Analysis of the Marketing Efficiency of Indigenous Leafy Vegetables (ILV) in Zambia: A Case Study of Soweto Market in Lusaka

A Research Report presented to the Department of Agricultural Economics and Extension of the University of Zambia.

BY

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LIST OF ABBREVIATIONS

ILV	Indigenous Leafy Vegetables
ZNFU	Zambia National Farmers Union
GDP	Gross Domestic Product
SADC	Southern African Development Countries
ZARI	Zambia Agricultural Research Institute
UNZA	The University of Zambia
SCP	Structure Conduct Performance Model
CR	Concentration Ratio
SPSS	Statistical Package for Social Sciences
VIF	Variance Inflation Factor

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ABSTRACT

Analysis of the Marketing Efficiency of Indigenous Leafy Vegetables (ILVs) in Zambia: A Case Study of Soweto Market in Lusaka

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It is a known fact that smallholder farmers are the major producers of indigenous leafy vegetables (ILVs) and other crops in this country. Various characteristics of these crops merit their high nutritional value, medicinal properties and low costs of production. However, farmers have cited lack of access to markets and uncoordinated market linkages among supply chain participants as the major marketing challenge regarding trade in these crops. This has led to low production of these crops, because it is the market that drives production. Most studies have looked at agriculture marketing policies, with maize markets as the focus of research while neglecting other crops.

This study was carried out in Lusaka district, and it was aimed at analyzing the marketing efficiency of ILVs and the factors that affect the marketing margins in Zambia. The objectives of the study were to assess the structure ILV markets, identify the marketing channels, measure the marketing margins and identify factors affecting marketing margins at each level of marketing.

The structured questionnaire was the primary instrument used for data collection and also informal interviews. Descriptive statistics were generated using SPSS. Excel was used to organize Outputs and Stata was used to estimate the model using the multiple regression.

The results showed that the market system of ILV was competitive and this was determined by the CR8 value of 14%. The farmer's share was determined at 83% showing that the market was efficient as just a small amount went into the marketing system. Factors that were considered affecting the marketing margins included age, level of education, household size, distance to the nearest market, farm size, extension services, access to credit and quantity traded. Household size (P-values = 0.017, 0.014, 0.019 for amaranthus, pumpkin leaves and sweet potato leaves respectively), access to credit (P-values = 0.03, 0.06, 0.08 for amaranthus, pumpkin leaves and sweet potato leaves respectively) and quantity traded for sweet potato leaves (P-value = 0.10) were identified as being statistically significant in explaining the marketing margins at 95% confidence level.

It is therefore recommended that effective linkages between producers, retailers and consumers be strengthened. Thus, it is important that the government create and improve access to markets and providing linkages so as to have ready markets. Extension service provision should also be considered as it can improve the effectiveness of this industry as it has the potential to increase smallholder incomes.

CHAPTER ONE

BACKGROUND

1.1 Introduction

Agricultural development is essential for sustainable improvements in Zambia's economic performance and for a reduction in rural poverty. This is evidenced by the fact that agriculture employs about 70 percent of poor households (ZNFU, 2011) while contributing 22 percent of Gross Domestic Product (GDP) (World Bank, 2010). Zambia's agricultural sector also contributes to the growth of other sectors in terms of producing food and other products for urban domestic use and for exports. It supplies excess labor to non-agricultural sectors and provides a net outflow of capital for investment in other sectors. The sector also generates demand for goods and services produced by other sectors.

Maundu (1997) define indigenous leafy vegetables (ILVs) as "... plants that are native or introduced whose leaves have been used over a long time hence have become part of the culture and tradition of a community". Examples include Amaranthus (*Amaranthus spp*), Cowpea leaves (*Vigna spp*), Nightshade (*Solanum Spp*), Spider plant (*cleome spp*), Sweet potato leaves (*Ipomeas spp*), Pumpkin leaves (*Cucurbita spp*), Jute Mallow (*Corchorus spp*), Cassava leaves (*Manihot esculenta*), and African eggplant (*Macrocarpon spp*). These crops possess several beneficial attributes such as high micronutrient content, medicinal properties, several agronomic advantages e.g. improve soil fertility by fixing nitrogen in the soil (cowpeas), and ability to generate income for the producers (Onyango, 2007).

ILVs have several advantages over most other crops, including shorter production cycles, relative lower input requirements, higher yield, and/or high nutritional value. As such they can support small-scale farmers both in terms of subsistence and income generation without requiring large capital investment. Past research indicates that ILV marketing is mostly dominated by women, and hence the likelihood that it is the biggest single employer of women today (Onyango, 2007). The market potential of indigenous leafy vegetables is very large and has not been fully exploited. This is true both in Zambia and in the region as a whole. In recent years, a few supermarkets have been stocking these vegetables especially in dry form,

alongside the commonly consumed exotic vegetables such as cabbage, rape, and spinach. While exotic vegetables are produced in relatively large quantities, the supply of ILVs is generally low, more so during the dry season.

