products pass through traders, wholesalers and retailers (Castano, 2001). The volume and quality standard of produce from small scale farmers has been hindering them from accessing formal supply chains. It is for this reason that a larger number of small producers supply their produce into informal market (Bunce, 2020).

Informal market involves selling the produce at farm gate, bakkie-traders, neighbours, hawkers and at pension day. Informal marketing has more benefits to a small scale farmer. This includes no transport costs and immediate payment to the farmer (Xaba & Masuku, 2013). In addition, small scale producers can take advantage of family labour to help with marketing which reduces marketing costs (Bunce, 2020). Studies show that the marketing from small scale farmers takes place more when they are well connected to towns hence bakkie-traders and vendors become important agents in this market for they can easily travel to towns. Therefore, these intermediaries enable small scale producers to sell large volumes of produce (Bunce, 2020).

Cousins et al. (as cited in Bunce, 2020) indicate that formal market involves intermediaries such as commissioner agents, supermarkets, processors, restaurants and fresh produce markets. Formal markets are regarded to offer stable marketing environment and producers find confidence in transacting with them for they absorb large volume of produce as they are able to add value through sorting and storage. (Xaba & Masuku, 2013).

In South Africa, 80% of the processed produce is sourced through contractual agreement between processors and producers. In this arrangement, parties agree on the growing calendar so that the produce is grown specifically for a certain market (Bunce, 2020).

In India, the marketing of fruits and vegetables is characterised by a large number of intermediaries whereby more that 90% of the produce is sold through the intermediaries (Xaba & Masuku, 2013).

Commission agents buy the produce from small scale farmers and sell to the auctioneers who sell at the Mandis (traditional wholesale markets). This is where retailers, vendors and roadside-shops buy the produce and sell to the consumers (Halder & Pati, 2011). The functional operation of intermediaries involves sharing profit margin with farmers hence the existence of intermediaries poses threat to profitability of small scale farmers (Negi & Anand, 2015). There is lack of transparency in pricing at the Mandis hence producers feel disadvantaged claiming that they do not get right prices for their produce. (Halder & Pati, 2011).

Some farmers in India prefer selling their produce to organised retailer buying centres than to the Mandis. The retailers buying centres have been set up closer to the farmers which saves farmers on transport. Studies indicate that retailers offer higher prices than the traditional market and payments are made on delivery (Halder & Pati, 2011). As transport cost is one of the factors that affect profitability of the farmers, the strategy of organised retailers has proven to enhance efficiency and profitability of small scale farmers in India (Halder & Pati, 2011).

In South Africa, small scale farmers can easily supply the Fresh Produce Markets (FPMs) but the high transaction costs within this channel reduce profit margin for the farmer. For that reason, FPMs are becoming less chosen chains in most parts of South Africa (Bunce, 2020).

Studies suggest that there would be more financial benefits to small scale farmers if they are integrated into formal value chains. This has resulted into formation of policies and programmes that are aiming at integrating small-scale farmers into formal value chains. Furthermore, retailers have been expanded to rural areas for easy access by small scale farmers where supermarkets are encouraged to purchase fresh produce directly from farmers (Bunce, 2020). In addition, the South African government has an act (Agribee) which stimulates market access to small scale farmers. The act states that retailers should source 30% of fresh produce from small scale farmers. However, there are still challenges that limit the participation of small scale farmers into this initiative and this includes location, procurement and quality aspects (Bunce, 2020).

2.5.2 Physical function

The physical function of marketing involves storage, transporting and processing of goods (Kohls & Uhl, 1990). In developing countries, production and marketing of agricultural produce is constrained by underdeveloped infrastructure such as roads, communication, finance, small storage units and unclear policies. Agricultural products are highly perishable and require cold transportation to get them to consumers well on time before they lose value. Small farmers lack appropriate transports to move these perishable goods, this bounds their marketing function to nearby consumers. As a result deterioration of the produce makes a significant percentage of post-harvest losses and causes prices to drop (Castano, 2001).

Post-harvest losses are a major problem in the supply chain of fruits and vegetables sector in India. Due to involvement of intermediaries in the fresh food supply chains, much food is wasted during transportation and storage before reaching the processing units. India has about 30 - 40 % of post-harvest losses. Some of the contributing factors to postharvest losses in hilly areas are poor logistics connectivity and lack of advanced technology to manage post-harvest losses (Halder & Pati, 2011).

South Africa implemented a strategy to equalise market access for large and small scale farmers. This resulted into the establishment of FPMs which offers cold storage for poor farmers where retailers are supposed to source their produce. The performance of FPMs is however going down as only about 10% of the produce is purchased from FPMs. Retailers have shifted toward sourcing their produce directly from producers due to improved road infrastructure. (Bunce, 2020).

Studies emphasise that supply chains should be able to preserve quality of produce and prevent them from getting deteriorated. Product deterioration leads to consumers rejecting the produce making the supply chain inefficient (Negi & Anand, 2015). Cold vehicles enable farmers to run their business successfully by delivering goods while still fresh and at the right time.

In Zambia, small scale farmers keep their produce in traditional structures (Mumba, Mwanamambo, Mwale, Sichivula, & Musamba, 2015). This exposes produce to unfavourable conditions which lower prices and consequently, farmers are not well remunerated for their produce (Negi & Anand, 2015). In

India, lack of cold chain facilities is the main obstacle in the supply chain of agricultural products (Negi & Anand, 2015).

Studies indicate that small scale farmers hardly meet standards set by retailers due to lack of infrastructure such as cold rooms and pack houses which negatively affect their profit margin (Xaba & Masuku, 2013). For that reason, the power of negotiation lies with retailers which exploits small scale farmers during transaction as they become price takers (Bunce, 2020). In an attempt to overcome these challenges small scale farmers resort to form cooperatives where they share infrastructure (Aparna & Hanumanthaiah, 2012). Poor road infrastructure also affects market access for poor farmers (Mumba et al., 2015).

Processing and value addition of fruits and vegetables reduces losses while increasing shelf life. However, developing countries have low food processing and do not use opportunities that exist in the processed food markets. India only processes about 1-2% of the fresh produce (Negi & Anand, 2015).

2.5.3 The facilitating functions

This function involves standardisation, financing, risk bearing and market intelligence functions. The exchange and physical functions are driven by facilitation function of marketing (Castano, 2001).

Standardisation refers to keeping same measurements in terms of quality and quantity of produce. It determines the selling units, quality control and selling prices (Kohls & Uhl, 1990). Informal marketing experience complicated exchange function due to lack of uniform measurements. Formal grading is minimally used in rural markets and due to small quantity of produce, farmers are not well motivated to sort and grade their produce. It is then left for traders to do cleaning and grading which bore high prices for the value added products (Castano, 2001).

Financing is an essential function at all stages of marketing (Castano, 2001). This refers to the use of money to pay for marketing resources such cold storage and processing units to accommodate food commodities before reaching the ultimate consumers (Kohls & Uhl, 1990). Wholesalers and exporters are characterised by high capital inputs which are necessary in handling perishable products and for that

reason they take a lead within value chains. As a results, producers obtain lower profit margins since prices are determined by these powerful intermediaries (Wondim, 2021).

In rural areas, financial institutions are reluctant of financing farmers due to the perishability of produce and the size of farming units (Castano, 2001). In Zambia, small scale producers are mostly assisted by microfinance institutions which have high interest rate. Commercial banks do not have products for small scale farmers claiming that they have poor business operations (Mumba et al., 2015).

In Uganda, some farmers acquire production loans with relaxed repayment conditions. Small farmers are only required to settle the loan after harvesting but due to low prices paid for the produce they still struggle to repay the remaining percentage of the loan (Lama, McEvoy, Parker, & Robbins, 2014). Risk bearing refers to the acceptance of possible loss of produce due to physical and market risks (Kohls & Uhl, 1990). Small farmers bear much risks due to lack of suitable infrastructure and communication. Consequently they operate at high risks of products loss through deterioration and lack of information (Castano, 2001).

Information is very crucial in facilitating marketing activities. It regulates prices based on demand and supply and helps wholesalers to sell profitably with lower margins (Castano, 2001). Lack of market information affects market intelligence. Marginal rural areas do not have enough information on the market hence urban prices are not well communicated to the farmers and this affects their marketing performance (Castano, 2001). Small scale farmers are not well connected to marketing information sources consequently, same crops are produced in excess which floods the market with the same produce (Bunce, 2020).

Proper information form basis for performance of the supply chain. Information about prices, demand and processing activities impact the smooth running of agribusiness (Mumba et al., 2015). Lack of information results into farmers supplying the market with whatever produce they have produced and not necessarily serving the demand (Halder & Pati, 2011)). Lack of information also causes farmers to miss on optimum prices and eventually get discouraged from expanding their future production (Negi & Anand, 2015). Louw et al. (as cited in Bunce, 2020) the number of fresh markets in South Africa

encourage marketing access by offering market information and linking small-scale farmers to various service suppliers.

2.6 Factors influencing vegetable marketing

Marketing channels for fruits and vegetables vary from commodity to commodity and from producer to producer. However, there are factors that specifically influence the marketing system for vegetables. These factors are related to production, product and market characteristics (Kohls & Uhl, 1990).

2.6.1 Perishability

Vegetables lose value right after harvesting until the moment they are consumed hence they should not be held for long periods (Babu, Yemaneberhan, & Gebrekidan, 2018). For that reason, horticultural marketing channels should be able to preserve the fresh value of vegetables (Kohls & Uhl, 1990).

Post-harvest loss of vegetables during marketing is attributed to improper handling and storage (Kohls & Uhl, 1990). Channels' structure is the key to successfully market vegetables with minimum possible loss. Therefore, marketing vegetables requires expensive channels, facilities and equipment to preserve quality during marketing (Kohls & Uhl, 1990). In that regard, fast transportation which is usually expensive is required than the normal transportation.

Perishability of produce affects price hence it requires a great deal of negotiations to secure markets. In most cases, sellers and buyers negotiate informally which may result in disputes and producers exploitation (Bunce, 2020). In this process, producers become price-takers as they are desperate to secure markets.

2.6.2 Price/quantity risks

Biological nature of vegetable makes supply difficult as vegetables may not be available when demand is at highest (Kohls & Uhl, 1990). Small scale farmers mostly serve the domestic markets and their produce generally gets expensive with an increase in distance from the farm gate (Bunce, 2020). In a market place product's price is influenced by factors such as demand and supply change, storage, transport, perishability and processing costs (Castano, 2001).

The vegetables production conditions such as prevailing weather and crop diseases affect marketing patterns and at times cause the crops to be sold below total costs. Changing in consumer demands puts them at quantity risks that producers may not supply at the market demand. (Kohls & Uhl, 1990).

Due to instabilities in prices and supply, modern food marketing systems have adopted the method of contractual agreements whereby for an example, processors contract farmers so that the exchange function is done on steady supplies and stable prices. There are no control measures regulating acreage of vegetable production in most countries and so farmers have less bargaining power due to the fact that they are disorganised (Kohls & Uhl, 1990). For that reason, a few farmers opt to market in groups to gain bargaining power.

2.6.3 Seasonality

Seasonal production and demand affect vegetable marketing. Crops used in canning and freezing have a specific period for harvesting and year-round demand. In an organised horticultural industry, fruits and vegetable are planted, harvested and marketed in sequence to allow constant supply over a period of time (Kohls & Uhl, 1990). To enable that, fresh produce is shipped from one area to another. However due to centralised procurement facilities, many retailers continue shipping even if the local supply is available which creates competition between local and far producers. On the side of the consumers, this practice provides more benefits as they get to choose between local and shipped produce (Kohls & Uhl, 1990).

2.6.4 Product bulkiness

Fruits and vegetables have high water content in relation to nutrition value per unit (Kohls & Uhl, 1990). This makes it necessary that the product should be transported in fresh form which increases marketing costs. The economical marketing can only be achieved by reducing the transportation of fresh produce over long distances. It is ideal that fresh produce is processed near the production area to avoid high transportation costs (Kohls & Uhl, 1990).

2.7 Efficient marketing

Efficient marketing aims at getting the flow of goods from producers to consumers at lowest possible costs with consistent level of satisfaction of consumers (Xaba & Masuku, 2013). Cost reduction techniques at an increased consumers' satisfaction are very important in getting the market to perform efficiently. An efficient marketing system desires for a direct proportion of increased production with an increased income. A good production year should not lower prices due to food reserved from previous season and consumers should get satisfied at reasonable costs (Lama et al., 2014).

2.7.1 Assessment of marketing efficiency

Market efficiency is the central point for performance of the market (Devkota, Dhakar, Gautam, & Dutta, 2014). Several studies have done market performance assessment through market efficiency analysis to determine whether farmers get reasonable prices for the produce. Vegetables have high production costs and are highly perishable, it is ideal that the produce is assured of reasonable prices as soon as they are available (Xaba & Masuku, 2013).

Prior to choosing a marketing channel, smallholder farmers consider the costs associated with transportation, profits, level of trust among the available brokers and familiarity with the markets (Xaba & Masuku, 2013). Hence, a market efficiency analysis is of outmost importance even at the level of a farmer. According to Isitor, Otunaiya, and Iyanda (2016), marketing efficiency (ME) analysis is applied to determine how effective price received by farmers relates to the cost incurred for marketing the produce.

The marketing efficiency measure suggested by Acharya and Agawal (2019) has been widely used by many researchers in assessing channel performance of fruits and vegetables. It is a commodity approach study that compares aspects involved in marketing of a specific commodity. It looks at the ratio of net price received by farmers in relation to the total marketing cost and the total marketing margin. High net price translates into high efficiency and vice-versa (Aparna & Hanumanthaiah, 2012). In this method the marketing cost, marketing margins, price spread, producer's share for commodities are compared to determine the marketing efficiency of commodities (Aparna & Hanumanthaiah, 2012).

2.7.2 The elements of the marketing efficiency formula

Parameters used to measure the efficiency of a channel are; quantity handled, producer's share, total marketing margin, and rate of return (Xaba & Masuku, 2013).

Adenuga et al. (2013) express the market efficient measure as;

$$\text{Marketing efficiency} = \frac{\text{NPF}}{(\text{MC} + \text{MM})}$$

whereby;

NPF = Net price received by farmer

MC = Total marketing cost

MM = Total marketing margin and,

2.7.3 The total marketing costs

Total marketing costs refer to all costs whether in cash or kind incurred by the farmer and various intermediaries involved for the commodity to reach the consumer (Aparna et al., 2018). The total marketing cost is broken down into the cost paid by the farmer for the produce to leave the farm, the charges brought in by the middlemen who buy and sell the produce within intermediated channels and the number of middlemen involved (Aparna et al., 2018).

The costs charged by every middleman correspond to the value added to the produce. Costs charged for transportation are generally lower than production, packing, storage and market place maintenance costs (Bidogeza et al., 2016). High labour costs of handling the produce at retails, transportation and packing accounts for a big portion of consumers' price (Kohls & Uhl, 1990).

Isitor et al. (2016) state that efficiency measure works best if prices paid by consumers reflect all marketing costs within a channel. Studies indicate that there are challenges incurred in capturing incomes for farmers who sell in informal markets (Bunce, 2020). The informal markets involve small variable transactions which is difficult to recall and account. In most cases wages are paid below minimum wages and some payments are made in kind. As a result, researchers have to work with estimates when calculating incomes for bakkie – traders, FPMs and hawkers (Bunce, 2020).

2.7.4 The market margin

Jassam, Ali, and Shukur (2018) indicate that the market margin determines the efficiency of marketing system by establishing the share of the product within the price paid by the consumer. This is the difference between the total payments (cost + purchase price) and receipts (sale price) of the middle men involved in the channel. It is the difference between what the consumer pays and what the producer gets (Kohls & Uhl, 1990).

Marketing margin is measured by farm-retail price spreads which entail all total returns per retail unit to the food marketing activities. It is inclusive of all profits and costs incurred for labour, transportation, packaging and many other activities performed at the retail level (Kohls & Uhl, 1990). It breaks down the consumer's price among market levels. To achieve this, all prices associated with middlemen are spread throughout the channel so that the difference between consumer's price and producer's price on specific commodity can easily be established (Aparna, 2018).

