

**ASSESSMENT OF THE TRANSACTION COSTS ON POST-
HARVEST MAIZE VALUE CHAIN PERFORMANCE IN
TANZANIA:**

**A SURVEY OF SELECTED MAIZE SMALLHOLDER FARMERS
IN KONGWA DISTRICT COUNCIL - DODOMA REGION**

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TANZANIA:**

**A SURVEY OF SELECTED MAIZE SMALLHOLDER FARMERS
IN KONGWA DISTRICT COUNCIL - DODOMA REGION**

By

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**A Dissertation Submitted to the School of Business in Partial Fulfilment of the
Requirements for Award of the Degree of Master of Science in Procurement and
Supply Chain Management (Msc PSCM) of Mzumbe University**

2018

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled **Assessment of the transaction costs on post harvest maize value chain: A survey of selected maize smallholder farmers in Kongwa District Council in Dodoma region**, in partial/fulfillment of the requirements for award of the degree of Master of Science in Procurement and Supply Chain Management of Mzumbe University.

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Accepted for the Board of School of Business

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I, **Prisca Pascrates Rutatola**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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DEDICATION

This research work is dedicated to my beloved late parents Mr Pascrates Rutatola and Mrs Helenestina Malingumu; Your presence, unconditional love, support and the witness of your daughter's achievement is highly missed. May their souls rest in eternal peace, Amen. Also is dedicated to my lovely son Reynold Rwegasira and husband Renovatus Raymond, your love for me is highly appreciated.

ABBREVIATIONS AND ACRONYMS

FAO	-	Food and Agriculture Organization
Ha	-	Hectares
KDC	-	Kongwa District Council
Kg	-	Kilogram
KIGM	-	Kibaigwa International Grain Market
Km	-	Kilometre
Msc PSCM	-	Master of Science in Procurement and Supply chain management
NFRA	-	National Food Reserve Authority
PO-RALG	-	President Office-Regional Authority and Local Government
Tshs	-	Tanzania Shillings
URT	-	United Republic of Tanzania

ABSTRACT

The study aimed to assess the transaction costs on post harvest maize value chain performance among maize small holder farmers in Kongwa District Council in Dodoma region. The study specific objectives comprised of assessing the transportation costs on post-harvest maize value chain performance, assessing the information costs on post-harvest maize value chain performance, assessing the middlemen costs on post-harvest maize value chain performance and assessing the effects of transaction costs on post-harvest maize value chain performance in Kongwa District Council Dodoma region. The study adopted a survey research design where a sample of 88 respondents obtained through multi stage sampling was used in the study. Interviews, questionnaires and documentary review were used as data collection techniques. Data were analyzed both quantitatively and qualitatively where chi square test and multiple regression techniques were used to establish the existence of the hypothesized relationship. It was revealed that transportation costs and middlemen costs affected post harvest maize value chain performance in terms of profits, output sales and post harvest losses in Kongwa District Council but information cost was revealed not to be a contributor of post harvest maize value chain performance in the study area. Through chi square test transportation costs and middlemen costs were significantly related to post harvest value chain performance whereas information cost was not significant related to post harvest value chain performance in the study area at $P < 0.05$. Moreover, through multiple regression profit earned by farmers was the major effect of transaction costs on post harvest maize value chain performance in the study area than the other two performance indicators whereas post harvest losses was proved not to be the effect of transaction costs on post harvest maize value chain performance in the study area. Thus, it was recommended for the government and all associated stakeholders to take various measures focusing on reducing transaction costs such as improvement of transportation infrastructures and establishment of well equipped market areas near farmers.

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CHAPTER ONE

AN OVERVIEW OF THE STUDY

1.1 Introduction

This chapter deals with the overview of the study, which includes the background of the problem, statement of problem, research objectives and research hypotheses, significance of the study, scope of the study and organization of the study.

1.2 Background of the problem

Agriculture is the bed rock of every country economic sector because it plays a major role in providing food for the population, employment opportunities, export earnings and high contribution to the nation's Gross Domestic Product (Oparinde & Daramora, 2014). In the world, agriculture employs about 40% of the active population globally and it persists to be a strategic sector in the development of most developing countries where more than 60% of the population in sub-Saharan Africa, Asia and the Pacific is highly dependent on it while in Latin America and high income economies the ratios are estimated at 18% and 4%, respectively (World bank, 2006).

In almost all African economies, agriculture is one of the important and crucial sector for attaining economic growth and is a key sector in ensuring poverty reduction at both household level and country level (Jagwe *et al.* 2010). According to Leyaro and Morrissey (2013) the sector is viewed as a main vehicle in any national economic strategy for combating poverty and hence gives a need for increased agriculture productivity. However, apart from its significant contribution in the country economy, and although the demand for agriculture products continue to increase the sector has been faced with several constraints and the production of both food and cash crops has remained stagnant or has increased at a very slow rate (Kaini, 2004).

Maize is one of the key important cereal food crops in agriculture economy in the world and used as both staple food for human beings, feed for animals and other industrial raw materials (Simiyu, 2014). Maize ranks third position next to wheat and rice in the world with respect to area while its productivity surpasses all other cereal crops. Maize is

grown in 70 countries of the world (Patil *et al.* 2007). And it is one of the world's leading crops cultivated over an area of about 142 million hectares with a production of 637 million tons of grain (Kaini, 2004).