Despite all the nutritional and other advantages of ILVs, they still remain a neglected group of vegetable crops. They are generally regarded as minor crops and as such have attracted little public sector support, compared to major crops and cash crops. For example, there is virtually no coherent system for collecting and disseminating ILV production and market-related information (Eliamoni Lyatuu, 2007) ILVs are highly perishable and tend to be produced remote rural areas, mainly during the rainy season. The associated processing technology and supply chain challenges identify a clear need for a better understanding of the sub-sector

1.2 Problem Statement

There is very little socio-economic research on indigenous leafy vegetables (ILVs) in Zambia. Lyatuu and Lebotse, (2010) looked at the marketing of indigenous leafy vegetables and how small-scale farmers can improve their incomes. In Zambia, studies on agricultural marketing have looked at other aspects like agricultural marketing policy, other than marketing organization and efficiency, Mwanaumo (1999), Nijholf et al (2003), Tembo and Jayne (2007). Other studies by Zambia Agriculture Research Institute (ZARI) and The University of Zambia (UNZA) Crop Science Department have concentrated much on the agronomic aspects of crops.

The decisions made by the farmer at planting time depends on, the expected profit on the anticipated price that would prevail in the market at the time of sale and the interpretation of this price. A trader who wants to maximize profits translates price signals in deciding what crops to buy, at what price to buy and where to buy from. The way a market is organized will influence how the prices are determined and how much each market participant gets in terms of income. Therefore, because market organization influences price, ultimately it will influence farmer decisions to produce, as well as trader decisions to participate in the supply of a product. If inefficiencies exist in the market, low production is expected, as well as uncoordinated linkages

among supply chain actors. Marketing efficiency requires a marketing system to have a structure that has competitive pricing at each stage, so that charges equal to costs plus a normal rate of profit (Branson and Norvell., 1973).

Nevertheless, the way a market is organized and how it functions can have tremendous influence on how farmers make their production and marketing decisions. According to Downey and Kohls (1972), while the initial way a product is offered may influence the marketing system, dynamics of the marketing process itself also have a direct influence on agricultural production. In making this decision; the purchase price offered primarily contributes 70 percent, the type of market mechanism contributes 5 percent while the commercial and social relations contribute 9 percent. Thus it is not only price that affects production, marketing also plays a part. The marketing system can either encourage or discourage the decision to produce depending on its efficiency.

A knowledge gap is seen to exist on market organization and the marketing efficiency of the indigenous leafy vegetables (ILVs) in Zambia. The roles of participants in the marketing chain are not clearly identified and marketing margins at different levels are not known. With lack of such information, there is no knowledge of producer incomes realized from the production of these vegetables and how this income can be improved. Poor market knowledge and other structural imperfections lead to inefficiency in markets. Inefficiency in turn leads to markets that are inaccessible and exploitative. Thus, this paper seeks to assess the marketing system of indigenous leafy vegetables in Zambia.

1.2 Objectives

The main objective of this study is to determine the efficiency of marketing channels that producers of indigenous leafy vegetables (ILVs) are engaged in. For purposes of this study, we look at Amaranthus (Bondwe), Sweet potato leaves (Kalembula), and Pumpkin leaves (Chibwabwa) because of financial constraints.

1.3.1 Specific Objectives

i. To assess the structure of the ILV market.
ii. To identify the marketing channels for ILVs in Lusaka district.
iii. To measure the marketing margins at the producer to level to determine efficiency.
iv. To identify factors affecting marketing margins at each level of marketing.

1.4 Rationale of the Study

This study is important because first and foremost it will add to the body of knowledge which will be used by interested people in making policies and other decisions. The results which will be obtained from this study will be used in the formulation of strategies to improve rural incomes, in considering the small-scales farmers. Information from this study will also be used to improve the marketing chain system of this neglected informal type of farming and encourage policy makers as Zambia focuses on diversification within agriculture.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant literature on definitions of key terms, importance of an efficient marketing system, and a summary of variables likely to affect the marketing margins of marketing channels. The chapter will start by giving the conceptual framework, then a review and discussion of relevant literature on previous studies that have been done regarding market performance.

2.2 Definitions of Terms

Market can be defined as a tangible place where forces of demand and supply operate, and where buyers and sellers interact and negotiate on the exchange/ trade goods and services, or in form of contracts and instruments for conducting transactions like money, and/or barter system. A market includes mechanisms for determining the price of the traded item, communicating the price information, facilitating deals and transactions, and effecting distribution (BusinessDictionary.com).

Market efficiency can be defined as a measure of the availability of the information to all stakeholders that provides maximum opportunities to buyers and sellers to effect transactions with minimum transaction costs1. It exists when marketing margins between participants equal to marketing costs plus a normal rate of profit (Branson Norvell, 1983).

Marketing channel is a set of practices or activities necessary to transfer the ownership, and move goods from the point of production to point of consumption. Therefore, it consists of all the institutions and all the marketing activities in the marketing process. This tool is useful because it links producers to buyers, influences the firm's pricing strategy, and enhances the performance of an industry through sales, advertising and promotion (Wikipedia, 2011).