The higher the differences between these prices, the lower the efficiency of the channel (Aparna & Hanumanthaiah, 2012). If market margins are high, it means that intermediaries are obtaining higher profits than producers. It may also be that improvement in services or consumer satisfaction result in increase in market margins (Xaba & Masuku, 2013).

2.7.5 The farmer's share

Farmer's share refers to the difference between retailer's price of food and the marketing margin (Kohls & Uhl, 1990). Aparna et al. (2012) refer to farmer's share as net price received by the farmer and it is expressed as a percentage of the price paid by consumer (retail price).

There are two approaches used in measuring farmer's share which are the marketing bill approach and the market basket approach. The former considers farmer's share as a ratio of the farm value of all domestically farm produced food to the value of consumer's food expenditure while the latter takes the ratio of the farm value to their retail price (Kohls & Uhl, 1990).

The market basket statistic has been widely used as it is calculated monthly to monitor changes in farm-retail price. Although the marketing bill approaches is also used for monitoring changes in farm-retail price and then the consumption patterns, it has been less used since it is calculated annually.

2.7.6 The marketing loss

Vegetable marketing is subject to post harvest losses which form part of marketing loss. The marketing loss is accounted from the total loss caused during handling of produce from the point of harvest to the point of consumption (Bhat, Kachroo, Singh, & Sharma, 2015). In addition to handling methods, Devkota et al. (2014) states that inappropriate transportation, lack of cold storage facilities and poor qualities also contributes to marketing loss. Recent studies on marketing efficient have applied the modified marketing efficiency measures which incorporates such losses as they impact farmers' net returns as well as the efficiency of the channel (Adenuga et al., 2019)

2.8 Overview of Namibia's vegetable production and marketing system

2.8.2 Climatic and production aspects

Namibia is a dry country with the climatic condition ranging from semi-arid to arid conditions. Rainfall also varies so much that some areas receive less than 25 mm on average while others especially in Zambezi region receive an average of 700mm per annum (Angula, Thomas, & Ijambo, 2014). Due to harsh climatic conditions coupled with low rainfall and frequent drought, the horticultural production mainly takes place under irrigation (Namibian Agronomic Board, n.d.). Other production constraints facing the horticultural sector includes poor soil fertility, high temperatures, high costs of production inputs (seed, fertilisers, chemicals), seasonality, lack of funding and lack of commercial farming skills which result into inconsistent supply of the agricultural products throughout the year (Annual symposium of the bank of Namibia, 2017).

Both communal and commercial areas play an important role in the production of fresh produce. Commercial areas consist of mainly large scale farmers whose majority are well experienced in the horticultural production. On the other hand, the communal areas are characterised by small scale farmers who have few years' experience and limited skills in horticultural production (Thomas & Vink, 2020).

Based on political history in developing countries including Namibia, small scale farming has been left to less fertile areas. Former agricultural policies were made to serve the interest of large scale farmers while creating a market structure unfavourable to small scale farmers.

2.8.2 Namibian Horticultural Fresh produce (HFP) marketing channels at the national level

The main horticultural production zones include Orange River, Karst, Central, South, North Central, Kavango, and Zambezi (Namibian Agronomic Board, n.d.). The main target for most of fresh production is the domestic market although there are some exports mainly in onions and table grapes. (Annual symposium of the bank of Namibia, 2017).

The demand of fresh horticultural produce has been driven by changing lifestyles coupled with increased incomes (Angula et al., 2014). The Namibian annual demand for horticultural products is about 74 000

tons, of which only 24 000 tons is produced locally and the rest is imported which leaves the country exposed to external price influences (Annual symposium of the bank of Namibia, 2017).

The most important vegetable grown by Namibian farmers is cabbage, which is followed by onions, tomatoes, and potatoes. Butternut squash, pumpkins, gem squash, green peppers, sweet corn, sweet potatoes, beetroot, spinach, cucumber, and green lettuce are among the other produced vegetables (Jokisch, Urban, & Kluge, 2016). The country has so far achieved self-sufficiency in terms of cabbages, sweet lemons, and pumpkins hence no import is allowed for these produce (Namibian Agronomic Board, n.d.).

Despite the fact that the country is a net importer of most fresh produce, the Namibian Agronomic Board (n.d.) indicates that the production of most vegetable lines has been on the increase for the past 10 years. This came as Namibia put trade restrictions to a number of imports that compete with local production (Annual symposium of the bank of Namibia, 2017). Farmers would have a better chance of succeeding if they offered a wide range of crops throughout the year. The producers rely on seasonal production of most popular products which are mostly cabbage, onions, tomatoes due to lack of knowledge and access to the market particularly supermarkets (Jokisch, Urban, & Kluge, 2016).

Windhoek is the most important logistical hub for the domestic HFP industry. Almost all fruit is imported from or via South Africa, with the exception of watermelons, oranges, avocados, papayas, and bananas, which are produced on a modest basis in Namibia. Tsumeb, Grootfontein, Hochveldt, Okahandja, and Stampriet are among the largest private providers of Namibian-grown vegetable (Haulofu, Uunona, & Amwaama, 2022). Majority of retailers and supermarkets source the produce either from South Africa or from the large commercial farms in Tsumeb and Mariental districts (Annual symposium of the bank of Namibia, 2017). Local producers still face several challenges to convince retailers to sell their products.

The growth of horticultural sector has brought on board various producers, agents, traders, processors, wholesalers, retailers and transporters. It has also attracted providers of related services such as transportation, storage, packaging and advertising who are contributing to value addition in vegetable value chains (Ministry of Agriculture, Water and Forestry, 2011).

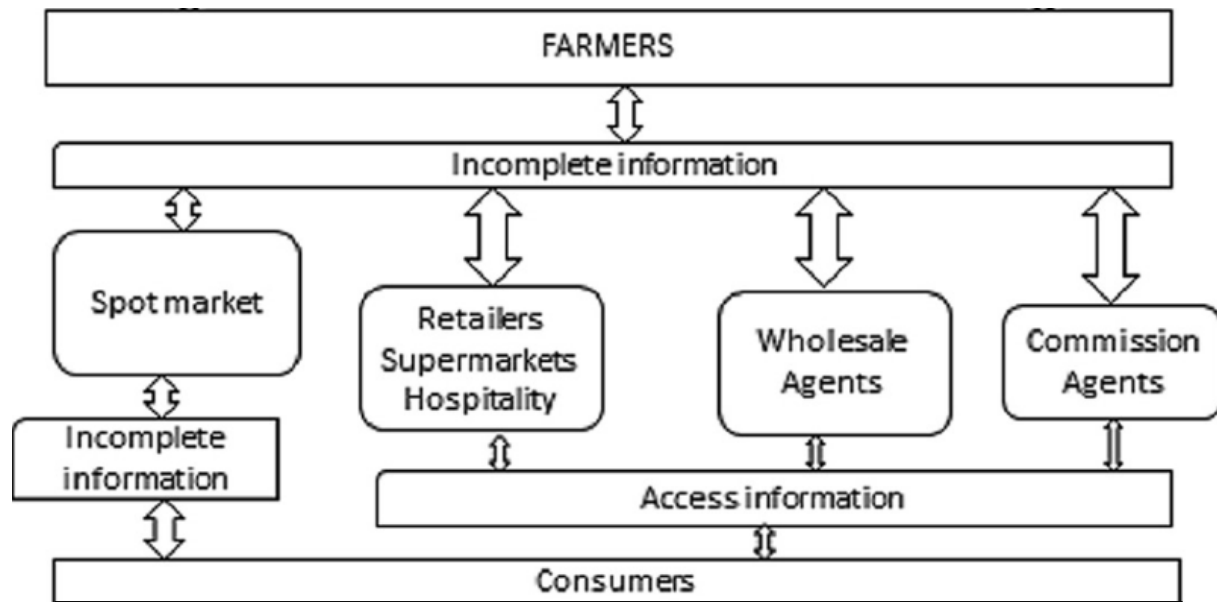


Figure 2: Vegetable players in north central Namibia:

Adopted from (Thomas & Vink, 2020)

The most important stakeholders regarding the domestic HFP market include Farmers' market which is a commissioning agent which sells products from northern areas, wholesalers such as the Hubs, retail chain distribution centre which procure most of their products from South Africa and the larger Namibian farmers, informal street vendors and traders in traditional open markets (Jokisch, Urban, & Kluge, 2016). Northern farmers sell the produce at spot market, contactor-centred agents, wholesale-centred agents and commissioned centred agents (Thomas & Vink, 2020).

2.8.3 Marketing channels for producers in Omusati region

The main HFP markets that interact with farmers in Omusati region are situated in Outapi, Oshakati, Ongwediva and Oshikango. Cabbage, tomatoes, green peppers, onions, and potatoes are among the seasonal produce purchased from Etunda farmers as well as farmers near the Olushandja Dam and the canal (Thomas & Vink, 2020). Only a few small scale farmers acquire contractual production with retailers but not even on a consistent basis. Meanwhile, Oshikango is the major shipment point for HFP to Angola where smaller-scale and less formal cross-border trade takes place. Small independent traders cross the border carrying produce on their own or coordinate transportation by bicycle or push-car to avoid customs fines that are charged to big imports (Haulofu, Uunona, & Amwaama, 2022).

In addition, Oshakati, Ongwediva and Outapi mainly offer retail chain branches which develop from a combination of centrally-imported products and some locally-purchased vegetables as well as street vendors and open markets (Haulofu, Uunona, & Amwaama, 2022). Farmers from Etunda and the Olushandja dam provide HFP to local Fysal branches. Spar gets about 35% of its vegetables directly from local farmers, with the rest coming through a middleman. Pick n Pay buys products from Tsumeb, Olushandja farmers, and Etunda farmers, as well as from its distribution centre in Windhoek.

Majority of vegetable producers in north central region are small scale producers, the formal value chain is not easily accessed by these farmers due to quality specifications which they hardly meet. For that reason, majority of small-scale farmers prefer to sell their produce to informal market where transaction costs are low (Thomas & Vink, 2020).

In that context, open markets are a second conduit for getting the produce from the farm to the customer in Oshakati and Ongwediva. Typical produce sold at open markets are onions, cabbage, tomatoes, potatoes, sweet potatoes and green peppers, butternut squash, spinach, pumpkins as well as apples, lemons, pears and oranges. Consumers in the surrounding area and mobile vendors who resell products in the villages are also served by these open markets. In certain small communities, such as Oshakati, informal street trading is prohibited to avoid conflict with the official open markets. In Oshakati, traders buy products directly from local farms or from middlemen who come and deliver the produce. Fruit is procured from supermarkets or wholesalers (Jokisch, Urban, & Kluge, 2016).

Nevertheless, horticultural marketing in small scale farming is constrained by farmers' inability to identify market opportunities. This is also coupled with lack of marketing infrastructure, lack of skilled labour and poor coordination of the players along the value chains (Montle & Teweldemedhin, 2014). Moreover, small scale farmers lack marketing information which affects their production in terms of the type of crops to supply to the market (Thomas & Vink, 2020). As a result, farmers become price takers as the power lies with traders and market forces.

2.8.4 Marketing characteristics for the dominant vegetables produced in Omusati region

Namibia's agro-processing industry is still in its early stages of growth hence most of locally produced vegetables are still consumed in primary form. Togarepi et al. (2015) indicates that majority of small scale farmers in northern Namibia prefer cabbage, tomatoes and onions due to high customer demand for these produce while Omusati region in particular is dominated by are tomatoes and cabbage.

2.8.4.1 Tomatoes

Tomato production is a major source of income for majority of small scale farmers in developing countries. It is planted for the edible fruit, which can be eaten raw in salads, cooked, or pureed in the canning industry. Tomatoes are used as condiments in stews, which are a common component of African cuisine. As a result, it is a crucial ingredient in the confectionary sector (Achoja & Okoh, 2014).

Colour, firmness, total soluble solids, and tomato shelf life are all post-harvest qualities of tomato fruit. Seasonal changes in availability and price, significant quality loss, and socio-economic loss to growers have all been linked to postharvest storage and processing (Achoja & Okoh, 2014).

Tomatoes can be harvested at a mature-green stage and matured under regulated settings, according to general recommendations. Because there aren't enough cool-chain and ripening facilities to accommodate mature-green to turning phases, tomatoes are harvested when they're fully ripe. However, because tomatoes ripen and senesce during shipment, more caution is needed to avoid physical damage (Achoja & Okoh, 2014). Due to a lack of alternatives to fresh produce markets, such as a tomato processing sector, most farmers suffer large post-harvest losses due to the high perishability of tomatoes (Togarepi, Thomas, & Samundengu, 2015). The ability of tomatoes to perish after harvest is a big danger to their commercialization. Postharvest losses can be as high as 10%-20% due to transportation delays and lengthy distances to urban markets (Achoja & Okoh, 2014).

The way tomatoes are handled, packaged, and transported is determined by the market for which they are intended (Ridolfi, Hoffmann, & Baral, 2018). Tomatoes destined for supermarkets have a considerably more advanced post-harvest management system, which includes proper packaging,

storage, and cold-chain transportation. Informal traders who buy directly from farmers don't have access to such systems, so they rely on improvised packing, storage, and transportation. These inappropriate methods not only harm the product, but they also increase the potential of food safety issues.

Processing the tomato into preserved items could help alleviate this problem, but processing equipment is scarce, and some households prefer to cook with fresh tomatoes (Togarepi, Thomas, & Samundengu, 2015). Information on post-harvest perishability would be needed to evaluate tomato marketing efficiency. Fresh tomato fruit growers and marketers in rural areas are aware of the product's perishability. As a result, it is quickly sold, sometimes at unprofitable prices (Achoja & Okoh, 2014). Omusati region holds potential for tomato processing as it is characterised by warm weathers that enable tomato production throughout the year (Togarepi, Thomas, & Samundengu, 2015).

2.8.4.2 Cabbage

Cabbage is a widely popular vegetable and Namibia has achieved self-sufficiency in its production (Namibian Agronomic Board, n.d.). Cabbage is commonly served as salad at a family level, social occasions and festivals, and hence there is a year-round demand for cabbage (Desai & Solanki, 2013). Cabbage can also be dehydrated (dried, flaked, or powdered) for use in soups and other dehydrated foods (Department of Agriculture, Forestry and Fishery, 2018).

Cabbage is a challenging crop to grow due to its vulnerability to a variety of insects, diseases and pests (Department of Agriculture, Forestry and Fishery, 2018). Providing technology and commercial support to increase cabbage production and sale can help greatly with food security, poverty alleviation, and rural economic development, especially in developing nations (Wahome, 2019).

Cabbage must be collected at the peak of maturity in order to meet the quality requirements of potential buyers. The amount of profit made from the cabbage harvest is determined by how well it matches market requirements. Physical and sensory parameters are routinely used to assess the quality of cabbage crops (Department of Agriculture, Forestry and Fishery, 2018).

For a profitable cabbage crop producers should limit field losses, improve the quality and safety of the produce after harvesting, and offer the food to consumers in the best possible condition. Therefore, harvesting at the correct stage of ripeness is the most basic aspect impacting high quality. Colour, firmness, crispness, and decay and rot resistance are the most essential quality attributes of fresh market cabbage (Wahome, 2019).

Kramchote, Srilaong, Wongs –Aree and Kanlayanarat (2012) found that leaf yellowing is delayed and leaf chlorophyll content is preserved when stored at 4 and 10°C. At low temperatures, weight loss, respiration rate, and ethylene production are all reduced, although head stiffness is preserved. High temperatures during the post-harvest period, as well as the use of non-protective packaging, are the most common causes of high-level damage and deterioration, reducing the potential post-harvest life of all fresh produce, including cabbage (Wahome, 2019).

The single most effective method of extending the post-harvest life of fresh food is low temperature or cold storage. Cabbage may be preserved for 18 days at 4 degrees Celsius and 12 days at 10 degrees Celsius. Cabbage degrades quickly at room temperature and barely last a few days. When cabbage reaches the retail market one or two days after harvest, it significantly reduces its quality. Traders and customers prefer cabbage heads that are green in colour (Wahome, 2019).