In order to ensure that maize production achieves its objectives and perform satisfactory, what is produced in one area need to be consumed in another area where a product moves from the producer to the consumer incurring a number of transformations and transactions along a chain of interrelated activities called value chain in which value is added successively at each stage and various costs incurred at each transaction (Sitko *et al.* 2011). At each stage of transformation and transaction various costs are incurred which acts as constraint towards the value chain performance making high transaction costs to be a common problem and a key constraint towards value crop value chain performance in developing countries (Eskola, 2005; Okoye *et al.* 2016; Patil *et al.* 2007).

Moreover, Alam and Kausar (2016) stipulated that in developing world although maize production is increasing at a satisfactory rate, the crop value chain performance is still not satisfactory due to high transaction costs. This is due to the fact that majority of the farmers reside in remote areas characterised with poor transportation and market infrastructures, presence of middlemen and lack of reliable market information as well as information on potential exchange partners leading to high transaction costs which tend to be so high that markets can be said to be lost and a major constraint towards farmers to full participate in the market thus, hindering the transfer of the commodity from surplus area to shortage area (Alam & Kausar, 2016; Key *et al.* 2000; Ouma *et al.* 2009).

According to Musah *et al.* (2014) access to market information is among the transaction cost variable that affect farmers market participation and the value chain performance, caused by existence of many layers and poor connections between producers and consumers. Information related costs constitute 70 percent of the total transaction costs, which is 15 percent of the total production cost incurred by the farmers (Silva *et al.* 2008). Information standards and quality assurance present a major challenge at many points in the maize value chain leading to high transaction cost (Wilson & Lewis, 2015).

This makes information access to be costfull and thus it has important implication on contract and transaction (Jagwe *et al.* 2010).

Furthermore, high transportation costs is another major transaction cost faced by farmers along the crop value chain as transportation is an important factor in agricultural development all over the world as it is the only means by which food produced at farm site is moved to different homes as well as markets (Jagwe, 2011; Tunde & Adeniyi, 2012). When road quality is poor, long distance from farm to market and transport means are not readily accessible, transport costs tend to be higher leading to transportation costs being a major component of transaction costs affecting agriculture (Canwat, 2014; Jagwe, 2011). Consequently, high transportation cost is among the long term recognized source of agriculture inefficiency and as despite of decreasing the profit of farmers selling commodities to traders, but also often cause non existence of markets in rural areas (Suzuki & Sexton, 2005).

Moreover, due to barriers of farmers' access to market information as well as poor transport infrastructure it has made the farmers to rely on middlemen in getting market information and thus incur middlemen costs as one type of transaction costs affecting smallholder farmers (Ismail *et al.* 2015; Mwangike & Mdoe, 2015). Middlemen costs is a kind of transaction costs incurred by farmers in form of charges paid by smallholder farmers in order to access information and other market procedures due to the fact that middlemen are the ones with accurate information on prices and arrival of buyers (Ismail *et al.* 2015).

According to Patil *et al.* (2007) high transaction costs has various negative impacts on maize value chain which include smallholder farmers to not fully participate in the market, affect profit earned and lower farmers income, less contribution of agriculture to economic growth, affect the level of outputs brought to the market and post-harvest losses which are approximately 7-10 per cent at the farm to market level and addition 4-5 per cent at market and distribution level for the system as a whole, while the amount of maize losses is around 3-4 million tonnes of maize which is 4% of the total grain loss.

As a consequence, with the increasing concern with regards to reducing poverty in the world, lowering transaction costs within the value chain is one of the key elements to

ensuring growth in agriculture which will in turn have a significant impact in reducing poverty (Silva *et al.* 2008). And, in order to make a significant contribution to economic growth, the sector needs to be commercialized to enable smallholder farmers to fully participate in markets and enabling improvement in value chain through reduction in transaction costs (Jagwe *et al.* 2010). And therefore, this dissertation focuses to address transaction costs affecting post harvest maize value chain, how they affect and suggesting ways to overcome in Kongwa District Council (KDC).

1.3 Statement of the problem

Maize is the most important food crop in the country and the main subsistence crop grown by more than 50 percent of Tanzanian farmers and ranks the 5th among all agricultural commodities grown. Tanzania is considered to be a potential maize producer for the whole east African and enables the country to be ranked among the top 25 maize producing countries in the world (Abate, 2014; Barreiro-Hurle, 2012). However, despite the significance of the crop to the country and people economy and wellbeing, post harvest maize value chain performance is still low and faced with several constraint one being high transaction cost (Ismail *et al.* 2015).

Transaction costs refer to the proportional or fixed costs incurred during market exchange (Azam *et al.* 2012). And the United Republic of Tanzania (URT) maize value chain is faced with various transaction costs such as high transportation cost, local production taxes paid to the government and to the market, maize markets and market information system as well as obtaining service from the middlemen (Wilson and Lewis, 2015; Ismail *et al.* 2015). According to Eskola (2005) and Sendall (2007) high transaction costs is a well-known problem in the developing world including Tanzania and is among the challenges affecting farmers and the crop value chain as a whole.

Tanzania farmers along the maize value chain face various transaction costs affecting post harvest maize value chain performance which include information costs relating to seeking and gathering information and services which make farmers subjected to low prices and hence low profit (Ismail *et al.* 2015; Wilson & Lewis, 2015). Transportation costs leading to reduction in quality and high number of post harvest losses in farm and on transit (Key *et al.* 2000; Wilson & Lewis, 2015).