Marketing system defines relations and behavior of agents involved in moving products from producers to final consumers (Branson and Norvell, 1983).

Indigenous Leafy Vegetables (ILVs) are defined as plants that are native or introduced whose leaves have been used over a long time hence have become part of the culture & tradition of a community (Maundu, 1997). For purposes of this study, only the following vegetables were considered: Amaranthus (Bondwe), Sweet potato leaves (Kalembula), and Pumpkin leaves (Chibwabwa).

2.3 Conceptual Framework

The primary focus of this study was the way in which the marketing system influences the behavior of different participants of the marketing channel. According to Thaung (2007), market performance is a function of the number, scale and role of market intermediaries who provide services involving transfer of goods from producer to end user. Aker (2007) stresses that while profits are important for traders' marketing behavior; social networks play an important role in these decisions as well. Therefore, to understand how commodities move through various market channels it is necessary to identify the role of various market places and market agents involved.

Marketing system is the critical link between farm production sector, nonfarm sector, and urban economy. Besides the physical and facilitating functions of transferring the goods from producers to consumers, the marketing system also performs the function of identifying the prices at different stages of marketing and transmitting the price signals in the marketing chain. The issues and concerns in marketing relate mainly to the performance (efficiency) of the marketing system, which depends on the structure and conduct of the market. An efficient marketing system helps in the optimization of resource use, output management, increase in farm incomes, widening of markets, growth of agro-based industry, addition to national income through value addition, and employment creation.

Marketing is thus, an important tool in making sure that the products are known to the public as it generates the strategies that underlines sales techniques, business communication and business

developments. There are numerous challenges in the marketing process of ILVs which are attributed to both the government and the farmers. These include lack of reliable market information to both farmers and market advisory service providers, lack of mechanism to set prices, lack of standard measures of fresh vegetables and inadequate government intervention (Eliamoni Lyatuu, 2007).

2.3.1 Structure, Conduct and Performance

A Structure, Conduct and Performance (SCP) approach is a standard tool for market analysis and stipulates that there is a relationship between market structure and the behavior of market participants including; farmers, traders, consumers and others. In turn, the behavior of these participants influences market performance and efficiency (Aker, 2010). Structure gives the characteristics of the organization of a market which seem to influence strategically the nature of competition and pricing within a market. It indicates the number of farmers and producers who are involved in the production of ILVs. It is analyzed by assessing the degree of market concentration i.e. the number of market participants (ILV producers) and their relative control. Conduct is the pattern of behavior which enterprises follow in adapting or adjusting to the markets in which they sale or buy. It refers to traders', farmers' and other actors' strategies with respect to pricing, buying, selling, transportation and storage. Finally, market performance represents economic results of structure and conduct. Two distinct and yet related concepts linked to market performance are market efficiency and market integration (Aker, 2007., Harris, 1979).

2.3.2 Marketing Margin

Efficiency is evaluated by examining marketing margins. Marketing margin is a function of the difference between the equilibrium of retail and wholesale prices (Wohlgenant, 2001). Marketing margins do not provide both measure of famer's well-being or the marketing firm's performance; they only give an indication of the performance of a particular industry (Tomek and Robinson 1990). Markets are efficient if off-season prices are approximately equal to storage costs, if inter

market price differences are approximately equal to transport (Harris, 1979). Marketing margins are said to be a result of demand and supply factors, marketing costs and degree of channel competition (Marsh, Brester 2004). It can therefore be concluded that, market margins reflect the aggregate processing and retailing firms' behavior that influences the level and variability of farm prices, and the farmer's share of the consumer food value (Gardner, 1975., Wohlgenant, Haidaicher 1989., Tomek and Robinson 1990).

Marketing margins capture the proportion of the final selling price to each particular agent in the chain and provide linkages between prices at various levels in the distribution system. Margins that vary widely from the marketing costs refer to inefficiency while the responsiveness/sensitivity of margins to price changes indicates efficiency in the channel. To investigate marketing margins thoroughly and exactly, it is better to divide them into two smaller portions of the Retailer Margin and the Wholesaler Margin. The Wholesaler Margin is the difference of the price at which wholesalers sale their product and the price at which they pay farmers as they buy the product from them while Retailer Margin is the difference in price at which retailers sell the acquired product to the consumers and the price they pay the wholesaler (Abassian et al, 2010). According to Thaung (2007), a marketing margin may be specified as

$$M_t = P_t^l - P_t^{l-1} \quad \ldots\ldots (1)$$

where,

M_t *is* marketing margin between level (L) and its preceding level (L-1),

P_t^l *is* price at market level (L), and

P_t^{l-1} *is* price at market level (L-1).

Marketing margins can be affected by many factors and it is essential that these factors be determined and the extent to which they affect marketing margins be measured (Abassian, 2010). Models that quantify the factors affecting marketing margins include the; mark-up model, relative price model, marketing cost model and rational expectations model.