Cabbage is best marketed under contract agreement because oversupply from competing markets can quickly decrease prices, while a cabbage supply deficit might result in windfall gains. Cabbage is hand-harvested and bulge-packed heads. In wholesales cabbage is packed into piles in a refrigerated section (Soe, et al., 2016).

2.8.4.3 Onion

Onion is Namibia's most popular vegetable (Namibian Agronomic Board, 2019). It is an important condiment that is used all year in all households. The immature and mature bulbs, as well as the green leaves are consumed uncooked or used in the production of food. Onions are used to flavour soups, sauces, and other dishes (Calica & Cabanayan, 2018).

Namibia imports onions only during the open border period (January to May) during which local production is insufficient to meet the demand. Therefore, on a yearly basis, Namibia has an overabundance of native onion during the production season (May to December) and a shortage during the off-season (January to April). The surplus onion harvested throughout the producing season is mainly exported to Angola, with South Africa being a rare exception (Namibian Agronomic Board, 2019).

The onion is a semi-perishable vegetable. The use of a post-harvest procedure lowers onion losses in the short term. Farmers cut the onion tops to a neck length of 1.0 to 1.5 cm after harvesting. Onion storage quality is greatly improved by top cutting bulbs. Prior to storing or marketing, most farmers cure onion bulbs in the shade for 2-3 days, decayed bulbs and the outer loose shells of their onion are removed. (Adnan, Rahman, & Sarker, 2014).

Marketing of onions involves cost of transportation, loading and unloading, gunny bag, commission, market tolls, bribery/subscription, storage, and house fair, cleaning and grading. Farmers utilize gunny bags for marketing, however owing to sufficient aeration, most distributors and retailers prefer perforated gunny bags. The intermediaries used a fan in the storage area to keep the onions from withering. Some retailers may blow air into onion lot using the table fan. (Adnan, Rahman, & Sarker, 2014).

2.8.5 Governmental initiatives towards improving the horticultural sector

The Ministry of Agriculture, Water and Forestry formulated and adopted policies and strategies to improve Namibia's agricultural marketing and trade in the domestic and international markets. These programmes address issues pertaining to production, processing, and marketing of fresh produce.

2.8.5.1 The Namibian Agricultural Marketing and Trade Policy and Strategy

Namibian Agriculture Marketing and Trade Policy and Strategy was formulated to enhance the agricultural sector in utilising opportunities presented by domestic and international markets. This would result into the agricultural sector obtaining optimum benefits to achieve the national objectives of Vision 2030 (Ministry of Agriculture, Water and Forestry, 2011).

This Policy provides the roadmap for the marketing of local produce in the domestic and international markets. It aims at promoting Namibian products so that they are chosen over international products. The policy ensures that local products are of high quality and conform to international standards and accessible to consumers (Ministry of Agriculture, Water and Forestry, 2011).

The policy gave rise to Agro-Marketing and Trade Agency (AMTA) which strives to increase local production by managing the fresh produce business hubs (FPBH), the national strategic food reserves (NSFR) and by facilitating trade, compliance to standards, marketing and product development in the agronomic sector. Namibia has two FPBHs situated in Rundu and Ongwediva. The FPBH opened their doors in 2019 and provide for marketing, processing, handling and trade of agronomic products. The hubs also collect levies on fresh produce and grains (Namibian Agronomic Board, n.d.).

The operation of the hubs is stimulated by the market share promotion (MSP) which was implemented in 2015 by the Namibian Agronomic Board. The MSP protects local producers from the rival of international producers by demanding all importers to buy certain percentage of local produce before obtaining the import permit for similar produce (Namibian Agronomic Board, n.d.). In 2015, the MSP required importers to buy 5% of local produce. The MSP share has been growing relatively to the expansion of the horticultural sector. Currently the MSP stands at 47% and aims for 60 % in the future. The production of most vegetables has since been increasing for the past 10 years since the MSP was introduced (Namibian Agronomic Board, n.d.).

The hubs offer storage facilities, packing and floor space, to enable farmers especially the small scale farmers to stimulate the interaction between commissioner agents or wholesale agents who are renting the facilities. Farmers supplying the hub use production calendar coupled with good agricultural practices which majority small scale farmers do not have. This provides uncertainty for the hub to source fresh produce from small scale farmers. On the other hand small scale farmers are hesitant to supply the hub claiming high transportation costs to the hub, high costs of the hub and low prices offered at the hub (Thomas & Vink, 2020). Although prices fluctuate based on demand and supply, farmers still feel that their prices are being manipulated by commission agents in the hub. Further, farmers also argue that they get delayed payments which sometime does not even correlate with the amount which was first agreed upon (Thomas & Vink, 2020).

The commission agents argue that reduced payments amount is due to time factor. Sometimes the produce goes for days without a buyer, this results into reduction in prices. In some instances when there are no buyers for the produce, farmers are asked to collect their produce from the hub which results into farmers claiming that the agents withhold certain marketing information which hinders their produce from being bought (Thomas & Vink, 2020). Hence the relationship between agents and farmers is associated with so many risks.

Parallel to the MSP scheme, the Agronomic Board has a close border scheme where borders are closed for the products which are regarded as special controlled products. Whenever there is sufficient local production in certain vegetables, the Agronomic Board demands imports for such products that are completely banned to open market opportunity for local producers.

2.8.5.2 The Green Scheme National Programmes

The Green Scheme National Programme is aimed at building agricultural capacity for rural farmers using irrigation based agronomic production. The programme promotes production and marketing managements for small scale farmers to bring about food security at household and national level (Annual symposium of the bank of Namibia, 2017).

The Government has about 11 Green Scheme projects (Etunda, Musese, Uvungu Vungu, Sikondo, Shadikongoro, Mashare, Ndonga, Shitemo, Kalimebeza, Hardap, ORIP) and they occupy a total area of about 6 000 hectares, (Annual symposium of the bank of Namibia, 2017). The scheme projects present opportunity for increased agricultural production which is important if Namibia is to become self-sufficient in terms of food. The green scheme programme is also made to benefit communities located within suitable irrigation so that they can participate in agricultural sector and obtain improved livelihoods. The green scheme policy seeks to cater for farmers' needs and challenges presented by free market factors. The scheme offers various developmental incentives for farmers and suggests appropriate interventions for challenges (Annual symposium of the bank of Namibia, 2017).

2.9 Empirical findings on channel efficiency from various studies

Panda (2012) assessed the marketing efficiency for some channels of vegetables in India using marketing efficiency measure by Acharya and Agarwal (2019). The study found that most farmers preferred to sell through wholesaler commission agent as farmers lack marketing infrastructure. The study found that spoilage of vegetable significantly affects the marketing margins as well as the marketing efficiency. The study suggests margin improvement through saving the produce from marketing loss during transportation. Longer channels (with more intermediaries) had high marketing margins compared to short channels. Direct channels were more efficient followed by a channel with only one intermediary. Although most producers preferred longer channels, they offered lower returns to the producers and were then considered as less efficient in marketing of all vegetables in the study.

Babu et al. (2018) conducted a study to compare prices set at different levels within channels in Ethiopia using the marketing margin calculations. The findings were: producers' share in tomato was highest in direct channels. Traders, collectors had the highest gross margin which accounted for 17.43% of the consumers' price in the intermediated channels. In the case of onions, the highest producers' share was still found within direct channels. The local collectors had the highest marketing margins in all of the intermediated channels. The papaya fruit had the highest total marketing margin in direct channel which accounted for 64% of the consumers' price. Retailers had the highest total gross marketing margin amongst other intermediaries. The study also found that even if traders and farmers share market information, the marketing system was not well established to communicate such information.

In a comparative study, Hugar and Hiremath (1984) compared marketing efficiency of two channels in India. The study found that majority small farmers sold their produce through commission agents while most medium to large farmers sold their produce through cooperative society. The percentage of net returns in relation to the quantity handled was high in commission agents than in co-operative society. The marketing margins for co-operative society was higher than that of commission agents which translates into less efficiency of cooperative society than commission agents.

A study done in India by Aparna and Hanumanthaiah (2012) compared marketing cost, marketing margins, price spread, producer's share in consumer's Rupee, marketing efficiency and marketing

constraints of supermarket channels versus two traditional marketing channels in the district of Rangareddy in Andhra Pradesh. The study revealed that the net price received by the farmers and producer's share in consumer's Rupee were higher in supermarket channel than in traditional channels. Hence the study concluded that the supermarket channel was more efficient than the traditional channels. Farmers supplying supermarkets were constrained by rejection of low grade produce, procurement-indent and poor grading. On the other hand, farmers supplying the traditional markets had major challenges such as threats of middlemen, high market charges and longer distance to the market.

In Nigeria, Adenuga et al. (2013) examined the marketing efficiency of different channels using marketing efficiency measure of Acharya and Adewal (2019). The study found that farm spoilage had effect on the marketing margins and marketing efficiency of vegetable production. Farmer's net returns were higher when estimated without considering the marketing loss. Further, intermediated channels had lower marketing efficiency than direct channels. The study recommends that local regulated markets accompanied by literacy education programmed should be introduced to raise efficiency of farmers in vegetable marketing.

The study done in India by Maske et al. (2012) analysed the marketable surplus and price spread of papaya in Raipur district of Chhattisgarh. The findings were that producers' share is in inverse relationship with the number of intermediaries. The farmer's net price was higher in direct channel when the produce is directly sold to the consumers or retailers. The study indicated that there is a need to reduce marketing losses at various stages by possibly strengthening the establishment of processing units and development of market infrastructure in the farming area.

In another study done in India by Bhat et al. (2015) to analyse the marketing costs and price spread in citrus fruit. The study found that producers suffer high marketing costs when direct marketing. Further the study revealed that the producers' share in the consumers' Rupee was the highest in direct channel as compared to intermediated channel. Consumer also paid the lower price in direct channel compared to intermediated channels hence direct sale from producer to consumer was beneficial for both producer and consumer. In conclusion the study revealed an inverse relationship in efficiency between marketing channels and the length of the channel.

LeRoux et al. (2009) compared performances of wholesale and direct marketing channels. The study found that wholesale and retail channels were more efficient in marketing since they had less wastage as they absorb large volumes. The direct marketing channels offered relatively high prices but could not consume large volumes hence significant value of vegetable got lost as it did not get the market. The study further discovered that profits were calculated as net returns relative to gross sales.

The direct marketing channels such as the community supported agriculture operations and farm stands (without staffs) showed highest profit in percentage than the wholesale channels. Although direct channels proved to be profitable, the major concerns with those channels were the left over produce that goes unsold. The study indicated that about 20% of the produce went to waste in direct marketing. The study found that both channels had some drawbacks in terms of volume for sale and prices. The study gave a recommendation that due to perishability of vegetables, small scale farmers need to be flexible and combine both kinds of channels to increase profitability and decrease labour costs.

2.10 Conceptual framework

The framework considered by this study relates marketing channels to marketing costs and how both translated into efficiency gains through marketing attributes at farmers' level. The key factors surrounding this study involved variables that influence the choices of marketing channels and those that are paramount to the performance of marketing channels. Determinants of marketing channel choices involves aspects that open farmers' access to a specific channels. Panda (2012) states that the choice of marketing channel is predetermined by marketing infrastructure and information at farmers' disposal.

Marketing choices available to farmers may consist of different levels ranging from the shortest channel where produce is marketed directly to consumers to a longer channel where several intermediaries are involved before produce reaches the consumer. In addition, marketing arrangements within channels also varies. Some channels involves a set of well organised structures while other channels may be disorganised, hence the terms formal and informal channels. While it is vital that farmers have obtain infrastructural attributes to enhance marketing, their marketing goal would be to obtain returns that pay off the marketing costs while maximising profit through market margin.

Market performance is related to the process of exchange of good with an advantage of taking price difference that exceeds marketing costs. It is thus important that farmers choose channels that provide convenience state of the marketing. Marketing channels is thus diverse, some farmers choose to sell just at the farm's gate, others catch prices offered in towns i.e, to the hawker, wholesalers, retailers and consumers. Although value addition is an important aspect in attracting better prices, its consideration depends on the costs involved in its operation. Availability of marketing information is key factor as it points ways to where and when farmers should supply the produce. The level of marketing costs influence trade flows and prices in the market. Marketing costs is negatively related to efficiency gain where, as marketing costs lowers, the efficiency gain raises.

Correct information on price lowers the costs of information gathering and avoid risks associated with the sudden change on unfavourable prices. Thus, traders get more opportunities to avoid less profitable transfer which consequently reduces their gross margin. Indicators to marketing performance include

factors such as the amount of sales, gross margins and producers' shares. Thus, form basis to measure marketing efficiency. The aforementioned framework forms basis to which methodology for this study was developed to achieve study's objectives.

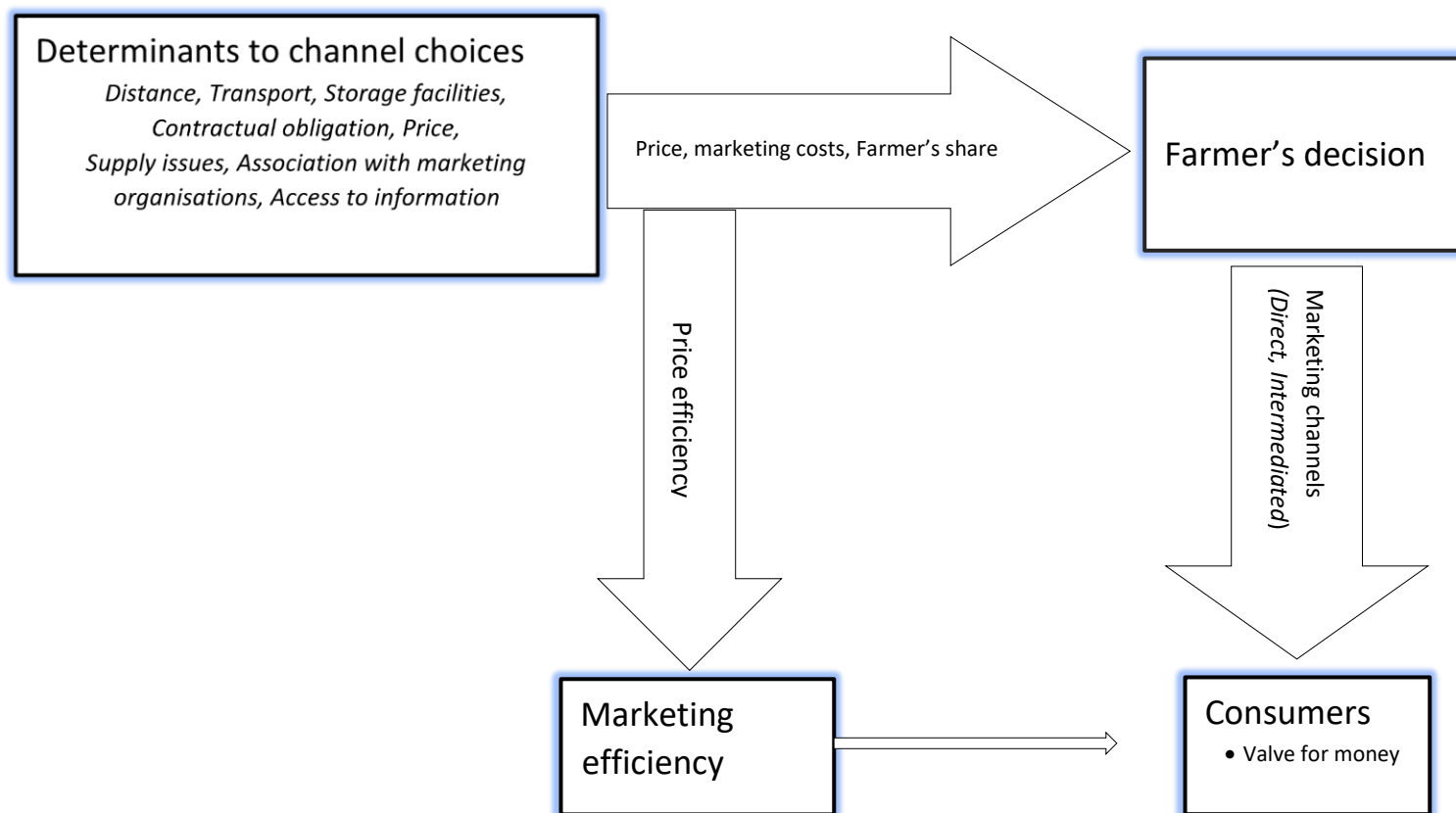


Figure 3: Conceptual framework for this study

2.11 Summary on literature review

Literature reveals that the marketing of fresh produce is complex task since products need to reach consumers while holding marketable value as per consumer demand. Producers prefer the marketing channels that sell fast and in large volumes. At the same time, desirable marketing channels should offer large producers' share in terms of profit. The empirical literature of various studies that conducted marketing efficiency measures have indicated that different channels offer different benefits. Although farmers desire efficient marketing channels, they are sometimes compelled to use channels with less benefits due to lack of marketing information and lack of organisation within marketing structures.