And middlemen costs which also make farmers subjected to low price and enlarge the gap between price paid to farmers and that to be received by middlemen (Ismail *et al.* 2015).

Hence, in order to reduce agriculture challenges both national and international initiatives should focus on reduction of transaction costs (Ouma *et al.* 2009). High transaction costs affect the whole value chain and has impact on farmers involvement in the agricultural market leading to poor market access and participation, the selection of channels and institutional arrangements for marketing, customers' fulfilment, affect price paid and received hence low profit, quality reduction and post harvest losses on the farm and during transportation (Alama and Kausar, 2016; Canwat, 2014; Ismail *et al.* 2015; Key *et al.* 2000; Omiti *et al.* 2009; Wilson and Lewis, 2015).

Therefore, as among the challenges facing maize farmers in Dodoma region are high transaction costs specifically high transportation costs and lack of market information (URT, 2012). And, whichever effort to improve maize distribution through reduction in transaction costs will facilitate the improvement of welfare of majority Tanzanians (Ismail *et al.* 2015). Thus, this dissertation focuses on addressing transaction costs on post harvest maize value chain performance.

1.4 Research objectives

The study intended to achieve the following objectives:

1.4.1 General objective

The general objective of this study was to assess the transaction costs on post harvest maize value chain in KDC in Dodoma region.

1.4.2 Specific objectives

The study focused on achieving the following specific objectives:

- i. To assess the transportation costs on post-harvest maize value chain performance in KDC in Dodoma region.
- ii. To assess the information costs on post-harvest maize value chain performance in KDC in Dodoma region.
- iii. To assess the middlemen costs on post-harvest maize value chain performance in KDC in Dodoma region.
- iv. To assess the effects of transaction costs on post-harvest maize value chain performance in KDC in Dodoma region.

1.5 Research Hypotheses

This study was governed by the following hypotheses stipulated as follows:

H1: There is a significant relationship between transportation cost and post harvest maize value chain performance.

H2: There is a significant relationship between information cost and post harvest maize value chain performance.

H3: There is a significant relationship between middlemen cost and post harvest maize value chain performance.

H4: There is a significant relationship between transaction costs and post harvest maize value chain performance.

1.6 Scope of the study

This study covered on transaction costs affecting post harvest maize value chain performance specifically transportation costs, information access costs and middlemen costs. The study analyzed each transaction cost by assessing the factors affecting the given type of costs, amount of costs in each transaction costs, its influence and impact on maize post harvest value chain performance in terms of sales volume, profit and post harvest losses and suggests ways to overcome. The study was conducted at KDC in Dodoma region where the Kibaigwa International Grain Market (KIGM) reside.

1.7 Significance of the study

The study adds knowledge to the existing body of knowledge concerning factors affecting post harvest maize value chain performance specifically on transaction costs, by indicating how they affect the maize value chain and ways to overcome.

The findings of the study serves as inputs to agriculture policy makers and associated stakeholders to formulate various strategies of improving the maize value chain through reduction of transaction costs. This lead to agriculture improvement hence poverty reduction and national income increased.

The study ensures the merging of theories studied into practices regarding transaction costs on maize value chain. This is because various transaction costs affecting agriculture specifically maize crop were practically studied, analyzed and addressed.

1.8 Limitations of the study

The study faced a major limitation on collection of data from small holder farmers at KDC because it was not the peak sale season and most of farmers were still on harvest thus there were few respondents per each day. This problem was solved by the researcher through follow up until the required sample size was obtained.

1.9 Organization of the study

This research report is organized into six chapters:

Chapter one consists of an overview of the study which includes the study background, statement of problem, research objectives, research hypotheses, significance of the study, scope of the study and organization of the study. This chapter is essential as it provide foundation to other following chapters as it describes where the problem lies and guidance on limits of the problem to focus upon. Chapter two deals with the review of literature on transaction costs on maize value chain. It gives more details on the topic under study by capturing the definition of concepts and terms, theoretical literature review and empirical literature review. Chapter three explained on the research methodology which offers a roadmap of how the study was conducted so as to answer the research objectives. It includes the area of the study, research design, types of measurements, data collection methods and approach, types of data, target population, sample and sample size, sampling procedures, reliability and validity of data and management and analysis of data. Chapter four contains presentation of the findings collected from KDC through interview, questionnaire and documentary review and using tables and narrations to illustrate the facts. Chapter five covers discussion of the study findings in relation to the research objectives, questions and hypothesis. And, Chapter six presents the summary, conclusion, policy implications and recommendations of the study and areas for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter involve the review of literatures which include theoretical literature review, empirical literature review and conceptual framework that present and describe the variables that were used in the study.

2.2 Definition of terms and concepts

2.2.1 Post harvest

This refers to all activities in the value chain that are done from the point of the time of crop harvest till its consumption or other end uses and include various activities including handling, harvesting, storage, processing, packaging, transportation and marketing (FAO, 2015).

2.2.2 Value chain

The term value chain is used to describe all range of activities that are needed to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky & Morris, 2001).

2.2.3 Transaction costs

Pingali *et al.* (2005) defines transaction costs as a trade-off between the costs of coordination within an organization and the costs of transacting and forming contracts in the market. Also, transaction costs are the resources expended in exchange relations to agreements to exchange goods or services involving buyer and seller relations (Appiah *et al.* 2010).