Waugh (1964) designed the mark-up price model by specifying the marketing margin a function of consumer price and marketing costs. The model is used to analyze the effects on relative prices and the aggregate price levels of exogenous changes in the nominal wage rate, tax rates, and the exchange rate and world prices. Simulations are carried out under passive price adjustments as well as adjustment with price ceilings. Thus the model calculates the endogenously determined reductions in profit mark – ups. George and King (1971) went further to hypothesize that margins consist of either linear constant absolute components or linear fixed percentage components, or both, i.e.

$$M = \alpha + \beta P_r \quad \ldots\ldots (2)$$

where,

M *is* marketing margin,

α, β are constants, and

P_r *is* retail price.

Regressions of margins on retail price, or equivalently of farm price on retail price, derive from the view that in the long run prices are determined at the retail level first, depending on what consumers are willing and able to pay for what is marketed, and then farm prices are determined by subtracting all marketing costs from retail prices (Waugh, 1964).

According to the Relative Price Model suggested by Wohlgenant and Mullen (1987), the marketing margin is modeled as a function of the retail price, the quantity of goods marketed and the marketing cost. In this model, Wohlgenant and Mullen go further to include the product quantity marketed.

$$MM = f(RP, TR, Z) \quad \ldots\ldots (3)$$

where;

MM is market margins,

RP is retail price,

TR is marketing cost, and

Z is quantities traded.

The marketing cost model is a complement to the relative price model that was also suggested by Wohlgenant and Mullen. In this model, it is assumed that the ground is all readily paved for the competition of economic enterprises rendering marketing services in such a way that the final costs equal the final income. Marketing margin is considered to be a function of the quantity of the farm product and the marketing cost:

MM = (Q, Z) ..... (4)

where:

MM is marketing margin

Q is quantity of farm product

Z is marketing costs

All the above suggested models are static in nature.

The rational expectation model suggests that there is a demur between the retail price and farm gate price when they are compared. By using the first order conditions to maximize the net income expected, the marketing margin equation can be extracted and is presented as follows:

Mt = f [PFt, Et (PFt + 1), Zt, r, g] ..... (5)

where:

PFt is farm price at the defined time

Et (PFt + 1) is expected farm price in the future, 'r ' to the interest

G is ratio of inventory to sale

Zt is vector of marketing cost

This model requires an auxiliary equation to determine Et (PFt + 1), which is the determination of rational expectations. The rational expectation may also be determined through the ARMA Model by using the retail and farm price.

ARMA (p, q):

$Yt = \alpha 0 + \alpha 1 yt - 1 + \alpha 2 yt - 2 + \ldots + \alpha p yt - p + \varepsilon t + \beta 1 \varepsilon t - 1 + \ldots + \beta q \varepsilon t - q$ ..... (6)

2.4 Significance of Marketing Efficiency

There are quite a number of studies that have been undertaken to investigate marketing efficiency, which is mostly measured by the marketing margins. However, care must be taken in interpreting marketing margins because they just give an indication of the market structure and efficiency, and they do not necessarily measure profitability. Studies have shown that the form of greater market power is likely to manifest in larger marketing margins and less social efficiency than would otherwise be the case (Abassian et al 2010). If marketing channels are efficient it is expected that margins among channel participants will not be very wide. This reflects an efficient market in which margins must differ among agents by marketing costs and normal rates of profit

Several studies have used marketing margins as a measure of efficiency. The study carried out in Sudan, Khartoum State, which aimed at evaluating the marketing efficiency of tomato by estimating the distribution of net margins among the various marketing agents wholesaler and retailer revealed that; wholesalers generally got higher marketing margins than retailers with exception of Khartoum market, where the converse was true (Emam, A.A., 2011).

Thaung (2007) investigated the performance and efficiency of marketing system of chick peas, green gram and pigeon peas in a number of selected townships. This study assessed the marketing channel, distributed marketing margins and spatial market price integration to evaluate the performance of pulses marketing in Myanmar and found that producers received the largest net share of the exporters' price (31% for Chick pea, 28.5% for Green gram and 28.1% for Pigeon pea). However, market inefficiency was observed at the exporter' level, where the exporters received the highest gross margin. It was concluded that the low marketing margins in the channel were an indicator of competitive and efficient markets, though the margins could be further improved with road and market facilities. Though this study was concerned with efficiency, it did not look at the market organization of the pulse markets by carrying out an SCP analysis, nor did it consider factors affecting the margins. Yet these two are important in determining whether a market is efficient or not. (Nyein Thaung, 2007).

Angela Maria and Mathias Von Oppen (2002) conducted a study to know the efficiency of vegetable market in Northern Thailand and it indicated that wholesale markets present outside the cities have strong influence on price determination for retailers. The average price for Cabbage was 12.65 Baht/Kg, for Carrot it was 19.42 Baht/Kg, for Onion 22.31 Baht/kg and for Tomato it was 18.07 Baht/Kg in retail shops in the city. Whereas it was 11.06 Baht/Kg, 17.63 Baht/Kg, 20.33 Baht/Kg and 16.34 Baht/Kg for Cabbage, Carrot, Onion and Tomato respectively for the outskirt retail shops.