Chapter 3: Methodology

3.1 Introduction

This chapter presents the research methodology followed and it begins by highlighting the study area's location, soil and climatic characteristics, horticultural production in the study area then the chapter presents the research design, population and sampling procedures, techniques and methods used to collect all relevant data required for the study. Thereafter the model used for analysis is calibrated in the theoretical framework and then the ethical considerations followed are also outlined.

3.2 Description of the study area

Olushandja is located within Omusati Region of the Northern part of Namibia and it is about 35 km west of Outapi. The ecological features that accounted Olushandja area to vegetable production are Olushandja Dam and the Calueque-Oshakati Canal. Both are located between Ruacana and Outapi and are pump-fed with water from the Kunene River in Angola (Fiebiger, et al., 2010).

Olushandja farmers use water from a canal which runs for about 155km through the Omusati Region to Oshakati, the canal is linked to Calueque Dam and Kunene River in Angola (Haidula, 2016). The horticultural activity in the area was attracted by this water source. Majority of farmers use drip irrigation system while few others use sprinkler and flood irrigation systems (Haidula, 2016).

Soil and climatic factors

The soil in the study area is mainly deep sandy with small extent of loams and silty soils coupled with low water retention (Haidula, 2016). The topsoil has low content of organic matters which makes it subject to low fertility, nutrient deficiency and soil salinity (Angula et al., 2014). Omusati Region is characterised with semi-arid climate and its rainfall ranges from 350 to 500 mm per annum. Furthermore, the area gets both hot and cold temperature whereby in hottest summer months, the temperature ranges between 30°C and 35°C and in the coldest winter days the temperatures range between 2°C and 6°C (Angula et al., 2014).

3.3 Olushandja horticultural production area

Namibian Agronomic board (n.d.) indicates that the area has more than 80 farmers while (Haidula, 2016) stated that about 50 farmers were registered with Olushandja Horticulture Producer Association. The association was founded by private farmers who farms on small plots of 3-20 hectares around Olushandja dam and it assists members with implements, packaging, branding and marketing. However, OHPA claims that a significant amount of their vegetables go to waste as they face resistance from local retailers who prefer to buy from established local producers (van Wyk, 2017).

Olushandja farmers aim at improving their livelihood, community uplifting and to contribute to Namibian food security. Crops grown in the area include mainly: maize, wheat, cabbage, tomatoes, groundnuts, butternuts, sweet potatoes, green peppers, watermelons and carrots (Thomas & Vink, 2020). Olushandja farmers adopted horticultural production through 13 Climate Change Adaptation (CCA) project that was a sub-project of the Country Pilot Partnership Program for Integrated Sustainable Land Management that operated from 2015-2017 (MAWF & CPP as cited in Haidula, 2016). The project trained farmers on different cropping system and the use of drip irrigation as a climate change response (Haidula, 2016).

Horticultural production in North- central Namibia is still at infant stage and most farmers have less than 10 years of experience in production and marketing (Thomas & Vink, 2020). North central vegetable farmers have enough land but have poor soils which need to be improved through application of fertilisers. However, this becomes more difficult since farmers have poor knowledge of fertiliser application (Thomas & Vink, 2020).

Majority of farmers do not have enough funds to purchase inputs needed for production and yet they cannot use communal land to access credit facilities. Therefore, farmers suffer from high transport cost for purchasing inputs such as seeds, chemicals and equipment, and packaging materials which are sourced from South Africa (Thomas & Vink, 2020). Further, farmers lack transports suited to carry inputs hence they are bound to hire transport which adds to high costs of transports. As a result, they do not prioritise on production inputs which negatively affect their production. Furthermore, farmers also lack cold transport to transport their produce to supermarkets and retailers (Thomas & Vink, 2020).

3.4 Research design

The study used a quantitative research design. Apuke (2017) stated that the goal of the quantitative design is to determine the relationship between independent variables and dependent variables within a population. The overarching aim of quantitative research study is to classify features, count them, and construct statistical models in an attempt to explain what is observed. The process involved collecting numerical data and analyse them using statistical techniques. This study collected data through a survey method. Apuke (2017) further states that survey method involves the use of scientific sampling method coupled with a designed questionnaire to measure characteristics of the population using statistical methods.

3.5 Sampling

The list of vegetable producers in the study area was obtained from the staff members of the Namibia Agronomic Board and this served as the sampling frame for the study. Selection of the farmers was based on the production of any of the selected vegetables under consideration and the willingness of farmers to participate in the study.

By the time of data collection, there was a total of 101 active farmers in the study area based on the list of active farmers provided by the Namibia agronomic Board. Due to homogeneity within vegetable producers and to enable the statistically analysis desired, the study targeted at least 70% of the population by random sampling. Thus a total number of 60 farmers was drawn from the population. However, not all targeted farmers could be reached for the interview since some farmer's contact numbers were unreachable, other farmers indicated that they could not be available for interview and others also indicated no to be willing to be interviewed. Therefore, the sample size was scaled down to 53 farmers.

Furthermore, a list of all traders that source produce from the study area was also obtained from the Namibian Agronomic Board. The geographical frame for the population of traders that source produce from Olushandja area was so wide that some of the produce is sent to distant towns. The researcher was not able to reach traders in those distant areas hence, traders within reachable distance were

identified and approached for interview through convenience sampling. This led to a selection of 7 hawkers, 3 retailers and 1 wholesaler for an interview.

3.6 Data collection

The study is based on primary data. Data were collected using a structured questionnaire, which was administered through face-to-face interviews with farm owners and traders. The interviews were in two parts, namely, one for the farmers and the other for traders. The questionnaire consisted of both closed and open-ended questions. The questionnaire was pre-tested to minimise errors in the questions. The primary data comprised variables such as volume sold, prices, marketing costs and buyers.

3.7 Data analysis

After data was collected it was then coded. Descriptive statistics were used to define the characteristics of the respondents based on demographic information (age, gender, education, and labour force size) and production factors (size of the farm, level of experience, training and production areas).

Through logistic regression, factors that were believed to have an effect on channel choices were regressed against the identified marketing channel to ascertain their influence to channel selection.

Logistic regression was used to predict a nominal dependent variable given one or more independent variables (transport source, information access, availability and condition of storage facilities and whether individual farmers belong to association, individually whether they had an influence on the dependent variable which determines the choice of marketing channels which were informal and mixed (formal and informal channels).

To construct the price spread that allowed for the assessment of the producer's share, data on prices, marketing costs per unit sold (kg) and marketing margins per kg were calculated. The marketing costs included post-harvest operations, transportation, packing and marketing facilities. Furthermore, the study determined the relationship between channel length, marketing margin and producers share through Pearson correlation analysis.

Acharya and Agarwal's method of marketing efficiency measure which is expressed as;

$$\text{Marketing efficiency} = \frac{\text{NPF}}{(\text{MC} + \text{MM})}$$

was used to calculate marketing efficiency for the marketing channels used utilising data on the farmer's price (FP), total marketing costs (MC) and total marketing margin (MM). In the same light, factors that were assumed to have an influence marketing channel efficiency were regressed against marketing channel efficiency through regression analysis to determine their level of influence.

The model was set out as: $\bar{Y}_0 = \beta_1 + \beta_2 X_1 + \beta_3 X_2 + \beta_4 X_3 + \beta_5 X_4 + \beta_6 X_5 + \mu_i$ whereby: Marketing Channel Efficiency = $\beta_1 + \beta_2$ (Channel length) + β_3 (Marketing cost) + β_4 (Marketing margin) + β_5 (Volume handled) + β_6 (Farmer's price) + μ_i

3.7.1 Logistic regression analysis.

Logistic modelling was run to analyse the data consisting of 53 observations. Logistic regression is a parametric method used for examining the relationship between a binary response variable (one that is categorical having only two categories) and a set of independent predictor variables that can be either continuous or categorical. (Abdillah, Sutisna, Tarjiah, Fitria, & Widiyanto, 2020).

Logistic regression is well suited for problems when the predictor variable is binary or has multiple categorical levels, or even when there are multiple independent variables in the problem (Abdalla & El-Habil, 2012). The model was used to quantify the factors influencing the choice of marketing channel type being (informal and mixed) by small holder. The odds ratio of the outcomes were modelled as a linear combination of the predictor variable. The P_{ij} represented the probability of determining factors and market outlet choice by small-scale producers, the equation to represent this was:

$$M_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon_i \quad (\text{eq.1})$$

Where, β_1 = Parameters to be estimated, ε_i = Randomised error, M_{ij} = market outlet choice among small scale vegetable producers, (Informal = 0, Mixed = 1). The explanatory (independent) variables are: X_1 = Information (No access = 1, Secondary information = 2 and primary information = 3), X_2 = Storage facilities (Poor = 1, Moderate = 2 and Good = 3), X_3 = Mode of transport (Public transport = 1, Hired transport = 2 and Own transport = 3) and association to marketing group (No = 0 and Yes = 1).

Furthermore, the j was the alternative choice; the probability of selecting outlet j is given by,

$$Prob(Y_i = j) = e_{zj} / \sum_{k=0}^j e_{zk} \quad (\text{eq. 2})$$

The z_j was the market choice and z_k was an alternative market choice that could be used (Magogo, Mlongo, Saidi, Mkurumwa, & Oradu, 2015). The logit model was then run to determine the probability of market outlet choice given by j factors that influence the choice of the market outlet in the study area. The logit model was also applied to identify the factors that influence choice of the market outlet. With a number of alternative choice the log-odd ratio was computed as:

$$\ln\left(\frac{P_{ij}}{P_{ik}}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon_i \quad (\text{eq. 3})$$

The P_{ij} and P_{ik} are probabilities of the market outlets given and an alternative outlet respectively. $\ln\left(\frac{P_{ij}}{P_{ik}}\right)$ is a natural log of probability market choice j relative to probability market choice k , α is a constant, β is a matrix of parameters that reflect the impact of changes in X on probability of using a given the determinants of choosing a given outlet, ε_i is the error term that is independent and normally distributed with a mean zero. Marginal effects of the attributes on choice are determined by getting the differential of probability of a choice and it is given by:

$$\delta = \frac{\partial p_i}{\partial X_i} = p_i(\beta_j - \sum_{k=0}^j P_k \beta_k) = P_i(\beta_j - \beta) \quad (3.17)$$

Every sub-sector of β enters every marginal effect both through probabilities and through weighted average. Hence, the marginal effects from the logit model, which measure the possible change in the probability of specific market choice were made with respect to a unit change in an independent variable, are reported and discussed below. The significant value indicates whether a change in the independent variable has a significant influence on the logit at a given level (Sigei *et al.*, 2015).

Goodness of fit

Prior to explanations and discussions on the results, the theory behind the model used is unpacked. The model goodness of fit is shown in table 5. Evaluation of fit occurs at two levels. The first part involves evaluating the fit of the full model containing full set of predictors. This is typically done using a likelihood ratio chi-square test to compare the full model with null or intercept only, and the Hosmer Lemeshow test results. The omnibus test is a likelihood-ratio chi-square test for the current model versus the null (in this case, intercept) model. The significance value of less than 0.05 indicates that the

current model outperforms the null model (Theofanidis & Fountouki, 2018). The p -value is compared to the critical value .05 to determine if the overall model is statistically significant. When the model is statistically significant it means that there is a significant improvement in fit as compared to the null model, thus the model is showing a good fit. On the other hand, Hosmer Lemeshow should show a non-significance level to indicate a good model fit.

Secondly, the overall model fit is often assessed using 'Pseudo-r- squares' indices and evaluation of the degree to which the model is able to classify individuals into groups on the dependent variable. One evaluates the individual predictor for their contribution to overall model fit. This is done using either the Wald test or likelihood ratio tests which involves comparing the full model with all the predictors against a reduced model with a given predictor removed (Abdillah, Sutisna, Tarjiah, Fitria, & Widiyanto, 2020).

The estimate column contains the regression coefficients. For each predictor, the regression slope is the predicted change in the log odds of falling into the target group per unit increase on the predictor. It is the predicted change in log odds per unit increase on the predictor. The positive regression coefficient indicates that the probability of falling into the target group increases as a result of an increase on the predictor variable. A negative coefficient indicates that the probability of target membership decreases with increase on the predictor. If the regression coefficient = 0, this is taken to indicate that there is no relationship between independent and depended variables (Win Pa Pa, Masahiro, & Susum, 2015).

The odds ratio values are interpreted as multiplicative change in odds for every one unit increases on a predictor. If odds ratio is >1 , it indicates that as scores on the predictor increases, there is an increasing probability of the case falling into the target group on the depended variable. An odds ratio <1 can be interpreted as decreasing probability of being in the target group as scores on the predictor increase. If the odds ratio =1, then this indicates no change in the probability of being in the target group as scores on the predictor change (Farrel, 2019).

3.7.2 Summary of data analysis by objective

The summary of data analysis as per the objectives of the study are presented in Table 1.

Table 1: Data analysis as per objectives

Objective	Data	Data source	Analytical model used
To assess the marketing channel choices for the dominant vegetables in the study area	Demographic data (<i>age, gender, education, labour availability</i>); Production aspects (<i>farm size, farming experience, training, area under production</i>); Determinants of channel choices (<i>training distance, transport, storage facilities, association with marketing organisation, access to information, type of channel</i>)	Farmers	Descriptive and logistic regression model
To estimate producers' share in the marketing channels used	Marketing expenses along the channel (<i>harvesting, sorting, packaging, transport, market fee</i>). Farmer's price; Consumers price; Marketing margin	Farmers and traders	Price spread Correlation analysis
To estimate the marketing efficiency for the marketing channels used	Channel length; Farmer's price (FP); Total marketing costs (MC); Total marketing margin (MM); Volume handled	Farmers and traders	Marketing efficiency measure by <i>Acharya and Agarwal (2014)</i> : $NPF/(MC+MM)$ Regression analysis

3.8 Limitations of the study

Theofanidis and Fountouki (2018) define a limitation is an 'imposed' restriction which is therefore essentially out of the researcher's control. The study sample was selected based on farmers who were indicated to produce all 5 crops as per the Namibia Agronomic board. However, it was discovered that the Agronomic Board database could not correlate to the crops grown in the previous season during the data collection procedure. As a result, some crops became popular than others, so did the number of crops studied per farmer. Due to the lack of other crops with a comparable number of observations, only tomato and butternut could be the subject of correlation and regression analyses. In that light, the study suggest that the Namibia Agronomic Board needs regular update of their database to reflect current status. Furthermore, some farmers were too busy to keep appointments with the researcher. This delayed time frame for data collection process.

Chapter 4: Results and discussions

4.1 Introduction

This chapter presents results for the study in which study objectives were presented as main topics. The chapter begins with findings pertaining to the first objective which is to assess marketing channel choices for the dominant vegetables produced in the study area, where the two spelled hypothesis were tested through multinomial regression model. The chapter moves on to the second objective where it presents price spreads for the five vegetables in the study and the respective hypothesis was tested through Pearson correlation analysis. Finally, the marketing efficiency for the identified marketing channels was determined and the corresponding hypothesis was tested through linear regression analysis.

4.2 Choice of marketing channels for vegetables

4.2.1 Socio economic characteristics of the respondents

The study was dominated by male farmers who made up 96.2% of the respondents with only 3.7% of female farmers. The farming space occupied was marginal small scale of 3.95 ha on average. Respondents' ages ranged between 20 to 59 years, with majority in their 40s, the remainder aged between of 30 and 39. This implies that the younger generation was in charge of horticulture production in the studied area.