2.3 Maize Crop in Tanzania

2.3.1 The position/significance of maize crop in URT

URT is among the top three maize producing countries in Africa and for two decades consecutively the URT has ranked among the best top 25 maize producing countries in the world and the country has the largest planted area of maize in all Southern and East Africa (Wilson & Lewis, 2015). Maize constituted approximately 5 percent of total agricultural imports between the years 2005-2010. It accounts for 30 percent of the country's crop production value and 10 percent of the total value added in the agricultural sector in the country. It is among the very political commodities in the country and regular trade measures are always put in place to assure food security (Barreiro-Hurle, 2012).

Maize is the most important food crop in the country and accounts for 30 percent of total food production, 70 percent of the country population consume maize as their staple food and is the major energy source in the peoples diet accounting for 25 percent of total caloric intake. It is the 5th agricultural commodity in the country by value of production covering both cash and food crops accounting for 7.5 percent of total production value (Barreiro-Hurle, 2012; Wilson & Lewis, 2015).

2.3.2 Maize production in Tanzania

Maize cereal crop is grown in all regions of Tanzania and a considerable quantity of maize is produced by smallholder farmers accounting for over 95% of all maize producers and mainly for subsistence rather than commercial purposes (Ismail *et al.* 2015; Wilson & Lewis, 2015). Maize constitutes 45 percent of total arable land and generates nearly 50 percent of rural cash income and is the highest priority among major crops in all five zones in the country and the second in northern zone (Abate, 2014). It is approximated that 4,086,555 ha, around four million or 70% of the land is used for maize production in the country (Ismail *et al.* 2015).

In Africa, Tanzania has the second prevalent area planted maize after Nigeria with about 4.12 million ha of land planted maize in 2012. Approximately 3.2 million households equivalent to more than 24 million people grow maize in the country and allocate almost 70% of their land to grow this crop (Abate, 2014)

Maize produced in the country is mainly white maize and is grown on about 41 percent of the cultivated land during the heavy rainy main season and 47 percent of the cultivated land during the autumn second season which allows the country to have maize production nearly around all the year (URT, 2012).

2.3.3 Maize productivity in Tanzania

In spite of the importance of maize to the country's food security and people and country economic well-being, maize productivity in the country is still very low attributed by high transaction costs. The average yield for year 2010-12 was 1370 kg/ha which is much less than the Sub-Saharan Africa average yield of about 1800 kg/ha (Abate, 2014). Although growing conditions in the country are often good for maize, the average yields are still low (Wilson & Lewis, 2015).

That is, although maize production has increased in recent years but it has been due to an increase in area planted rather than an increase in yield gains. The yield gain for maize in Tanzania was 33 kg/ha/yr which is below compared to 146 kg/ha/yr for Malawi, 124 kg/ha/yr for Uganda, 110 kg/ha/yr for Zambia and -20 kg/ha/yr for Kenya (Barreiro-Hurle, 2012).

2.3.4 Maize production in Dodoma (URT, 2012)

Dodoma region is the fourth region with largest land area under cultivation growing both annual crops and annual mixed crops. Although the region is dominated by dry season, it is the second region in the country with largest maize planted area and among the largest planted areas per household.

Maize is the leading cereal crop in the region with the planting area covering 64% of all cereals planted area. Also it is the leading grown crop per number of households growing cereals as 94% of agricultural households grow maize in Dodoma.

Kongwa district is the leading district in maize production in the region. It has the largest maize planted area per household which is 2.4ha and the leading district in number of households growing maize in the region. Also, the percent of crop growing households selling crops was highest in the district comprising of 83.4% of all households.

Table 2.1: Area production and yield of major cereals in Dodoma

Crop	2007/2008		
	Area Planted	Amount Harvested	Yield (T/ha)
Maize	338,843	350,797	1
Paddy	2,818	1,983	0.7
Sorghum	96,147	68,739	0.7
Bulrush Millet	80,956	47,738	0.6
Finger Millet	9,660	6,232	0.6
Total	528,424	475,671	

Source: URT (2012)

2.3.5 The maize value chain or Marketing Chain

The maize value chain is highly expanded due to demand pull from the poultry sector, brewery and other agro-industrial products (Kaminski *et al.* 2013). The maize value chain constitute of three main agents who purchase maize from farmers namely the private traders, the Cereals Board and the National Food Reserve Agency (NFRA). Among the three agents public interventions in the market is very low as NFRA and cereal boards purchases less than 10 percent of the total production (Barreiro-Hurle, 2012).

The maize marketing structure is featured by a high number of small traders operating both from the main production centres and from the major urban areas. Produce from the farm is taken to primary markets in producing areas directly by farmers or middle men who purchase the maize at the farm. The majority of marketed maize is delivered to local collection hubs, accumulated by traders who sell on to local, regional and urban markets and some is also sold to processors and grain traders who accumulate and export (Wilson & Lewis, 2015)

According to Wilson and Lewis (2015) regardless the importance of maize to the people and the country at large, the value chain is fragmented and poorly coordinated characterised by presence of many layers and inefficient connections between producers

and consumers. Trust, reliable information systems, and the benefits of economies of scale are not well established. The maize market margins are generally quite high, indicating inefficiencies in its supply chains and post harvest losses are quite significant and productivity levels are low. Prices vary greatly between harvesting seasons and non harvesting period and only large scale farmers or traders, with access to storage facilities and financial services are the one able to take advantage of price fluctuations (Barreiro-Hurle, 2012).