Marketing efficiency is an important aspect in determining the profitability of a production activity especially in the agricultural sector. Some Iranian researchers also studied marketing margins of different agricultural crops included a few of these (Kazemnezhad, Sadrol-esharfi 2000; ha, Sadrol-esharfi 1996; Shajari 2002; Samsami 2004). These scholars in their studies concluded that the existence of an efficient market, especially in the agricultural sector, is of immense importance.

2.5 Summary of Variables Likely to Affect Market Margins

The table below gives the summary of possible variables/factors that are likely to affect market margins.

Table 1: Summary of Variables likely to affect Market Margins

Variable	**Sign**
Age	Positive (+)
Level of education	Negative (-)
Household Size	Negative (-)
Distance to the market	Negative (-)
Farm Size	Positive (+)
Access to credit	Positive (+)
Extension Services	Positive (+)
Quantity Traded	Positive (+)

Once the marketing margins are known, for effective policy to be implemented in taking corrective measures if necessary, factors that influence the margins must be known. Wohlgenant (2001) reviewed the studies on marketing margins and the development of empirical models. Aside from the variables that come in when using a structural model (that looks at the farm, the retail, and the input market equilibrium), he discussed other possible explanatory variables that had been included in studies that used the reduced-form models. These factors primarily included the retail price, the demand shifters (like population and income), and marketing input costs. Others include price risk (Brorsen et al. 1985; Schroeter, Azzam 1991), product quality (Parker and Zilberman 1993), and market power (Schroeter, Azzam 1991; Holloway, Hertel 1996).

The study by Gardner (1975) provided a basic framework for analyzing marketing margins. It defined the major sources of variation in the retail-farm price spread, i.e., the shifts in the retail food demand, in the farm product supply, or in the supply of marketing services. Similarly, Heine (1977) came up with an analysis of the farm-retail margin (in percentage difference) that related the margin with the farm output and the ratio of retail price and marketing costs. Using the Cobb-Douglas production function, his analysis showed that an increase in the marketing costs and in the level of farm output reduces the percentage marketing margin.

CHAPTER THREE

METHODS AND PROCEDURES

3.1 Introduction

This chapter outlines the methods and procedures that were used to achieve the stated objectives. It will give information on the area of study, research design, sampling procedure, data collection and data analysis tools to be used in the study.

3.2 Market Organization

A Structure, Conduct and Performance (SCP) model was used to analyze the organization of indigenous leafy vegetable markets in Zambia. In analyzing market structure, the market concentration index which measures the percentage of traded volume accounted for by a given number of participants will be used to determine market concentration. A four-firm concentration ratio (CR4) of less than or equal to 33 percent indicates a competitive market structure, while a concentration of 33 to 50 percent and above indicate oligopolistic market structures (Arker, 2007). A CR4 ratio is calculated by;

$$C_i = \frac{q_i}{Q} \quad \ldots\ldots (7)$$

where;

C_i is the market share of the four highest producers /wholesalers,

q_i is the total product quantity for the highest producers/ wholesalers, and

Q *is* the total output by all producers/wholesalers.

Since market conduct is concerned with the behavior of firms, whether competitive or collusive, it was determined by studying price discovery methods at wholesale and farm level. Performance represents economic results of structure and conduct and may be measured by studying price integration as well as distributed marketing margins. Therefore to determine the performance of ILV markets in Zambia, efficiency will be determined by measuring marketing margins. They will be calculated by finding out the price spread at the farmer to wholesaler level as shown;

$$MM = P_w - P_f \quad (8)$$

where;

MM *is* the marketing margin,

P_w is the price charged by wholesaler, and

P_f is the price charged by the farmer.

From theory, a number of factors affect marketing margin. Therefore a multiple regression model will be used to determine which factors significantly affect the margins and by how much. In the model, the marketing margin will be the dependent variable while factors affecting it will be the independent variables.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \epsilon \quad (9)$$

Where,

Y *is* marketing margin,

$X_1, X_2 \cdots X_n$ *are* explanatory variables

ϵ is the error term.

3.3 Study Area

This study was conducted at Soweto Market in Lusaka district. This area was selected because it comprised of smallholder farmers. Therefore, it gave a true representative of various household characteristics and variables such as education and levels of knowledge, which are some of the variables this study was measuring.

3.4 Sample Size

Since the supply chain is not clearly identified for these vegetables, target and reference sampling techniques were used to identify and survey/interview downstream supply chain participants. Supply chain participants were asked to identify their primary buyers and this information was used to track them. Convenience sampling was then used to collect information from asking respondents at each stage to identify their customers and their suppliers so that this

informal segment of the industry is covered. Therefore, a sample of 146 participants was selected from a sampling frame comprising farm households who grow ILVs.

3.5 Data Collection and Analysis

Both primary and secondary data were collected in this study. Primary data was collected through personal interviews using structured questionnaires which were carefully developed around the overall objectives of the survey. Secondary data was collected from the marketeers, relevant publications and the internet. The data from questionnaires were analyzed using SPSS to generate tables, pie charts, and bar and line graphs. Microsoft excel was used to organize the outputs and regression was done in Stata.