In terms of marital status, 60.4 % of the respondents were married and 33.7% were single. With regards to education, majority of respondents (50.9%) had completed secondary education, 47.2% had completed tertiary education while 1.9 % had completed primary education. Further socio-economics characteristics are presented in table 2.

Table 2 : Socio- economic characteristics of the respondents (n=53)

Characteristics	Categories	Percentage
Land tenure	Own land	67.9
	Family land	26.4
	Rented land	5.7
Transport	Use public transport	9.4
	Hire transport	26.4
	Use own land	64.1
Training	Trained by other farmers	15.1
	attended private training	54.7
	Trained by Nab	30.1
Access to information	No access to information	7.5
	Secondary source of information (hearing from other farmers)	47.1
	Primary source of information (NAB, AMTA, WhatsApp groups, and customers)	45.2
Storage facilities	poor	35.8
	Moderate	58.4
	good	5.6
Membership to marketing association	yes	60.4
	no	39.6

In terms of land tenure, majority of respondents (67.9%) used their own land which they acquired through traditional authority, 26.4% used family land which exist as portions alongside the family millet field belonging to their respective families. Only 5.7% was leasing. Of farmers 64.1% used their own vehicles to transport their produce to the market, 26.4% depended on hired vehicles, and 9.4% used public transport.

In terms of farming skills, 54.7% indicated that they were trained by private organisations that offer training to farmers. Some 30.1% of farmers received training through Agronomic Board and 15.1% got exposed to farming by experienced farmers through field trips field days and look and learn programs.

In relation to marketing information, 47.5% indicated that they got orientation from other farmers. 45.2% indicated that they obtained their marketing information from NAB, AMTA, social media

platforms like WhatsApp groups, and buyers themselves. Sadly, 7.5% of respondents lamented that they lacked access to relevant marketing information.

In terms of storage facilities, 58.4% of respondents indicated that they had moderate storage facilities, 35.8% regretted having poor storage, and only 5.6% said had good storage facilities.

When farmers were asked if they belonged to any marketing organization, 60.4% were registered members to Olushandja marketing association, while 39.6% were not affiliated to any organization. Based on additional information provided by the staff of Olushandja association, the number of active members has been decreasing over the years. Lack of transport to bring the produce to the association point and erratic supply water supply form the only dam were some of the factors that discouraged some farmers to remain association members.

Amongst the benefits provided to the members of association was market access. The association made arrangement with a Cunene catering company that provided food to schools' hostels. Through this, farmers declared the produce available for sale every Monday before the association processes the purchase order with the catering company. The quantity of produce demanded by the catering company was then distributed throughout the members. In addition the association had also made an arrangement with fresh mark, a distributor of vegetables for retailer such as Checkers and Shoprite U-Save. Unfortunately, the latter arrangement never materialised into any contract. Thus retailers could nullify arrangement any time.

4.3 Farmer participation in marketing channels

The study identified five main channels through which farmers marketed their produce. However, no single farmer was limited to selling through a single channel thus most farmers attempted to combine more than one channel to increase their market share. The main channels used by farmers in the study area are presented in Table 3.

Table 3: Identified marketing channels of vegetables (n=53)

Channel	Number	Number of farmers participated
Farmer- consumer	1	53
Farmer – catering company	2	32
Farmers – Hawkers – consumer	3	53
Farmer – retailer – consumer	4	33
Farmer – wholesaler (<i>AMTA & Freshmark</i>) – retailer – consumer	5	41

Channel 1 entails the direct sale of produce at the farm's gate and all 53 farmers were involved in this channel. Channel 2 involved 32 farmers who were members of Olushandja association, farmers had to supply the produce to the association facility where it was bought by Cunene Catering Company which supplies school hostels with food. Channel 3 involves farmers supplying the produce to the open market where they transact with hawkers. Channel 4 involves farmers supplying the produce to the retailers/supermarkets who consequently sell to the consumers. Channel 5 was the longest channel, where produce is supplied to the wholesalers which were AMTA in Ongwediva and Freshmark trader in Outapi. The wholesalers consequently supply the retailers and the produce eventually flows to the consumers.

Based on this study, channel 2, 4 and 5 were considered as formal channel because they required some level of oral or written agreements. In addition, produce going through these channels was subject to tax charged by the government. Channels 1 and 3 were considered as informal channels whereby, the market was not guaranteed and there was little to no arrangement done between the producers and the buyers.

In terms of marketing arrangements, the study observed that market was not well-organized in terms of distribution channels. The marketing channels were so dispersed and some of them appeared to be crushing into one another. For example, AMTA was intended to supply both retailers and hawkers, but the same farmers that supply AMTA also sell directly to retailers and hawkers. This could be seen to be creating vegetable block in the system and complicate the flow of produce. Farmers spent a lot of time

and effort driving around towns looking for buyers which points to market disorganisation. The participation of marketing channels per crops is shown in Table 4.

4.3.1 Marketing channel participation per crop

The number of farmers who participated in the production of 5 crops for the last season varied. Tomato and butternut were the most popular crops with an average of 42.4 and 40.8, respectively. Thus, a high number of participation for the 2 crops throughout the marketing channels. This was followed by cabbage, onion and Green pepper with average of 29.2, 25.6 and 13.2 respectively. The number of farmers who participated in the production of specific crops is shown in Table 4.

Table 4 : Marketing channels participation per crop (n=53)

Channels	Tomato	Cabbage	Butternut	Onion	Green pepper
1. Farmer – Consumer	53	43	53	37	16
2. Farmer – catering company	32	24	32	20	11
3. Farmer – Hawkers- consumer	53	43	53	37	16
4. Farmers – Retailer – consumer	33	7	28	8	5
5. Farmer – wholesalers- retailer-consumer	41	29	38	26	18
Average participation per crop	42.4	29.2	40.8	25.6	13.2

Members to Olushandja association picked on all channels, but engaged exclusively in channel 2 where they had preferential advantage. All members to the association also picked on channel 5 (*Farmer-Wholesalers- Retailers-Consumers*) in this regard the wholesalers referred to, included Fresh-mark trader which was exclusive to members of the association and AMTA hub which accepted produce from all kinds of farmers.

Based on the findings, the Olushandja association has increased the number of farmers who participated in Channel 5, which would not otherwise be the case. Non-members to the organisation frequently used traditional channels which involved supplying directly to consumers in channel 1 and to hawkers in channel 3. Some farmers who were not members of association were able to work out arrangements with some retailers so that they could sell to them in channel 4. The arrangement reached, however,

was not an agreement which implied that farmers could only supply the retailers when there was room in the store. From the perspective of the retailers, it was difficult to enter in agreements with farmers because most farmers were inconsistent in supply. Retailers therefore only accepted the produce looking at their stock level. The same applied to wholesaler, AMTA.

4.4 Analysis of farmers' marketing channel choices

The logistic regression results shown in Table 6 present factors that determine the marketing participation choices of farmers in the study. The five marketing channels identified were grouped into 2 main channels; informal channels as *channel 1 and 3* which were common to all farmers and formal channels as *channel 2, 4 and 5* where only a certain number of farmers participated.

Table 5: Goodness of fit

Omnibus test			
Step 1	Chi - square	df	Sig
Step	46.354	5	<.001
Block	46.354	5	<.001
Model	46.354	5	<.001
Hosmer and Lemeshow test			
1	1.423	6	.964

The chi-squared tests indicates that the model is a significant improvement (P -value <.001) over null model. In addition, an insignificant P -value (.964) in this context implies a good model fit.

The outcomes of the logistic regression model indicate the findings of the important variables that affect farmers' decisions regarding market selection in the research area. The model took into account the variables that were covered in the previous section and assessed them for significance. The logistic results of mixed channel choice compared to informal channel is presented in Table 6. The table shows the regression coefficients, Wald test, significance level and odds ratio of independent variables in the model.

Table 6: Logistic regression results

Variables in the equation	B	Wald	Sign	Exp (B)
----------------------------------	----------	-------------	-------------	----------------

Transport	2.927	4.840	.028	18.672
Training	.629	.645	.422	1.875
Information	1.907	5.462	.019	6.735
Storage	2.521	8.157	.004	12.443
Association	2.612	4.945	.026	13.619
Constant	-9.722	13.298	<.001	.000

Variables entered on step 1: transport, training, information, storage, association

The likelihood that a farmer will fall into mixed channel option increases when the coefficient has a positive sign. Of the 5 independent variables used in the model, 4 variables were statistically significant at the 5% significance level. It was evident from Table 6 that holding all factors constant, the likelihood for using the mixed channel option would decrease by 9.722 making reference to informal market option.

Transport was a positive and significant predictor of the probability of mixed channel ($B = 2.927$, P -value=.028). The odds ratio indicates that for every one unit increase on transport, the odds of getting access to mixed channel increases by a factor of 18.672. The positive relationship between the variables is because the farmers' own vehicles allow them freely without relying on others to participate in formal markets, which are marketing centres located far off. This will not only minimize time of reaching the marketing centres but also the vegetables are delivered fresh and undamaged. This increases the marketability of the produce (Panda, 2012).

Training was a non- significant predictor of mixed channel choice ($B = 1.907$, P -value=.645). This implies that the type of training received by farmers does not matter with what channels farmers are likely to choose.

Access to information is positive and significant predictor of the probability of mixed channel ($B = 2.927$, P -value=.019). The odds ratio indicates that for every one unit increase on transport, the odds of getting access to mixed channel increases by a factor of 12.443. Thus, the null hypothesis is rejected at the acceptance of alternative hypothesis which states that farmers with marketing information are likely to use multiple channel choices. The results imply that when farmers are informed about the market, produce is distributed through appropriate channels attracting good prices. It also allows farmers to bargain with dealers more forcefully by carrying clear pricing signals from consumers to producers. This

result is in line with the finding of Panda (2012) who found that increase in the availability of marketing information results in an increase in both informal and formal participation. In addition, Win Pa Pa, Masahiro and Susum (2015) found that farmers with insufficient market information are more likely to sell at the farm gate and less likely to sell through other channels.

Storage facilities was a positive and significant predictor of the probability of mixed channel ($B = 2.521$, $P\text{-value} = .004$). The odds ratio indicates that for every one unit increase on transport, the odds of getting access to mixed channel increases by a factor of 12.443. Thus, the null hypothesis is rejected at the hands of research hypothesis that state that farmers with storage facilities are likely to use mixed channel. The result implies that an increase in storage facilities enhances entry into other marketing channels because the farmer has flexibility with regard to when and where the crop is marketed. This increases the chances of farmers getting access to various marketing channels. This result is consistent with the finding of Win Pa Pa, Masahiro and Susum (2015) who found that when farmer has storage facility, they get access to other marketing channels reducing the probability of intention of selling at the farm gate.

Membership to a marketing organisation is positive and significant predictor of the probability of mixed channel ($B = 2.612$, $P\text{-value} = .026$). The odds ratio indicates that for every one unit increase on transport, the odds of getting access to mixed channel increases by a factor of 13.619. The result is in line with our hypothesis that states that members to a marketing association are likely to use mixed market. In this case the null hypothesis that states otherwise was rejected. The main reason for such a positive relationship could be accounted to the fact that association strives to open up new markets for its members. This finding correlates with that of Bizikova et al. (2020) who found that farmers' organisations connect members to specific markets to sell products, shared transport or storage facilities. Therefore, in addition to already existing market, members to association get new market opportunities. Consequently, their likelihood to use a combination of both formal and informal channels increases.

4.5 Price spread and producer's share

The price spread in various marketing channels of selected vegetables has been presented in table 7 through 11. For each channel, the average price spread per unit (kg) was used to determine the

marketing margin and producer's share in consumer's price (N\$). Noteworthy is that produce was supplied through the channels without processing. Majority of the post-harvest activities involved was mainly labour accounted to harvesting, sorting and packaging which were carried out by occasional labourers who were paid in kind in exchange to some poor qualities of produce. Generally, transport costs were a prominent component of marketing costs incurred by producers.

4.5.1 Price spread channel 1 (Farmer - Consumer)

The price spread for channel 1 is presented in table 7. The defining feature for channel 1 was the direct produce sales to consumers at the farm gate. Majority of buyers in this channel were buying for home consumption as well as occasional gatherings such as weddings and funerals. Farmers at this level incurred minimum marketing costs which primarily constituted of minimal labour and packaging supplies. However, producers at this level did not incur transportation costs as it is paid for by the consumers. On average, the total costs per kg varied from N\$ 0.30 in cabbage and Onion to N\$ 2.75 in green pepper. Due to absence of intermediaries in this channel, the producers share was 100% of the consumer's price.

Table 7: Price spread in channel 1

Particulars	Tomato (kg)	Cabbage (head)	Butternut (kg)	Onion (kg)	Green pepper (kg)
Farmers price	8.09	12.61	5.99	7.85	10.50
Marketing costs					
Post harvesting	0.50	0.30	0.25	0.60	1.25
Packaging materials	1.50	0.00	0.70	0.70	1.50
Transport	0.00	0.00	0.00	0.00	0.00
Total costs	2.00	0.30	0.95	1.30	2.75
Producer's share %	100	100	100	100	100

4.5.2 Price spread channel 2 (Farmer – catering company)

The price spread for channel 2 is shown in table 8. This channel constituted of farmers transporting their produce to the association facilities to be sold to the catering company. Farmers incurred transport costs in addition to usual marketing expenses such as labour and packaging materials. Transport charges were in most cases high in relation to the quantity of produce handled because farmers were compelled to transport the produce despite the quantity. The producers share was still 100% as there were no

intermediary charges within this channel. In addition, this channel offered reasonable prices compared to channel 1.

Table 8 Price spread in channel 2

Particulars	Tomato	Cabbage	Butternut	Onion	Green pepper
Farmers price	9.50	12.00	6.25	7.50	12.00
Marketing costs					
Post harvesting	1.30	0.64	0.58	1.3	0.47
Packaging materials	0.00	0.00	0.71	0.71	0.00
Transport	0.46	0.27	0.44	0.23	0.57
Total costs	1.76	0.91	1.73	2.24	1.04
Producer's share (%)	100	100	100	100	100

4.5.3 Price spread in channel 3 (Producer - Hawker – Consumer)

The price spread for channel 3 is presented in table 9. This channel involves farmers moving the produce to open markets however buyers were not guaranteed. Farmers spent time on marketing and in return it creates other transactional costs such as food and other arrangements. Hence, transportation and miscellaneous costs were significant components of marketing costs which led to high total marketing costs within this channel.

Table 9 : Price spread in channel 3

Particulars	Tomato	Cabbage	Butternut	Onion	Green pepper
Marketing costs					
Post harvesting activities	1.50	0.50	0.50	1.50	0.50
Packaging supplies	0.00	0.00	0.70	0.70	0.00
Transport	4.50	5.50	4.00	2.60	2.70
Miscellaneous costs	0.50	1.00	0.50	0.80	0.50
Total costs	6.50	7.00	5.70	5.60	3.70
Farmers selling price	8.50	15.81	6.21	8.57	15.90
Hawkers level					
Purchase price	8.50	15.81	6.21	8.57	15.90

Marketing costs					
Packaging material	0.50	0.00	0.00	0.00	1.50
Transport	2.50	4.40	3.20	3.60	3.60
Miscellaneous costs	1.25	0.80	0.50	0.70	0.60
Total costs	4.25	5.20	3.70	4.30	5.70
Consumers price	13.90	19.90	10.45	12.60	19.50
Marketing Margin	5.40	4.09	4.24	4.03	3.60
Producer's share (%)	61.15	79.45	59.43	68.02	81.54
Average producer's share					69.9%

Based on this study, farmers used this channel the second most frequently. The marketing costs involved in this channel were costs of labour, packaging supplies, transport and miscellaneous costs. Produce such as tomato, cabbage and green peppers were not packed but were carried and sold in crates. Thus, besides the initial costs, farmers did not spend on packaging materials for tomato, cabbage and green pepper. Transport constituted the largest part of marketing costs, followed by labour and other costs. The total costs at the farmer's level ranged between N\$7.00 per head of cabbage to N\$3.70 per kg of green pepper. Although cabbage is not packed, it happened to have high marketing costs due to its large share during transportation and the opposite holds for green pepper.