2.4 Theoretical literature review

The study was governed by one major theory namely the transaction cost theory. The theory is discussed as follows:

2.4.1 The Transaction Cost Theory

Transaction cost theory has been derived from the “New Institutional Economics” approach and the theory focuses on institutions of governance. The theory is based on the principle that institutions are transaction cost minimizing arrangements that may change and evolve with changes in the nature and sources of transaction costs (Ouma *et al.* 2009).

This theory states that there are always economic costs involved in the transaction between two or more entities (Abdul-Halim *et al.* 2012). Transaction costs are often actor specific, and all producers, traders and buyers make their decisions based on the price and transactions cost that they incur and which are specific for them instead of reacting to a uniform market price (Eskola, 2005).

The theory pioneers believe that apart from the transaction costs during physical movement of goods from point A to point B, the exchange process itself is costly in terms of obtaining market information, negotiating contracts, monitoring, enforcing the agreed transactions and cost relating to marketing their produce (Eskola, 2005; Mwangi & Mdoe, 2015).

In crop production sector, most often the cost of exchange varies depending on the personal relationship between the two parties, crop type, location and household characteristics, thus as the transaction costs are specific to each market actor, there is no

single effective price at which exchange occurs (Pingali *et al.* 2005; Sadoulet and de Janvry, 1995).

Transaction costs appear in both stages of the exchange or transaction process such as information costs which arise *ex ante* (prior) an exchange process, negotiation costs which occur during the physical carrying of the transaction and monitoring costs which occur *ex post* of a transaction and include the costs of ensuring that the terms of the transaction are adhered to by the parties involved in the exchange (Pingali *et al.* 2005).

Transaction cost incurred by farmers affects them on various ways such as high transportation costs and information costs affect the decision for them not to sell direct to final consumers and to rely to middlemen (Mwagike & Mdoe, 2015) whereas high transaction costs to farmers on accessibility of inputs and marketing of produce make farmers not to get the anticipated benefits due to low profit received less than costs incurred (Llanto, 2012).

2.4.2 Sources of transaction costs

2.4.2.1 Information asymmetry

Information asymmetry is created when one group has a better understanding or more information about an exchange than the other group (Rossignoli, 2015). Information asymmetric is a situation which occurs when parties involved in a transaction do not possess same information and are not equally informed (Minarelli *et al.* 2016). Also it refers to a condition where buyers and sellers do not have the same information regarding price, quality, safety and market conditions (Nkhori, 2004). Information asymmetries problem have an effect on all actors along the agri-food supply chain including farmers, wholesalers and retailers, processors, consumers, quality agencies and public regulator (Minarelli *et al.* 2016). And it is accelerated by the presence of inadequate or poor means of communication including inadequate or poor rural road network (Nkhori, 2004).

Before decision on how to market a product and to whom to sell it, producers must determine the price that they expect to receive while the consumer must determine the quality and safety of the product (Minarelli *et al.* 2016; Nkhori, 2004). Thus, transaction

costs arise when market information is asymmetric as this brings about activities such as information searches to improve the level of information accuracy, bargaining, vertical coordination by means of market contracts or vertical integration, monitoring, enforcement and protection of property rights, which are all by nature costly (Minarelli et al. 2016; Nkhori, 2004).

2.4.2.2 Asset specificity

Each transaction normally needs to be supported by the use of assets in both the production process and the exchange phases. And thus, asset specificity occurs when the exchange process necessitates specific investments to implement lawful contracts or when distinct know-how is acquired during contract application (Rossignoli, 2015).

According to Williamson (1981) exchange that involve unspecialized assets pose few risks and transaction costs as buyers in the exchange process can easily turn to alternative sources of suppliers and suppliers can easily switch from one buyer to another with ease and incurring less costs. However, asset specificity increases the problem of transaction costs due to the fact that when specific investment has been made it makes the parties to the exchange bound to each other and locked in a relationship for a specific period of time and transaction costs incurred from any efforts of withdrawing from the exchange process (Rasheli, 2016; Williamson, 1981).

2.4.2.3 Opportunism

This refers to self interest seeking behaviour within the human beings (Rasheli, 2016). And it manifests itself in moral hazard and adverse selection which occur when one party cannot establish the trustworthiness of the other party (Nkhori, 2004). When the risk of opportunism is very high it make it impossible for the parties to foresee all uncertainties thus farmers incur much cost in making transaction decisions such as acute observation of market price (Rossignoli, 2015).

Opportunism attributes to high transaction costs as it calls for more formal governance mechanisms to be used to solve opportunistic which are usually more costly than informal governance mechanism but at the same time leads to an increase of other transaction costs such as search and screening costs by both exchange parties so as to

get more trustworthy exchange partners with less opportunistic behaviour and search mechanism for preventing the given behaviour (Allen, 2015; Besanko, *et al.* 2010).

2.4.2.4 Bounded rationality

Bounded rationality ascertain that, even despite the fact that humans behave in an intentionally rational way, they are actually not as much of so due to the limitations of their knowledge, far-sightedness, technical abilities and the available response time (Rossignoli, 2015). It refers to cognitive and perceptual limitations on the part of human beings (Rasheli, 2016).