CHAPTER FOUR

STUDY FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents and discusses the study findings. It begins with discussion of the demographic characteristics of the respondents followed by the various types of milk marketing channels in the district. The farmers' perception of the various milk marketing channels will be presented and then a discussion of the factors affecting the adoption milk marketing channels will be explained later.

4.2 Demographic Characteristics

Most of the respondents in the study (93.8%) were male as compared to (6.2%) females that constituted the sample. The majority of the farmers (44.5%) had ages between 41 and 50 years. About 26% constituted those that were between 31 and 40 years while 18 % were between 51 and 60 years. Further, 6.2% constituted those that were 61 and above while 4.8% were between 21 and 30 years respectively (see Table 1).

Table 2: Distribution of Farmers by Age and Sex

Age Group (Years)	Sex of Household Head		Total	Percent
	Female	Male		
21-30	0	7	**7**	**4.8%**
31-40	1	37	**38**	**26.0%**
41-50	7	58	**65**	**44.5%**
51-60	1	26	**27**	**18.5%**
61 & Above	0	9	**9**	**6.2%**
Total	**9**	**137**	**146**	**100%**
Percent	**6.2%**	**93.8%**	**100%**	

About 34% of the farmers had reached formal school up to secondary level, 15.8% up to primary and 21.9% up to tertiary level. Since the majority (71.9%) of the farmers had reached secondary and tertiary levels, the implication is that they may be able to comprehend new technologies and practices easily (see Table 2).

Table 3: Distribution of Farmers by Education Levels

Education	Frequency	Percent
Primary	23	15.8%
Secondary	50	34.2%
Tertiary	32	21.9%
None	41	28.1%
Total	**146**	**100%**

4.3 Types of Vegetable Marketing Channels and the Extent of Use

Two types of marketing channels were identified in the district. Of the respondents in the sample the majority of the farmers (72.6%) supplied their vegetables to the marketeers, and about 12% supplied to supermarkets while the remaining 15.8% supplied to both consumers and marketeers. The informal market has the largest share of the quantities of vegetables marketed by producers. It is thus important, as it accounted for more than 72% of the indigenous vegetable marketed in 2011/12. The formal market share could only market about 12% (see Table 3).

Table 4: Vegetable Marketing Channels

Marketing Channel	Frequency	Percent
Informal (Marketeers)	106	72.6%
Formal (Supermarkets)	17	11.6%
Consumers & Marketeers	23	15.8%
Total	**146**	**100%**

4.4 Farmers' Perception of the Various Marketing Channels

Market access, higher price, easy to sell and respect to payment agreement of the buyer were the most important determinants of vegetable marketing in all the Marketing channels (see Table 4). Market reliability and stability was the most frequently reported and highly ranked in the choice of a marketing channel among the farmers. Supermarkets followed the monthly payment procedures to pay farmers who supplied them with the vegetable, particularly sweet potato leaves (Kalembula) and pumpkin leaves (Chibwabwa). Marketeers and consumers effected payments immediately at the time of purchase, implying that the two were more effective than the supermarkets in timeliness of payments to producers (see Table 4).

Table 5: Characteristics in Choice of the Marketing Channel

	% of farmers indicating which Marketing Channel they consider Better for them			
Marketing Channel	**Marketeers**	**Supermarkets**	**Consumers & Marketeers**	**Total (%)**
Pays higher price	73.3%	11.6%	15.1%	100%
More secure & continued market access	73.3%	11.6%	15.1%	100%
Easier to sell to (close, familiar)	73.3%	11.6	15.1%	100%
Respect to payment agreement (less risk)	71.9%	11.6%	15.1%	98.6%
Provides technical assistance	57.5%	2.7%	7.5%	67.7%
Provides credit	30.8%	7.5%	2.7%	41.1%

4.5 Market Performance

Table 5 shows the parameters that were used to measure the market performance for the ILV market system. The adjusted selling prices were calculated using an estimated conversion factor

of 0.97, to which the rest of the value went to the wastage in the process of marketing. This was assumed for all the three vegetables. The market structure was determined using the concentration ratio of the eight (8) largest producers among the respondents. A CR8 value of 14% was calculated, this implies equality in the distribution showing the market to be a perfect market. The farmers share was found to be 83.5%, meaning that from the final price the consumer pays the farmer gets a share of that amount. The implication of this is that 16.5% of ILV consumer's expenditure went to the marketing system.

Table 6: Parameters of the Market Performance

Parameter	**Average Costs (Kwacha/Kg)**
Farm-gate price	
Amaranthus	2,599
Pumpkin Leaves	2,681
Sweet Potato Leaves	2,618
Adjusted Selling Price	
Amaranthus	3,783
Pumpkin Leaves	3,880
Sweet Potato Leaves	3,879
Marketing Costs	
Transportation cost	357
Overheads	10
Total Marketing Costs	367
Total Cost	
Amaranthus	2,966
Pumpkin Leaves	3,048
Sweet Potato Leaves	2,985
Marketing margin	
Amaranthus	817
Pumpkin Leaves	832
Sweet Potato Leaves	894
Farmer's Share (%)	83.5%
Concentration Ratio (CR8)%	14%

4.6 Multiple Regression

The multiple regression model was estimated in Stata from data collected from sample survey. Table 6 shows the results of estimating the function from a sample of 146 respondents, to assess the factors that determine the marketing margins of the marketing system of indigenous leafy vegetables. The dependent variable was the marketing margin. The model was also tested for heteroskedasticity, multicollinearity and model specification and the following shows the results.