At the second level in this channel were the hawkers. Producers sold their produce to hawkers who then sold to final consumers. In terms of the packaging materials, hawkers incurred packaging costs for the produce that was purchased unpacked such as tomato and green pepper. As for onion, hawkers had to unpack the onion from the 7 kg bags and repack them in one kilograms or eye estimated, hence they also incurred packaging expenses with onion. In order to find buyers, hawkers had to move around with their produce. This resulted in significant transportation costs. The marketing margin between farmer's price and consumer's price ranged between N\$5.40 in tomato and N\$ 3.60 in Green pepper.

The marketing margin in this channel varied, Tomato and Butternut experienced high marketing margins of N\$5.40 and N\$4.24, respectively. The producer's share at this level decreased due to the presence of the middleman, the hawker. Thus, on average, the producer's share was 69.9% of the consumer's price in all vegetables.

4.5.4 Price spread in channel 4 (Farmer – Retailer – Consumer)

The price spread for channel 4 is presented in table 10. This channel involved farmers moving the produce to retailers based on oral agreements. At this level, producers still incurred marketing costs ranging from post-harvest labour, packaging materials, transport and some other costs. Transport still occupied the big portion of marketing costs followed by labour that is involved in harvesting, sorting and packing. The largest transport costs was incurred in cabbage, green pepper and onion with N\$5.20, N\$ 4.50 and N\$4.30 respectively. On packaging materials, farmers were relieved from packaging tomato, cabbage and green peppers as they were carried in open crates while Butternut and onions were packed in bags. The selling price for producers at this level was typically lower than in channel 3 since retailers set the price, turning farmers into price takers.

Table 10 : Price spread in channel 4

Particulars	Tomato	Cabbage	Butternut	Onion	Green pepper
Marketing costs					
Post harvesting activities	1.70	0.80	0.40	1.80	1.60
Packaging material	0.00	0.00	0.70	0.70	0.00
Transport	3.40	5.20	2.20	4.30	4.50
Miscellaneous costs	0.50	0.30	0.50	0.40	0.50
Total costs	5.60	6.30	3.80	7.20	6.60
Farmer's selling price	8.49	12.60	7.20	8.50	10.30
Retailers' level					
Purchase price	8.49	12.60	7.20	8.50	10.30
Marketing costs					
Packaging material	1.50	0.00	0.00	1.50	1.50
Transport	0.00	0.00	0.00	0.00	0.00
Tax	1.91	2.75	1.64	1.94	2.46
Other costs	0.25	0.37	0.22	0.26	0.33
Total costs	3.66	3.11	1.85	3.69	4.29
Consumers price	12.70	18.30	10.90	12.90	16.40
Mm	4.21	5.70	3.70	4.40	6.10
Producer's share (%)	66.85	68.85	66.06	65.89	62.80
Average producer's share					66.1%

Since producers were compelled to deliver the produce directly to the retailers, retailers were spared of transportation costs at this level. Tax, which was levied at 15% of the selling price, was one noteworthy marketing expense at the retailer level. Cabbage gave the highest tax rate per head of N\$ 2.70 when compared to other crops. Other costs at the retailer level involved storage and cooling fees which were rated at 2% of the selling price. The marketing margin varied between N\$ 6.10 in green pepper and N\$ 3.70 in butternut. Due to the presence of an intermediary who is sharing the returns with the producer, the producer's share was 66.1%.

4.5.5 Price spread channel 5 (Farmer – Wholesaler – Retailer – Consumer)

The price spread for channel 5 is presented in table 11. This channel comprised of 3 levels and was the longest channel used by farmers in the study area so far. Produce was sent to wholesalers, in this case, AMTA. AMTA subsequently sold it to retailers and ultimately to consumers. Except for tomato, cabbage and green pepper which were carried in open crates, producers had to buy packaging materials for butternut and onion. Transport remained the most costly component of marketing expenses, with tomato having the highest fee of N\$5.70 and onion having the lowest fee of N\$2.30. Producers incurred additional expenses as well, which increased the overall marketing expenditures.

Table 11: Price spread in channel 5

Particulars	Tomato	Cabbage	Butternut	Onion	Green pepper
Farmers' level					
Marketing costs					
Post harvesting activities	0.90	0.30	0.50	1.30	0.50
Packaging material	0.00	0.00	0.70	0.70	0.00
Transport	5.70	4.50	3.60	2.30	3.50
Other costs	0.30	0.50	0.60	0.50	0.40
Total costs	6.90	5.30	5.40	4.80	4.40
Farmer's price	8.26	12.00	5.22	7.85	12.50
Marketing margin	2.24	3.90	2.68	3.05	5.90
Wholesalers' level					
Purchase price	8.26	12.00	5.22	7.85	12.50
Marketing costs					
Packaging material	0.00	0.00	0.00	0.00	0.00
Transport	0.00	0.00	0.00	0.00	0.00
Tax	1.58	2.39	1.19	1.64	2.76

Other costs	1.05	1.59	0.79	1.09	1.84
Total costs	2.63	3.98	1.98	2.73	4.60
Wholesaler's price	10.50	15.90	7.90	10.90	18.40
Retailers' level					
Purchase price	10.50	15.90	7.90	10.90	18.40
Marketing costs					
Packaging material	1.50	0.00	0.00	1.50	1.50
Transport	0.21	0.32	0.16	0.22	0.37
Tax	2.39	3.29	1.34	2.06	3.54
Other costs	0.32	0.44	0.18	0.27	0.47
Total costs	4.41	4.04	1.67	4.05	5.88
Consumers price	15.90	21.90	8.90	13.70	23.60
Mm	5.40	6.00	1.00	2.80	5.20
Producer's share	51.95	54.79	58.65	57.30	52.97
Average producer's share					55.13

At the wholesaler's level, the selling prices by producers were generally low. Tomato, cabbage, butternut, onion and green pepper were sold at average of N\$ 8.26, N\$ 12.00, N\$5.22, N\$ 7.85 and N\$12.00 per kg, respectively.

The wholesalers did not incur transport costs as producers were compelled to transport their produce to the hub. At the same time, wholesaler was also spared of packaging costs as the produce were sold in bulks to the retailers. The tax charges however made significant costs on to the consumer's price. In that light, green pepper gave the highest charges N\$2.80 per kg while butternut gave a low of N\$1.20 per kg. There were also other costs incurred by the wholesalers such as cooling and storage fees which were estimated at 2% of the selling price. The marketing margin between wholesalers and retailers varied between N\$ 5.90 in Green pepper and N\$ 3.60 in Tomato.

At the retailer's level, packaging materials for the produce were procured in bulk. Retailers also incurred transportation costs to move the produce from the wholesalers to the retailer. Tax constituted the biggest portion of marketing costs which was highest in green pepper and lowest in onion.

In terms of the marketing margin, this channel gave the highest margin due to the presence of two intermediaries (wholesaler and retailer) involved in the channel. The marketing margin between the

wholesaler and retailer was highest in cabbage with N\$6.00 and lowest in butternut with N\$ 1.00. On the other hand, this channel gave the lowest producers' share in comparison to all other channels. The average producer's share in this channel was 55.1%, indicating that intermediaries which were wholesalers and retailers received 44.9 % of the producer's share.

In rounding up, it was evident that as the length of the channels increased, the marketing margins increased too while the producer's share decreased. This is also in support with (2012) who found that as the number of intermediaries increased, the producer's share in consumer's rupee decreased. The study reveals a decrease in producers share from 100% to 55.1% in channel 1 through to channel 5. Farmers' prices were relatively lower due to the absence of transportation charges and price negotiations by buyers in channel 1 and 5 respectively. Although farmers incurred high marketing costs in channel 4, the selling prices were generally still low due to price negotiation between the farmer and the retailer. Channel 3 offered better prices in three crops (tomato, cabbage and green pepper) however, this channel was associated with much of other miscellaneous costs involved in securing buyers as they were not guaranteed. Lower prices in channel 1 was contrary to the finding of Panda (2012) who found that the net prices received by farmers is higher in channels where they sell directly to the consumers. From the producers' stand point, channel 1 and 4 were better options and more efficient as they cushioned the farmers during marketing process.

4.5.6 Association between channel length, marketing margin and producers share

The study tested for a possible relationship that existed between channel length (number of intermediaries), marketing margin and producers' share. Through Pearson correlation analysis, the established relationship was shown in table 12.

Table 12: Relationship between channel length, marketing margin and producers' share

	Channel length	n=53
	Pearson correlation	Significance level
Marketing margin	0.872**	$P<.001$
Producers' share	-0.851**	$P<.001$

**Correlation is significant at the 5% level (2 tailed)

The study found a strong positive relationship between marketing margin and channel length. This relationship was significant at 5% level. The null hypothesis which states that there was no significant relationship between marketing margin and channel length is rejected. The result implies that an increase in the channel length resulted in an increase in marketing margin. This result speaks the same to the finding of Saadah, Salam, Asmawati and Sakia (2021) , the longer the distance from producers or from traders to consumers, the more intermediaries are involved which translates into higher marketing costs and consequently higher margin in prices. This is also supported by Chand, Kumar, Suresh and Dsatagiri (2020), the major factor that contributed to higher prices in some channels was the differences in the marketing cost, which was mainly accrued by the trader. Traders accounted for almost 15% of the consumer's price where both farmers and retailers had almost equal share in marketing costs.

The study has also found a negative relationship between producer's share and channel length which was significantly strong at 5% level. The null hypothesis which suggests for no relationship between two given variables is rejected. The result implies that an increase in channel length resulted in a decrease in producers share because part of the consumers' price goes to intermediaries as they cover their marketing costs. The result is in line with the findings from Babita (2017), the prevalence of traders subjects the price spread between producer and consumers to become larger, thus producer does not get the actual price of the produce.

4.6 Marketing efficiency across marketing channels

Marketing efficiency of different channels is presented in Table 13. In channel 1 and 2, the marketing efficiency was above 100% across all vegetables. This implies that this supply chain minimized marketing costs with over 100% making the channels cost effective. When compared with channel 2, channel 1 was more efficient to majority of the produce such as cabbage, butternut, and onions, because the farmer of lower marketing costs which would emanate from transportation and packaging.

Table13: Marketing efficiency across all channels

Channel 1	Tomato	Cabbage	Butternut	Onion	Green pepper
FP	8.09	12.61	5.99	7.85	10.50
RP	0	0	0	0	0
MC	2.00	0.30	0.95	1.30	2.75

MM	0.00	0.00	0.00	0.00	0.00
MEI	4.05	42.03	6.31	6.04	3.82
Channel 2	Tomato	Cabbage	Butternut	Onion	Green pepper
FP	8.26	12.00	5.22	7.85	12.50
RP	0	0	0	0	0
MC	1.76	0.91	1.73	2.24	1.04
MM	0	0	0	0	0
MEI	4.69	13.19	3.02	3.50	12.02
channel 3	Tomato	Cabbage	Butternut	Onion	Green pepper
FP	8.50	15.81	6.21	8.57	15.90
HP	13.90	19.90	10.45	12.60	19.50
TMC	10.75	12.20	9.40	9.90	9.40
MM	5.40	4.09	4.24	4.03	3.60
MEI	0.53	0.97	0.46	0.62	1.22
channel 4	Tomato	Cabbage	Butternut	Onion	Green pepper
FP	8.49	12.60	7.20	8.50	10.30
CP	13.90	19.90	10.45	12.60	19.50
TMC	9.26	9.41	5.65	10.89	10.89
MM	5.41	7.30	3.25	4.10	9.20
MEI	0.58	0.75	0.81	0.57	0.51
channel 5	Tomato	Cabbage	Butternut	Onion	Green pepper
FP	8.26	12.00	5.22	7.85	12.50
CP	15.90	21.90	8.90	13.70	23.60
TMC	13.94	13.32	9.05	11.57	14.88
MM	7.64	9.90	3.68	5.85	11.10
MEI	0.38	0.52	0.41	0.45	0.48

However, channel 2 was efficient with cabbage and green peppers since there were no packaging costs associated with these crops. The marketing efficiency for channel 2 ranged between 97% with cabbage and 46% in butternut. On the other hand, the efficiency index for channel 3 was highest in green pepper with over 81% and lowest in butternut with 46%.

The highly efficient crop in channel 4 was butternut with 81% with the least being green pepper 51%. This was due to the presence of intermediaries that existed before the produce reaches the consumer. In channel 5, the MEI was below 53% in all crops which was generally lower as compared to other channels. Cabbage gave the highest index of 52% while tomato gave the lowest index of 38%. Based on the result, channel 5 could be said to be less efficient in relation to all other channels.

To sum up, marketing efficiency was generally higher in channel 1 and 2 where marketing took place with minimal costs. This was followed by channel 3 where farmers sell to hawkers at negotiated prices. Channel 4 was characterized by buyers who were price-makers as they dictated on prices thus lowering returns offered to the producers. This affected the marketing efficiency index. The least efficient channel was channel 5 where prices were very low despite high costs in all vegetables under the study and this consequently affected the marketing efficiency index. This is in line with the finding of Adenuga et al. (2013) who found marketing efficient to be high in shorter channels (1 and 2) where marketing was taking place at daily local markets. In addition, marketing margins were high in intermediated channels. The most efficient crops across the channels were cabbage and butternut and this could be accounted to price less packaging materials.

4.6.1 Determinants of marketing efficiency

A multiple regression was run to predict marketing efficiency index from channel length (number of intermediaries), volume of produce handled, marketing costs, marketing margin and farmer's price within the most popular crops (Tomato and Butternut) under the study.

The model was set out as;

$$\bar{Y}_0 = \beta_1 + \beta_2 X_1 + \beta_3 X_2 + \beta_4 X_3 + \beta_5 X_4 + \beta_6 X_5 + \mu_i$$

$$\text{Marketing Channel Efficiency} = \beta_1 + \beta_2 (\text{Channel length}) + \beta_3 (\text{Marketing cost}) + \beta_4 (\text{Marketing margin}) + \beta_5 (\text{Volume handled}) + \beta_6 (\text{Farmer's price}) + \mu_i$$

Table 14: Model summary-linear regression

Tomato n=53		Butternut n=53	
R square	Sig. F Change	R square	Sig. F Change
.962	< .001	.968	< .001

Table 14 shows the R-squared is a goodness-of-fit measure for linear regression models. The R squares of .962 and .968 in the models for Tomato and butternut respectively indicate that the models were well fitted to explain how independent variables influence the depended variables. After fitting the models, the R square shows that 96% of variance within depended variables could be explained by independent variables fitted in the models for both crops.

Table 15: Linear estimates of determinants of marketing efficiency for Tomato and Butternut

Tomato				Butternut		
Factor	coefficient	std error	P-value	coefficient	std error	P-value
Constant	2.753	.893	.003 **	10.512	2.357	< .001**
Channel length	.026	.082	.752	-2.144	.639	.002**
Volume handled	.000	.000	.303	.000	.001	.777
Farmer's price	.316	.099	.003 **	-.726	.440	.105
Marketing cost	-.621	.030	< .001 **	-.545	.181	.004**
Marketing margin	-.127	.019	< .001**	.140	.120	.251
n=53						

***, **, * indicate significance at 1%, 5% and 10% level, respectively

The analysis in table 15 indicates significant relationship between the marketing efficiency and farmer's price, marketing costs and marketing margin in tomato. Farmer's price showed a positive significant influence on the level of marketing efficiency. This is explained that a dollar increase in farmer's price per kg of tomato increased the level of marketing efficiency. In addition, marketing cost indicated a significant negative relationship with marketing efficiency. This implies that an increase in dollars of costs decreased the level of marketing efficiency. Furthermore, marketing margin had a negative significant relationship with marketing efficiency. This can be explained that a dollar increase in marketing margin decreased the percentage of marketing efficiency. The relationship for the three indicated variables were significant at 5% level. The null hypothesis which suggests that there was no significant relationship between independent variable (farmer's price, marketing costs and marketing margin) when regressed against marketing efficiency was rejected and the alternative hypothesis was found true.