Bounded rational actors inhibit limits in formulating and tackling complex problems and in processing information (Williamson, 1981). It display individual limited ability to process information, failure to foresee all possible uncertainties, deal with complexity and pursue rational aims (Besanko, *et al.* 2010). Bounded rationality attributes to transaction cost problems as it leads to formulation of incomplete contracts bringing contracting problems and also leads to an increase in search costs and costs resulting from involvement of large number of trading partners so as to get a rational partner (Besanko, *et al.* 2010; Williamson, 1981).

2.4.3 Forms of transaction costs

Most studies has indicated that there are two major forms of transaction costs as stipulated below (Alam and Kausar, 2016; Holloway *et al.* 2000; Key *et al.* 2000; Nkhori, 2004).

a) Fixed versus Proportional Transaction costs

Fixed transaction costs are costs that do not vary with the volume of input as well as output or magnitude and level of transactions made and include information search costs, negation costs and contract enforcement costs while Proportional transaction costs vary with the level of or volume of output involved in the transactions and includes transportation, packaging and handling costs. Proportional transaction costs influence market participation, agricultural supply response, the choice of channels and institutional arrangements for marketing and; customers' satisfaction.

b) Observable versus Unobservable

Observable transaction costs are visible costs when the transaction takes place which always affect magnitude of trade include costs such as transport, handling, packaging, and storage while Unobservable transaction costs are the costs not visible when the transaction takes place and include costs of information search, bargaining, screening, monitoring, coordination, and contract enforcement

2.5 Empirical literature review

Ismail *et al.* (2015), in Tanzania in the study called transaction costs and market participation decisions of maize smallholder farmers in Dodoma region specifically in Kongwa and Mpwapwa districts. The study found out that transaction costs influence market participation of maize small holder farmers whereas transportation costs and middlemen costs were the two variables significant to determine market participation. The study more revealed that distance from home to the market and the qualities of the roads are major related factors influencing the said transaction costs in the district. The binary logistic regression model and the chi-square test were applied to test the hypothesis. The results revealed that market transaction costs influence market participation decisions of maize smallholder farmers in the region and this was due to the impacts of transportation costs and middlemen costs.

Mwagike and Mdoe (2015), in Tanzania in their study titled the role of middlemen in fresh tomato supply chain in Kilolo district Iringa region. The findings of the study described that rural small holder vegetable farmers rely to middlemen and incur middlemen costs such as contractual costs due to the fact that they have narrow access to urban markets due to low quality road networks leading to high transaction costs in form of transportation costs which constraint number of traders accessing the villages. The study further portrayed that relying to middlemen leads to farmers receiving low price than that earned by middlemen and hence can be reduced by improvement in feeder roads and improved dissemination of market information.

Eskola (2005), in the study called agricultural marketing and supply chain management in Tanzania the study focused on describing the prevailing marketing arrangements in Tanzania at local, regional, national and export markets using Dar es Salaam, Ifakara,

and Mtwara as case study. The study assessed physical infrastructure, knowledge and capital and institutional arrangements as agriculture market barriers and revealed that ineffective physical infrastructure in terms of roads increases transaction costs such as increase in cost of transportation and marketing costs as it act as informal market barrier, form a block between the supplier price and consumer price and damage and perishability of products. This study reveals the need for assessing the transportation costs, middlemen costs and market information costs on agricultural value chains.

Alam and Kausar (2016), in the study called transaction cost Analysis of Maize Marketing in Bangladesh. The study collected data from 55 randomly selected maize farmers and maize marketing intermediaries from two district of Bangladesh. The study recognized five components of transaction cost in maize marketing and included information costs which include search cost and screening cost, and contracting costs which include bargaining cost, monitoring cost and enforcement cost. The study found out that information cost in form of screening costs on the reliability of both buyer and seller and on the quality of maize and monitoring costs was found to be the highest. The study recommended that transaction cost should be regarded a separate cost item in the computation of marketing cost and margin of maize growers and marketing intermediaries.

Ouma *et al.* (2009) on the paper called transaction costs and smallholder farmers' participation in Banana Markets in the Great Lakes Region. The study found out that market participation is influenced by transaction cost associated factors such as distance influenced by geographical location of farmers households, sources of market information and travel time to the nearest urban centre. The study recommended that government policies towards improved and increased investment in rural infrastructure such as road networks, telecommunication services and market place establishment can facilitate the reduction in transaction costs and therefore improve participation of smallholder farmers in markets.

Jagwe *et al.* (2010) in the study called transaction costs and smallholder farmers' participation in banana markets in the Great Lakes Region of Burundi, Rwanda and the Democratic Republic of Congo. The study found out that farmer's decision to take part in the market is highly influenced by fixed transaction costs while the extent of

participation is determined by variable transaction costs. The study more found out that access to market information, ownership of means of transport and different in quality of infrastructure basing on geographical location of the household which lead to high information costs and transportation costs affect market participation and intensity of participation. The study concluded that market participation is not only caused by the factors of production possessed household but is also determined by the transaction costs involved in accessing markets for both inputs and outputs.

Kaminski *et al.* (2013) in Burkina Faso in their study titled an analysis of Maize value chain and competitiveness in Burkina Faso: Implications for smallholder-inclusive policies and initiatives. The study found out that due the fact that cereals have low value to weight ratio transport unit costs is a major constraint towards maize marketing leading to high transport cost. The study further portrayed that the high transportation cost is highly accelerated by logistic disadvantages one being low quality infrastructures, concluding that, transport cost element of cereal marketing is often significant and limits market integration and leads to high transaction costs.