Test for Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Total marketing margins

chi2 (1) = 10.93

Prob > chi2 = 0.0009

The model was tested for heteroskedasticity and it was found that it was present since according to the Breusch-Pagan test it was found that the P-value was significant at 95%. And therefore robust standard errors were used.

Test for Multicollinearity

Multicollinearity was not present because all the independent variables had variance inflation factors (VIF) within the accepted range (≤ 10) or $1/VIF \geq 0.1$). This means that the degree of multicollinearity for the explanatory variables was within the acceptable limit. The mean VIF value was 1.15.

Model Specification Test

Ramsey RESET test using powers of the fitted values of Total marketing margins

Ho: model has no omitted variables

F (3, 138) = 5.35

Prob > F = 0.0016

Using the Ramsey test for model specification it was found that there were no variables which were missing because the P-value was greater than 0.05 (at 95% confidence level).

4.7 Factors Affecting Marketing Margins in the Marketing of ILVs

From the results shown below (Table 7), marketing margin was regressed on age, level of education, household size, distance, farm size, extension services, access to credit and quantity traded and the following variables were found to be significant at 95% confidence level in influencing/ affecting the marketing margins. These are household size, access to credit and quantity traded. It was shown from the table that there is a negative relationship between marketing margins and household size. The implication of this is that a unit increase in the number of people in house (family size) will reduce the marketing margin by the amounts given by the coefficients at 0.05 levels of significance. Access to credit indicated a positive relationship with marketing margins. This implies that if ILV farmers have access to affordable credit, it will increase marketing margins. Meanwhile, quantity of ILV traded showed a positive relationship with marketing margins implying that a unit increase in the traded quantity will cause an increase in the marketing margin by the coefficients. This was only significant for sweet potato leaves. Other factors were not found to be significant at all levels of significance.

Table 7: Regression Analysis

Variables	Amaranthus	Pumpkin Leaves	Sweet Potato Leaves
Age	.9467382 (1.361664)	.9258152 (1.353155)	.8946251 (1.359323)
Level of Education	-.2228458 (1.404199)	-.64744 (1.52966)	-.0169953 (1.416652)
Household Size	-1.673672 (.6931076)*	-1.740712 (.6959824)*	-1.71172 (.7209385)*
Distance	.8788295 (1.781603)	.9809047 (1.767417)	1.054962 (1.795607)
Farm Size	-.8780175 (5.416192)	-6.284416 (10.57769)	-1.779319 (5.75775)
Extension Services	.9433763 (2.799463)	.6590514 (2.62612)	.8460469 (2.719656)
Access to Credit	.0868541 (2.532556)*	.1407913 (2.535442)*	.1933503 (2.561576)*

Quantity Traded	.0232596 (.0328549)	-.0282005 (.0432289)	-.0044942 (.0451999)*
Constant	822.9504 (10.15662)***	848.4833 (12.49361)***	904.0484 (10.49706)***

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The efficiency of ILVs production and marketing system is important in identifying the imperfections and issues confronted in production system and marketing mechanisms. This chapter presents the conclusion and recommendations of the study based on the findings and interpretations of the study.

5.2 Conclusions

The study evaluated the market efficiency of ILV marketing system in Lusaka district. The economic analysis showed that the ILV marketing system is a perfect competitive market as was shown by the concentration ratio, CR8 of 14%. It was conducted with the objective of analyzing Amaranthus, pumpkin leaves and sweet potato leaves marketing. The study was primarily based on qualitative and quantitative analysis of primary data, which was collected from the sample of ILV producers by interviewing them through pretested questionnaires. The results indicated that household size, access to credit and quantity traded for sweet potato leaves were the most important factors that affect the marketing margins. The results also indicated that, the informal market dominates the marketing system of this type of vegetables, though there was a small portion of the formal market as participated by the supermarkets.

5.3 Recommendations

Marketing provides many social and economic benefits to both sellers and buyers, and only by participating can the producers fully utilize the opportunity for economic growth that is accessible. Production can be significantly increased if access to market can be assured and it is a general experience that an avenue for marketing provides the needed incentive for increased income generation for smallholder farmers if effective linkages between producers, retailers and consumers exist. Thus, it is important that the government create and improve access to markets and providing linkages so as to have ready markets. Extension service provision should also be considered as it can improve the effectiveness of this industry as it has the potential to increase smallholder incomes.