On the other hand, the study found insignificant relationship between marketing efficiency when regressed with channel length, farmer's price and volume handled. In relation to channel length, the margins were not always aligned to channel length. It was found that some shorter channels had higher marketing margins than longer channels. Chand et al. (2020) found that the length of the marketing channel had no bearing on channel efficiency, primarily because at the retailer level, the benefit of fewer middlemen is greatly offset by greater marketing margins.

In terms of farmer's price, one prime reason for this could be the weak price spread mechanism of prices from the farmer to the consumers when produce is sold through intermediated channels (AMTA, Retailers and Freshmark). These channels had high level of price negotiation which in most cases compel farmers to accept prices which were not too beneficial for them in terms of profit.

In terms of volume of tomato handled, it could be explained that in most cases, the volume of produce brought to the market exceeds the quantity demanded. Thus, some quantities of produce is reverted back to the farm yet the quantity sold did not attract good prices to justify marketing efficiency. This was in support with the finding of Chand et al. (2020) who found insignificant relationship between volume of trade and marketing efficiency pointing to high number of cultivators and traders in tomato which led to fluctuations in demands.

In relation to butternut, the analysis indicate a negative significant relationship between marketing efficiency with channel length and marketing costs. In terms of channel length, this could be explained that an increase in the number of intermediaries within the channel resulted into a decrease in the level of marketing efficiency as intermediaries created additional costs within the channels. In addition, an increase in marketing costs within the channel could reduce the marketing efficiency for that specific channel. Chand et al. (2020) also found that marketing costs significantly reduces the marketing efficiency. Marketing costs and channel length had a significant relationship with marketing efficiency at 5% level. Thus, the null hypothesis which suggest for no relationship between channel length and marketing costs with marketing efficiency was rejected.

The study, however, found insignificant relationship between marketing efficiency and volume handled, farmer's price and marketing margin. This could be explained that volume handled could not explain any level of efficiency as in most cases farmers were driving long distances, accumulating more costs yet buyers and prices were not guaranteed. In addition, some farmers could travel long distances just to sell small quantities of produce as buyers could not be secured within the farm's vicinity. In that light, the return from sale could not justify the volume handled and costs incurred.

In terms of farmer's price, this could be explained that prices were up for negotiations more especially in the formal channels. Farmers were homogenous in terms of the type of crops they produced and they had fewer open markets and retailers to sell at. This sometimes led to vegetable block in sales at those spots subjecting farmers to accept non- profitable prices.

Chapter 5: Conclusion and Recommendations

5.1 Introduction

This chapter draws the main conclusions and forward recommendations based on the findings from the study. The main aim of the study was to assess the marketing channels used by farmers in the study area and measure their efficiency. To attain the main objective, the study investigated market channel participation by farmers in the study area and constructed price spreads to measure their efficiency. A sample of 53 respondents was used in the study.

5.2 Conclusion

5.2.1 Socio economic characteristics of respondents

According to the study's analysis of respondents' socioeconomic characteristics, men between the ages of 40 and 49 made up the majority of respondents. Majority of respondents used own land and own transport. Although training is essential for enhancing agricultural productivity, production and marketing, majority of farmers indicated to have received training from profit organisations and had limited access to information and lacked storage facilities. Farmers in the study were small- to medium-sized. Members for Olushandja marketing association, were found to have more marketing opportunities compared to farmers who were not associates to any marketing organisation.

5.2.2 Choice of marketing channel for selected vegetables

The study identified 5 primary marketing channels for the selected vegetables. Channels 1 and 3, where the produce is sold at the gate and open marketplaces, respectively, were the most popular marketing channels. Due to the lack of official logistics in channels 1 and 3, the study classed them as informal channels. Channels 2, 3, and 4 were categorised as formal channels because trading was based on some kind of informal agreements. The classification resulted into a study having 2 main types of channels which are informal and formal. The study found that marketing channels are not well distinct, i.e farmers supply hawkers directly at the same time they supply the hub. This may have contributed to the vegetable lump somewhere in the system.

A logistic regression model revealed that membership to a marketing organisation, storage facilities and access to marketing information were significant to farmers towards gaining access into formal

marketing channels addition to their existing informal marketing channels. Thus, an increase in each of the variables tested resulted in a higher probability of farmers to trade within multiple marketing channels.

5.2.3 Price spread throughout the marketing channels

The major cost incurred in the channels' price spread was the cost of transportation. Direct channels (Channel 1) had low marketing costs as transportation was not involved. Other channels had high marketing costs due to transportation charges and the existence intermediaries which contributed to high marketing margins. The study also found that as the number of intermediaries increased, the marketing margin increased and producers' share in consumer price decreased. Thus, as compared to other marketing channels, producer's share in all crops was more in channel 1 and 2 which involved direct sales of produce to the consumers. The correlation analysis to establish the relationship between channel length marketing margin and producers share within the channels revealed a significant relationship. There was a positive relationship between channel length and marketing margin. On the other hand, there was a negative relationship between channel length and producers share.

5.2.4 Marketing efficiency across the channels

In terms of marketing channels efficiency, the marketing efficiency index decreased significantly as the length of the channel increased. Channel 1 and 2 were more efficient with efficiency level of above 100%. Channel 5, which was the longest channel had less efficiency due to the presence of 2 intermediaries within the channel. With reference to specific crops, cabbage and butternut were the most efficient crops in most channels because farmers did not incur packaging costs on these products. On the other hand, high packaging costs in tomato, green pepper and onion rendered them to high marketing expenses.

The study established factors that affected channel efficiency in the most popular crops (tomato and Butternut). Through multinomial regression analysis, farmer's price had a positive significant influence in marketing efficiency of tomato. Marketing costs and marketing margin had a negative significant relationship in the marketing efficiency of tomato. On the other hand, channel length and marketing costs had negative significant relationship in marketing efficiency of butternut.

5.3 Recommendations

Based on the results of the study, the following recommendations are made for future intervention strategies which are aimed at promoting vegetables production and marketing in the study area.

- The aspect of inconsistent supply of produce from farmers in the study area has been hindering producers from entering agreements with retailers. This has compelled most farmers to sell produce through channel 1 and 2. More interventions to counteract production and storage aspects. Technological and capital investment are necessary to boost production of quality produce.
- Marketing information was not sufficient with most farmers as farmers relied into each other, this has resulted into supply challenges as farmers were not well informed about the market. This needs to be improved through effective platforms of information dissemination as a market development strategy.
- The study has established that farmers market efficiently in channels that has low transportation costs. Therefore, there is a need for logistic investment into the study area to counteract transport costs and link small scale farmers to the market in the study area. Efforts should be made to suggest more affordable and effective transport options, including the development of collection centres in various convenient locations. In addition, more marketing institutions, cooperative and farmers coordination would help organise marketing channels to avoid collision of marketing channels, increase farmers' bargaining power and safeguard their interest over their produce.

5.4 Recommendation for further research

Future studies may suggest an integrated approach to increase efficiency of the least efficient marketing channels (*channel 3, 4 &5*) the approach would involve organising farmers, improve farmers' productivity and link them to the market.

References

- Abdalla, M., & El-Habil. (2012, March). An Application on Multinomial Logistic Regression Model. *Pakistan Journal of Statistics and Operation Research*, 8(2). Retrieved from <http://dx.doi.org/10.18187/pjsor.v8i2.234>
- Abdillah, A., Sutisna, A., Tarjiah, I., Fitria, D., & Widiyanto, T. (2020). Application of multinomial logistic regression to analyze learning difficulties in statistics courses. *ECS Meeting*. IOP Publishing. doi:10.1088/1742-6596/1490/1/012012
- Achoja, F., & Okoh, R. (2014). Post-Harvest Properties of Tomato and Effect on Its Marketing Efficiency. *Turkish Journal of Agricultural and Natural Sciences* 1(1); 1(1), 52–58 .
- Adam, A. (2020, April 25). Sample size determination in survey research. 26(5), 90-97. doi:10.9734/JSRR/2020/v26i530263
- Adenuga, A., Fakayode, S., & Adewole, R. (2013). Marketing Efficiency and Determinants of Marketable Surplus in Vegetable Production in Kwara state, Nigeria. *5th international conference of the African association of agricultural economics*. Hammamet: lcaaae.org.
- Adnan, K., Rahman, M., & Sarker, S. (2014). Marketing Channels and Post Harvest Practices of Onion: A Case of Bogra and Joypurhat District in Bangladesh. *Universal Journal of Agricultural Research* , 2(2), 61-66, . doi: 10.13189/ujar.2014.020205
- Angula, M., Thomas, B., & Ijambo, B. (2014). The economics analysis of small scale vegetable production in North Central Namibia. *Universal Journal of Agricultural Research*, 2(4), 141-146. doi: 10.13189/ujar.2014.020501
- Annual symposium of the bank of Namibia. (2017). Feeding Namibia: Agricultural productivity and industrialisation. *Annual symposium 2017 of the bank of Namibia*. The Research Department of the Bank of Namibia.
- Ao, G., Liu, Q., Qin, L., Chen, M., Liu, S., & Wu, W. (2021, June 2). Organization model, vertical integration, and farmers' income growth: Empirical evidence from large-scale farmers in Lin'an, China. 16(6). Retrieved from <https://doi.org/10.1371/journal.pone.0252482>
- Aparna, B., & Hanumanthaiah, C. (2012, July-December). Are Supermarket Supply Channels More Efficient than traditional market channels? *Agricultural Economics Research Review*, 25(2), 309-316.
- Apuke, O. (2017, October 12). Quantitative research methods a synopsis approach. *Arabian Journal of Business and Management review (Kuwait chapter)*, 6(10). doi:10.12816/0040336
- Ayinde, O., Ibrahim, H., & Salami, M. (2017). Effect of Vertical Integration on Multidimensional Well-being of Fish Farmers in Lagos State Fish-hub, Nigeria. *Agricultural Tropic Et Subtropica*, 50(2), 81-87. doi:DOI: 10.1515/ats-2017-0009
- Babita, K. (2017). Marketing efficiency, Price spread, and Share of farmers: a case of Horticultural Markets of Assam. *International Journal of Advance Research and Development.*, 2(8). Retrieved January 28, 2023, from <http://www.ijarnd.com/>
- Babu, N., Yemaneberhan, M., & Gebrekidan, T. (2018). A study on marketing channels of perishable agricultural products (with reference to selected perishable agricultural products in central zone of Tigray regional state, ethiopia). *International Journal of Applied Research*, 4(2), 74-80. Retrieved from www.allresearchjournal.com

- Bezot-Jarzębowska, A., & Rembisz, W. (2016). The Role of Agri-food Processor in the Food Economics. *International journal on food system dynamics*. doi: pfsd.2016.1621
- Bhat, A., Kachroo, J., Singh, S., & Sharma, R. (2015, June). Marketing costs and price spread analysis for citrus in Samaba district of Jammu region. *Agro economist an international journal*, 2(1), 41-46.
- Bidogeza, J., Afari-Sefa, V., Endamana, D., Endamana, D., & Kane, G. (2016). Value chain analysis of vegetables in the humid tropics of Cameroon. *5th International conference of AAAE*. Addis Ababa: AAAE.
- Bisen, J., Patel, R., Kundu, K., & Sanjay. (2018, June). Marketing efficiency between traditional and modern supply chains of fruits and vegetables. *Economic Affairs - Official Publication of AESRA*, 63(2), 441-447. doi:10.30954/0424-2513.2.2018.21
- Bizikova, L., Nkonya, E., Minah, M., haniscg, M., Turaga, R., sperannza, C., . . . Timmers, B. (2020, october). A scoping review of contributions of farmers' organization to smaller holder agriculture. 1, 620 -630. Retrieved May 30, 2023, from <https://doi.org/10.1038/s43016-020-00164-x>
- Bunce, B. (2020). *Fresh produce production under irrigation by small-scale farmers in South Africa*. University of Western Cape. Research associate at the Institute for Poverty, Land and Agrarian Studies (PLAAS). doi:10.13140/RG.2.2.14449.92003/1
- Calica, G., & Cabanayan, Z. (2018). Assessment of the postharvest systems and losses of bulb onions in Nueva Ecilja, Philippines. *Asian Journal of Postharvest and Mechanization*, 1(1).
- Castano, J. (2001). Agricultural marketing systems and sustainability. Study of small scale Andean hillside farms. *Wageningen Universiteit.Promotor: Prof. dr ir M.T.G. meulenberg, Co-promoter (en): Dr A. van Tilburg and dr ir N.G. Janssen. -[S.I.] :[S.N.],2001*.
- Chand, K., Kumar, S., Suresh, A., & Dsatagiri, M. (2020). Marketing efficiency of vegetables in developing economies: Evidences for critical intervention from Rajasthan, India. *Indian Journal of Agricultural Sciences* , 90(8).
- Chlebicka, A., Falkowski, J., & Lopaciuk, G. (2017, December 18). Horizontal integration between farmers – governing cooperation through different enforcement mechanisms. 85 - 104. Retrieved from <https://doi.org/10.3920/978-90-8686-844-5>
- Cornell Cooperative Extension of Tompkins County. (2014). *Guide to Marketing Channels selection: How to Sell Through Wholesale & direct Marketing Channels*. South Central NY Agriculture Program: Cornell Cooperative Extension of Tompkins County.
- Department of Agriculture, Forestry and Fishery. (2018). A profile of the South African Cabbage market vaue chaini.
- Desai, J., & Solanki, K. (2013, December). Extent of Adoption of the Market Intelligence Among the Summer Cabbage Growers. *Gujarat Journal of Extension Education*, 24.
- Devkota, A., Dhakar, D., Gautam, D., & Dutta, G. (2014). Assessment of fruits and vegetable losses at major wholesale markets in Nepal. *International Journal for Applied Science and Biotechnology*, 2(4), 559-562. doi:10.3126/ijasbt.v2i4.11551
- Elsayir, H. (2014). Comparison of precision of systematic of sampling with some other probability sampling. *American Journal of Theoretical and Applied Statistics*, 3(4), 111-116. doi:10.11648/j.ajtas.20140304.16

- Farrel, K. (2019). A look ahead for the agribusiness industries. *National Agricultural Outlook Conference* (pp. 78-94). Economic Research Service. Retrieved from <https://ageconsearch.umn.edu/record/325503/files/2019-14.pdf>
- Haidula, S. (2016). Irrigation water use and vegetable production efficiency assessment between sprinkler and drip irrigation system at North Central Namibia (Master Thesis, Hedmark University of Applied Sciences).
- Halder, P., & Pati, S. (2011). A Need For Paradigm Shift to Improve Supply Chain Management of Fruits & vegetables in India. *Asian Journal of Agriculture and Rural Development*, 1(1), 1-20.
- Hardesty, S. (2014). Determining marketing costs and returns in alternative marketing channels. *Renewable agriculture and food system*. doi:10.1017/S1742170509990196
- Haulofu, M., Uunona, S., & Amwaama, A. (2022). Application of Integrated Water Resources Management Towards Livelihood Improvement: A Case of Smallholder Farmers in Olushandja, Namibia. *Food Security for African Smallholder Farmers*, 16(6770), 978-981.
- Hugar, L., & Hiremath, K. (1984). Efficiency of alternative channels in the marketing of vegetables in Belgaum City - a comparison., XXXIX, pp. 192-200. Bombay.
- Isitor, S., Otunaiya, A., & Iyanda, J. (2016, February 15). Efficiency of Vegetable Marketing in Peri-Urban Areas of Ogun State,. *Journal of Agricultural Science*, 8(3). doi:10.5539/jas.v8n3p142
- Jassam, Q., Ali, N., & Shukur, A. (2018, July). Economic study to measure the efficiency and marketing margins of the main vegetables Crops Baghdad Province for the agricultural season 2016. *Journal of Agriculture and Veterinary Science*, 11(7), 11-15. doi:10.9790/2380-1107011115
- Jokisch, A., Urban, W., & Kluge, T. (2016, June 14). Small Scale Rain- and Floodwater Harvesting for Horticulture in Central-Northern Namibia for Livelihood Improvement and as an Adaptation Strategy to Climate Change. *Implementing Climate Change Adaptation in Cities and Communities book series*, 85-143.
- Kesavalu, K., Asokan, R., & Abdul Raheem, A. (2019, April). Horticultural production and marketing efficiency in India : A view. *Review of Researches*, 8(7).
- Kramchote, S., Srilaong, V., Wongs-Aree, C., & Kanlayanarat, S. (2012). Low temperature storage maintains postharvest quality of cabbage (*Brassica oleraceae* var. *capitata* L.) in supply chain. *International Food Research Journal* . 2012, Vol. 19 Issue 2,, 759-763.
- Lama, M., McEvoy, A., Parker, S., & Robbins, K. (2014). *An analysis of market systems approaches to agricultural development in Uganda and Tanzania*. Brac.
- LeRoux, M., Schmit, T., Roth, M., & Streeter, D. (2009, April). Evaluating marketing channel options for small scale fruits and vegetable producers. (14). Ithaca, New York, USA: Department of Applied Economics and Management.
- Magogo, J., Mlongo, P., Saidi, M., Mkurumwa, A., & Oradu, S. (2015). Determinants of choice of marketing outlet for African indigenous vegetables among the agro-pastoral maasai of Narok and kajiado countries of Kenya. *Journal of economics and sustainable development*, 6(8), 29-42. Retrieved October 25, 2022
- Maske, M., Jain, B., & Parwate, P. (2012). An analysis of marketable surplus and price spread of papaya in Raipur district of Chhattisgarh. *International journal of Agronomy and Plant Production*., 3(3), 89-93. Retrieved from www.ijappjournal.com