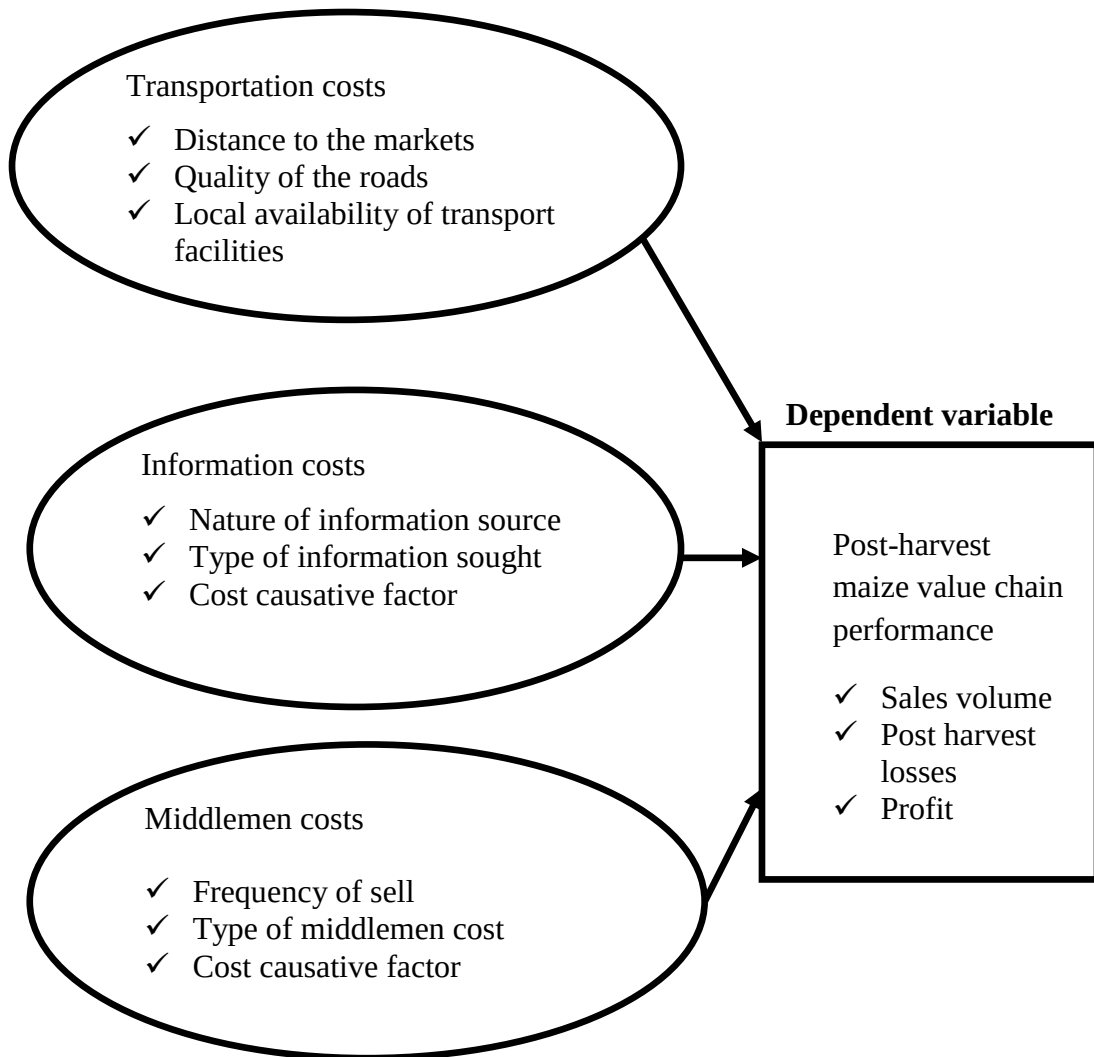
Omiti *et al.* (2009) in the study called factors influencing the intensity of market participation by smallholder farmers in rural and peri-urban areas of Kenya. The study found out that market information on prices and quantities of commodities in various markets is a key to market participation and farmers incur various costs in order to access appropriate information. The study further described that information costs are considered to be fixed transaction costs that influence market entry decisions and concluded that market information plays a key role in farmers' decision on how much output to make available to the market basing on information costs incurred, the existing market price and distance to the market.

Macharia *et al.* (2014) conducted a study on the effect of transaction costs on smallholder maize market participation: case of Kwanza District, Trans Nzoia County, Kenya. The results revealed that information search costs influenced smallholder maize market participation negatively and it was recommended that emergence of institutions and more towards accurate and timely market information availability and accessibility. This study showed that information costs as among transactions has effects on maize market participation for smallholder maize farmers.

2.6 Conceptual Framework

Figure 2.1: The conceptual framework

Independent variables



Source: Researcher's own construct (2018).

The conceptual model on figure 2.1 describes the independent variables and dependent variable of the study. The figure shows that transportation costs, information costs and middlemen costs are the independent variables and post-harvest maize value chain performance as the dependent variable. Transportation costs under this study is attributed by distance to the markets, quality of the roads and local availability of transport facilities, whereas, information costs is influenced by nature of information

source, type of information sought and information costs causative factor . Also, figure 2.1 depicts that frequency of sell through middlemen, type of middlemen costs incurred and middlemen cost causative are among the indicators of middlemen costs as part of transactions costs that affect the post-harvest maize value chain. The dependent variable post harvest maize value chain performance is measured by three indicators namely sales volume, profit and the quantity of post harvest losses. The link between the variables is explained in the following paragraphs:

2.6.1. Transportation costs on post harvest maize value chain

Transportation is the main activity which facilitates the movement of agriculture produces from farm site to the respective homes and markets and it has been regarded as an important catalyst to agriculture progress and development because it is a phase in production process which completes and ensures that commodity is in the hands of the final consumers and the value of any agricultural products can be realized only when commodities are transported to the buyer in good condition (Ali & Ikejiofor 2013; Hine & Ellis, 2001).