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APPENDICES

Questionnaire serial number: [| | |]

Analyzing the Marketing Efficiency of Indigenous Leafy Vegetables in Zambia: A Case Study of Soweto Market in Lusaka

Department of Agricultural Economics & Extension Education

The University of Zambia

This questionnaire is for academic purpose only. Be rest assured that all the information you provide will be treated as private and confidential as possible. Feel free to answer all the questions honestly. Your cooperation in this regard will be highly appreciated.
Instructions: Please write some answers in the boxes and blank spaces provided.

SECTION A: DEMOGRAPHICS

1. Is the respondent the owner of the farm?

1. Yes [ ] 2. No [ ]

2. What is the sex of the respondent?

1. Male [ ] 2. Female [ ]

3. Age (at last birthday)..... [ ]

4. What is your marital status?

3. Single [ ] 2. Married [ ] 3. Divorced [ ] 4. Widowed [ ]

5. What is your highest level of education?

1. Primary [ ] 2. Secondary [ ] 3. Tertiary [ ] 4. None [ ]

6. How many are you in the family.....?

SECTION B: SOCIO-ECONOMIC STATUS

7. How do you classify the area where you come from?

1. Rural [ ] 2. Peri - Urban [ ] 3. Urban [ ]

8. How much income did you earn from selling vegetables in the past 12 months?

1. < K1, 000,000 [ ] 2. K1, 000,000 to K3, 000,000 [ ] 3. >K 3,000,000 [ ]

9. Are you engaged in any off farm activities?

1. Yes 2. No *(If No, go to question 12)*

10. Which of the following were the most important off farm activities engaged in?

1. Civil service [ ] 2. Agri-business trading [ ] 3. Vendor/Marketer [ ]

11. How much income did you earn from such activities?

1. < K1, 000,000 [ ] 2. K1, 000,000-K3, 000,000 [ ] 3. >K3,000,000 [ ]

SECTION C: NATURE OF THE FARM

12. How far is the farm from the nearest market?

1. Less than 5km [ ] 2. Between 5 and 10km [ ] 3. Greater than 10km [ ]

13. What is the main economic activity for this farm? (Pick one only)

1. Fruits & vegetables [ ] 2. Grains [ ] 3. Livestock [ ] 4.Other, (specify)....

14. Do you use family labor?

1. Yes [ ] 2. No [ ]

15. How many farm laborers did the farm hire during the past 12 months?

a) Male [ ] b) Females [ ]

SECTION D: ORGANIZATION OF CAPITAL

16. Do you belong to any association?

1. Yes [ ] 2. No [ ], *If No. go to question 19*

17. Which one of the following associations do you belong to?

1. Cooperative [ ] 2. Farmer group [ ] 3. Others (specify).....

18. Do you sale your product through your association?

1. Yes [ ] 2. No [ ]

19. Who sets the buying and selling prices?

1. Market [ ] 2. Cooperative [ ] 3. Other arrangements [ ]

20. What is the main source of funding for the farm?

1. Retained earnings [ ] 2. Off farm activity [ ] 3. Money lending Institution [ ]

4. Association/NGO/Government [ ] 5. Family/Friends [ ] 6. Both 1 and 2 [ ]

7. Both 1 and 3 [ ] 8. Both 1 and 4 [ ] 9. 1, 2 and 5 [ ] 10. 1,2 and 3 [ ]

SECTION E: PRODUCTION AND SALES

21. Has this farm had any irrigation system?

1. Yes [ ] 2. No [ ], *(If No, go to question 24)*

22. Does the farm have enough irrigation water all year round?

1. Yes [ ] 2. No [ ], *(If No, go to question 24)*

23. How many months in a year is there enough irrigation water.....?

24. How many hectares of each vegetable crop did you grow in the past 12 months?

a) Amaranthus [ ] b) Pumpkin leaves [ ] c) Sweet potato leaves [ ]

25. What does a sack of vegetables approximately weigh (kg).....?

26. Who was the main buyer of the vegetables that was sold?

1. Marketeers [ ] 2. Consumers [ ]

3. Supermarkets [ ] 4.Marketeers/Consumers [ ]

5. Consumers & Supermarkets [ ]

27. Does the farm sell vegetables under contract?

1. Yes [ ] 2. No [ ] *(If No, go to question 29)*

28. Are the following pre-established with the buyer in the contract?

a) Quantities to deliver [ ] b) Schedule of delivery [ ]

c) Quality standards [ ] d) Price [ ]

29. Which marketing channels do you consider for your products?

1. Marketers/retailers [ ] 2.Wholesalers [ ] 3. Consumers directly [ ]

4. Supermarkets [ ] 5.Both retailers and wholesaler [ ]

6. Consumers and marketers/retailers [ ] 7. Consumers and wholesalers [ ]

30. Do the following characteristics matter in choosing the marketing channel?

a) Pays higher price [ ] b) More secure and continued access to the market [ ]

c) Easier to sell to [ ] d) Respect to payment agreement [ ]

e) Provides technical assistance [ ] f) Provides credit [ ]

31. How much of each product did you sell in the past 12 months?

a) Amaranthus [ ] b) Pumpkin leaves [ ] c) Sweet potato leaves [ ]

32. What were the total marketing costs in total.....?

THANK YOU FOR YOUR CO-OPERATION