- Ministry of Agriculture, Water and Forestry. (2011). *Namibian agriculture marketing and trade policy strategy*.
- Montle, B., & Teweldemedhin, M. (2014). Small-scale irrigation farming system situational analysis in Namibia: Case Study from Ndonga Linena Green Scheme, Kavango West Region. *International Journal of Agriculture Innovations and Research*, 3(1).
- Mumba, M., Mwanamambo, B., Mwale, M., Sichivula, I., & Musamba. (2015). *Horticulture sub-sector study report 2015*. Agribusiness Incubation Trust.
- Mutayoba, V., & Ngaruko, D. (2015 , August). Market performance and farmers'choice of marketing channel of high value crops in Tanzania. *International Journal of Economics, Commerce and Management.*, 3(8). Retrieved January 28, 2023, from <http://ijecm.co.uk/>
- Namibia Agronomic Board. (2020). *Annual report 2018/2019*. Windhoek. Retrieved from <https://www.nab.com.na>
- Namibian Agronomic Board. (2019). Evaluation of storage options for surplus onion in Namibia.
- Namibian Agronomic Board. (n.d.). *Horticultural overview*. (Ewathelo) Retrieved April 02, 2021, from nab: <https://www.nab.com.na>
- Nangolo, M., & Alweendo, N. (2020). *Agriculture in Namibia: An overview*. Windhoek: Institute for Public Policy Research.
- Negasi, M. (2016, April). Marketing system analysis of vegetables and fruits in Amhara state: Survey evidence from Raya kobo and Harbu Woredas. *Ethiopian Journal of Economics*, XXXI(2).
- Negi, S., & Anand, N. (2015, June). Issues and challenges in the supply chain of fruits and vegetables in India: A review. *International Journal of Managing Value and Supply Chains*, 6(2). doi:DOI: 10.5121/ijmvsc.2015.6205
- Panda, R. (2012). Marketing channel choice and marketing channel efficiency in Agribusiness. *Journal of International Food & Agribusiness Marketing*, 24, 213-230. doi:10.1080/08974438.2012.691812
- Pawlak, K., Kołodziejczak, M., & Xie, Y. (2019). Horizontal Integration in the Agricultural Sector as a Factor Increasing Its Competitiveness –Experience from Poland. 25(1), 195-232. doi:10.12775/eec.2019.008
- Pritchard, N. (1996, July). A framework for analysis of agricultural marketing in developing countries. *Agricultural Economics Research*, 21(3).
- Rahnama, R., & Beiki, A. (2013, January). Modern marketing, concepts and challenges. *Arabian Journal of Business and Management Review*, 2(6).
- Ridolfi, C., Hoffmann, V., & Baral, S. (2018). *POST-HARVEST LOSSES IN FRUITS AND VEGETABLES: The Kenyan context*. International Food Policy Research Institute.
- Saadah, Salam, M., Asmawati, & Sakia, N. (2021). Measuring margin and efficiency of the rice marketing channel. *IOP Conference Series: Earth and Environmental Science*. IOP Publishing. doi:10.1088/1755-1315/681/1/012107
- Shapi, M. K. (2017). Contemporary challenges facing the small farmers in the green projects schemes in Namibia. *Sustainable Agriculture Research*, 6 (3). doi:10.5539/sar.v6n3p1
- Soe, T., Hnin, T., Soe, Y., Htwe, N., Myint, K., & Win, T. (2016). Study on Postharvest Handling Practices of Cabbage and Cauliflower in selected areas of Myanmar. 91. Bhutan and Japan.
- The World Bank. (2023, March 23). *Agriculture and Food*.

- Theofanidis, A., & Fountouki, A. (2018). Limitations and delimitations of the research process. 7(3). doi:10.5281/zenodo.2552022
- Thomas, B., & Vink, N. (2020). The development of vegetable enterprises in the presence of transaction costs among farmers in Omusati region of Namibia: An assessment. *Journal of Agriculture and Food Research*(2). Retrieved February 20, 2021, from <https://doi.org/10.1016/j.jafr.2020.100028>
- Thomas, B., & Vink, N. (2020). The development of vegetable enterprises in The presence of transaction costs among farmers in Omusati Region of Namibia: An assessment. *Journal of Agriculture and Food Research*(2). Retrieved from www.journals.elsevier.com/journal-of-agriculture-and-food-research/
- Togarepi, C., Thomas, B., & Samundengu, B. (2015). Analysis of Constraints for Agro Processing Industry Development in North Central Namibia: A Case of Omusati region Tomato value chain. *NCRST symposium*.
- van Wyk, L. (2017). The way to go: Climate-smart agriculture: for community empowerment through climate-smart agriculture more support is needed from Namibian retailers and consumers for locally-grown produce. 29(2), 10+. Retrieved 11 22, 2021, from <https://link.gale.com/apps/doc/A507825702/AONE?u=anon~a8e21341&sid=googleScholar&xid=e429a19f>
- Wahome, P. (2019). Efforts towards the reduction of post-harvest of cabbage. *UNESWA Journal of Agriculture*, 20, 8-12. Retrieved 12 05, 2021, from <http://ojs.uniswa.sz/>
- Win Pa Pa, S., Masahiro, M., & Susum, F. (2015, September 18). Factors influencing marketing channel choice by rice farmers in Myanmar. *Journal of Faculty of Agriculture, Kyushu University*, 60(2), 535-542. Retrieved May 30, 2023, from <https://doi.org/10.5109/1543425>
- Wondim, D. (2021, March 10). Value chains analysis of vegetables (Onion, Tomato and Potato) in Ethiopia : A review. *International Journal of agricultural science and food technology*, 7(1), 108-113. doi:<https://doi.org/10.17352/2455-815X.000096>
- Xaba, B., & Masuku, M. (2013). An Analysis of the Vegetables Supply Chain in Swaziland. *Sustainable Agriculture Research*, 2(2). doi:10.5539/sar.v2n2p1

Appendices

APPENDIX 1: FARMER'S QUESTIONNAIRE

EVALUATING THE PERFORMANCE OF MARKETING CHANNELS FOR SMALL-MEDIUM SCALE VEGETABLE PRODUCERS USING OLUSHANDJA-OGONGO CANAL WATER

This study is conducted to find out about the efficiency of marketing channels used by farmers in Olushandja area and those farming along Olushandja – Ogongo water canal. Your participation in the study is voluntary, information will be treated as confidential and strictly for the purpose of this study.

Questionnaire no _____

Location _____

1) DEMOGRAPHIC DETAILS

1.1 Gender: Male ☐ Female ☐

1.2 Age _____

1.3 Marital status: Single ☐ Married ☐ Divorced ☐ Widow/er ☐

1.4 If your garden is part of the family field, what is your relationship to the household head?

Head	Wife	Sibling	Part of extended family
☐	☐	☐	☐

1.5 Education level of the farmer:

No formal education	Primary level	Secondary level	Tertiary level	Other (specify)
☐	☐	☐	☐	☐

1.6 Tenure system of your garden

Tenure	Tick
Own land	☐
Family land	☐
Rented land	☐
Other (<i>specify</i>)	☐

1.7 Do you grow any of the following crops? Tick the crops grown.

Crops	Tick
Cabbage	
Tomato	
butternut	
Onion	
Green pepper	

2) MARKETING ASPECTS

2.1 What are the marketing channels through which you sell your produce

Place	Tomato	Cabbage	Butternut	onion	Green P
Directly to the consumers					
Wholesalers					
Retailers					
Hawkers					
Rural assemblers					
Brokers					
Cooperative					
Other (specify)					

2.2 How is your produce transported through the following marketing channels?

Channels	Directly to consumers	Wholesales	Retailers	Hawkers	Rural assemblers	Brokers	Cooperative
Own transport							
Hired from individual							
Public transport							
Buyer transport							

Cooperate transport							
Other (specify)							

2.3 What are the challenges experienced when transporting the produce

Challenges	Tick
Lack of appropriate transport	
Small size of transport	
High transportation costs	
Poor road infrastructure	
Other (specify)	

2.4 Advisory services

(i) Do you get into contact with NAB/ AMTA during the marketing period? Yes ☐ No ☐

(ii) What services are provided by Nab/AMTA regarding marketing

Advice on production	Advice on marketing	Marketing space	Other (specify)

(iii) Is there any other agents that provide marketing services? Yes ☐ No ☐

If yes, indicate the marketing services provided;

Type of marketing services provided	Name of agent

(iv) Is Nab/AMTA always available when you need help?

Never available	
Sometimes	
Always	

2.5 Marketing information

(i) Do you have access to market information Yes ☐ No ☐

(ii) Do you receive market information prior to sale Yes ☐ No ☐

(iii) Where do you get information about;

Prices	Date of sale	Buyer	Demand	Opportunity

(iv) Which platform do you think can best improve your access to information?

Media	Cell phone	Extension officer	Farmers group	Other (Specify)

2.6 Association with marketing organisations

(i) Do you market collectively with other farmers?

Yes

☐

No

☐

(ii) How do you benefit from collective marketing?

Benefits	Ticks
transport	
Increase in bargaining power	
Share market knowledge	
Other (specify)	

2.7 Storage facilities

Do you have enough storage facilities to store your produce

Yes

☐

No

☐

3) MARKETING COSTS

3.1 Quantity of each produce for the last season

Vegetables	Tomato (crates)	Cabbage (heads)	Butternut (crates)	Onion (crates)	Greenpepper (crates)
Quantity					

3.2 Cost on transport

				Produce transported (crates)					
Trips	Amount paid (N\$)	Destination	Distance (km)	1.	2.	3.	4.	5.	6.
1									
2									

3									
---	--	--	--	--	--	--	--	--	--

3.3 Labour costs

How much was spent on labour for the marketing activities.

		Produce involved;				
Activities (specify)	Amount paid (N\$)	1.	2.	3.	4.	5.

3.4 Packaging Expenses

List all packaging materials used for each produce

Crops	Materials	(N\$)	Materials	(N\$)	Materials	(N\$)	Materials	(N\$)
Tomatoes								
Cabbage								
Onions								
Butternut								
G.pepper								

4) RETURNS ON THE PRODUCE

4.1 Who are your main customers and at what price do you sell to them?

Customers	Tomato crates)	Cabbage (heads)	Butternut (crates)	Onion (crates)	Green P (crates)
Individual consumers					
Wholesalers (specify)					
Retailer (specify)					
Rural assemblers					
Hawkers					

Brokers					
Farmer cooperative					

4.2 How is the price set during sales

	I set the price	We negotiate	It is market driven	It is dictated by the buyer	Contract price	Specify (others)
Individual consumers						
Wholesalers						
Retailer						
Hawkers						
Rural assemblers						
Brokers						
Farmer cooperative						

4.3 Do you always find the market for all these produce? **Yes (v)** **No (x)**

Tomato	Cabbage	Butternut	onions	Green pepper

4.4 What was the unsold quantities within the following channels for the last season?

Customers	Tomato (crates)	Cabbage (heads)	Butternut (crates)	Onion (crates)	G. pepper (crates)
Individual consumers					
Wholesalers					
Retailer					
Hawkers					
Rural assemblers					
Brokers					
Farmer cooperative					

4.5 What happens to unsold produce?

Lost to spoilage	Consumed by family	Sell at lower price	Store and sell later

4.6 What do you think should be done to support the value chains of these commodities?

Thank you very much for responding

APPENDIX 2: TRADER'S QUESTIONNAIRE

EVALUATING THE PERFORMANCE OF MARKETING CHANNELS FOR SMALL-MEDIUM SCALE VEGETABLE PRODUCERS USING OLUSHANDJA-OGONGO CANAL WATER.

This study is conducted to find out about the efficiency of marketing channels used by farmers in Olushandja area and those farming along olushandja – Ogongo water canal. Your participation in the study is voluntary, information will be treated as confidential and strictly for the purpose of this study.

1. DEMOGRAPHIC DETAILS

1.1 Name of the trader _____ Location _____

1.2 Gender:

Male	☐	Female	☐
------	--------------------------	--------	--------------------------

1.3 Age: _____

1.4 Highest level of education

No formal education	☐	Secondary education	☐
Primary education	☐	Tertiary education	☐

2. TRADING INFORMATION

2.1 Main occupation

Wholesaler ☐ farmer trader ☐ Retailer ☐ Hawker ☐

Other _____

2.2 Do you purchase any of the following vegetables from olushandja area?

Tomatoes	☐
Cabbage	☐
Butternut	☐
Onion	☐
Green peppers	☐

2.3 Who is your Olushandja vegetable suppliers?

	Tomatoes	Cabbage	Butternut	Onions	G. peppers	Term of payment 1 cash, 2 credit, 3 paid after sale.
Farmers						
Traders (name)						
Retailer (name)						
Wholesalers (name)						

2.4 Which supplier do you prefer to source vegetables from most of the time?

	Tomatoes	Cabbage	Butternut	Onions	Green peppers
Farmers (area name)					
Traders (area name)					
Retailer (area name)					
Wholesalers (area name)					

2.5 Why do you prefer such markets?

Better quality		High supply		Short distance		Other (specify)
----------------	--	-------------	--	----------------	--	-----------------

2.6 Do you participate in vegetable trading year round? Yes ☐ No ☐

If no, at what period of the year do you participate in trading?

During high supply	
Other (specify)	

2.7 Who do you sell your vegetables to?

	Tomatoes	Cabbage	Butternut	Onions	Green peppers
wholesalers					
retailers					
hawkers					
consumers					

3. PURCHASE PRACTICES

3.1 How do you attract suppliers?

By giving fair price		By visiting them		Other (<i>specify</i>)
----------------------	--	------------------	--	--------------------------

3.2 How do you measure your purchase?

By sack/bag		By crate		By Kgs		Other (<i>specify</i>)
-------------	--	----------	--	--------	--	--------------------------

3.3 Average cost incurred per unit in the trading process of the vegetables below:

	Tomatoes (kg)	Cabbage (head)	Butternut (kg)	Onions (kg)	Green pepper (kg)
Purchase price					
packaging					
Load/unload					
Transportation					
sorting					
Storage costs					
Storage loss					
Others (<i>specify</i>)					
Selling price (<i>per kg</i>)					

3.4 Do you experience Olushandja produce that goes to (waste) unsold? Yes ☐ No ☐

3.5 Quantity of Olushandja produce supplied but went unsold (wasted) from the last stock.

Supplied	Supplied	Not sold
Tomatoes (<i>crates</i>)		
Cabbage (<i>heads</i>)		
Butternut (<i>crates</i>)		
Onions (<i>crates</i>)		
G. pepper (<i>crates</i>)		

3.6 What are the main causes of such waste?

poor quality	
Low demand	
Other (<i>specify</i>)	

3.7 What do you think should be done to support the value chains of these commodities?

Thank you for responding!!!!