Transportation influences agriculture development and productivity by improving the crop value chain, farmers' market access, influences cost and price of produce and improve quality of life of the people (Ajiboye & Afolayan, 2009). Thus, transport costs constitute a significant component of marketing costs as always crops are transported to the markets for sell and especially where the produces are transported over long distances, road conditions are poor and when only small quantities of produce are transported at one time (Canwat, 2014).

Transport cost depends on the distance between the farm and the market, the road quality, and the local availability and ownership of transport and thus when the road has poor quality and means of transport are not readily accessible, transport costs tend to be higher and the reverse is true (Canwat, 2014; Ismail *et al.* 2015; Wandschneider & Yen, 2006). This is due to the fact that, when roads condition is poor transporters increase the transport fees and charges to compensate for damages to their vehicles resulting from the use of such roads, hence reduce the price that farmers could receive from traders (Nkhori, 2004).

According to Wilson and Lewis (2015) transportation costs specific for maize crop in the country are very high which call for considerable amount of investment to facilitate farmers to get their crops to the market easily. Therefore, as transportation costs is one of the key transaction cost affecting value chain performance it led to the formulation of first hypothesis which stated that:

H1: There is a significant relationship between transportation costs and post harvest maize value chain performance.

2.6.2 Information costs on post harvest maize value chain

According to Omiti *et al.* (2009) and Ouma *et al.* (2009) market information comprises insights on prices, quantities and potential exchange partners of commodities in various markets emanating from formal sources such as radio, television, newspapers, public and private organizations or informal sources such as neighbours, friends and relatives. Market information is a key inducement for increased and plays an important role to farmers as influence decisions on how much output to bring to the market depending on the prevailing price because prior making a decision about how to market a product and to whom to sell it, farmers must determine the price that they anticipate to receive (Makhura *et al.* 2001; Nkhori, 2004).

As stipulated by Nkhori (2004) informational costs involve costs of finding accurate information on price and quality, service record, availability of a product and potential buyers usually influenced by quality of the roads, distance to the market and presence of communication infrastructures. Presence of poor quality roads, long distance from households to the market and poor communication infrastructures restricts farmers access to information making it difficult to make accurate price decisions and choice of buyers and raises transaction costs such as search and monitoring costs as well as the use of middlemen (Ismail *et al.* 2015; Nkhori, 2004; Omiti *et al.* 2009; Pingali *et al.* 2005). Thus, as information is fundamental for post harvest value chain performance, and the cost affect the level of performance it gave ground to the formulation of the second hypothesis which stated:

H2: There is a significant relationship between information costs and post harvest maize value chain performance.

2.6.3 Middlemen Costs on post harvest maize value chain

Middlemen act as guarantors and are elements needed in various parts of the supply chain to facilitate transfer of quantities and price between the buyer and the seller (Mwagike & Mdoe, 2015). Farmers especially smallholders sell their produce to various middlemen due to high transaction costs which include transportation costs and imperfect market information (Robinson & Kolavalli, 2010).

Middlemen costs are charged as both observable and unobservable charges paid by small scale farmers in order to access market information and necessary market procedures (Ismail *et al.* 2015). These costs are usually experienced by farmers due to long distance from the market characterised by poor road infrastructure which limit farmers to get information on arrival of buyers and price changes (Ismail *et al.* 2015). Middlemen possess accurate information about the market thus in order for farmers to access they have to pay either by cash or by reducing price of the produce (Holloway *et al.* 2000). This makes farmers to get low farmgate prices while middlemen capture a high amount of profit (Wilson & Lewis, 2015). As several studies enumerated the significance of middlemen costs on agriculture performance, this directed the researcher on formulation of the third hypothesis which stated as follows:

H3: There is a significant relationship between middlemen costs and post harvest maize value chain performance.

2.6.4 Effects of transaction costs on post harvest maize value chain performance.

According to Pingali *et al.* (2005) transaction costs has various effects which includes, high marketing costs which affect farmers' decision to participate in the market, affect choice of marketing channels used by the given farmer and leads to reduction in the rate of crop production as farmers are not sure on their availability to sell. Nkhori (2004) indicated that high transaction costs leads to high costs of inputs which include capital necessary for market entry and making transactions, differences between perceived buying and selling prices which affect prices received for agricultural products and profit gained by farmers affecting farmer's income and affect the level of participation in the market.

Moreover, according to Patil *et al.* (2007) high transaction costs leads to reduction in crop quality which affect the price to be paid for the given crop, reduction in percentile contribution of agriculture to country's economic growth and post harvest losses which occur at farm, on storage and during transit. Therefore as transaction costs in general has been reported with various authors on its impact on post harvest performance it led to the formulation of fourth hypothesis which stated:

H4: There is a significant relationship between transaction costs and post harvest maize value chain performance.

CHAPTER THREE

RESEARCH METHODOLOGY

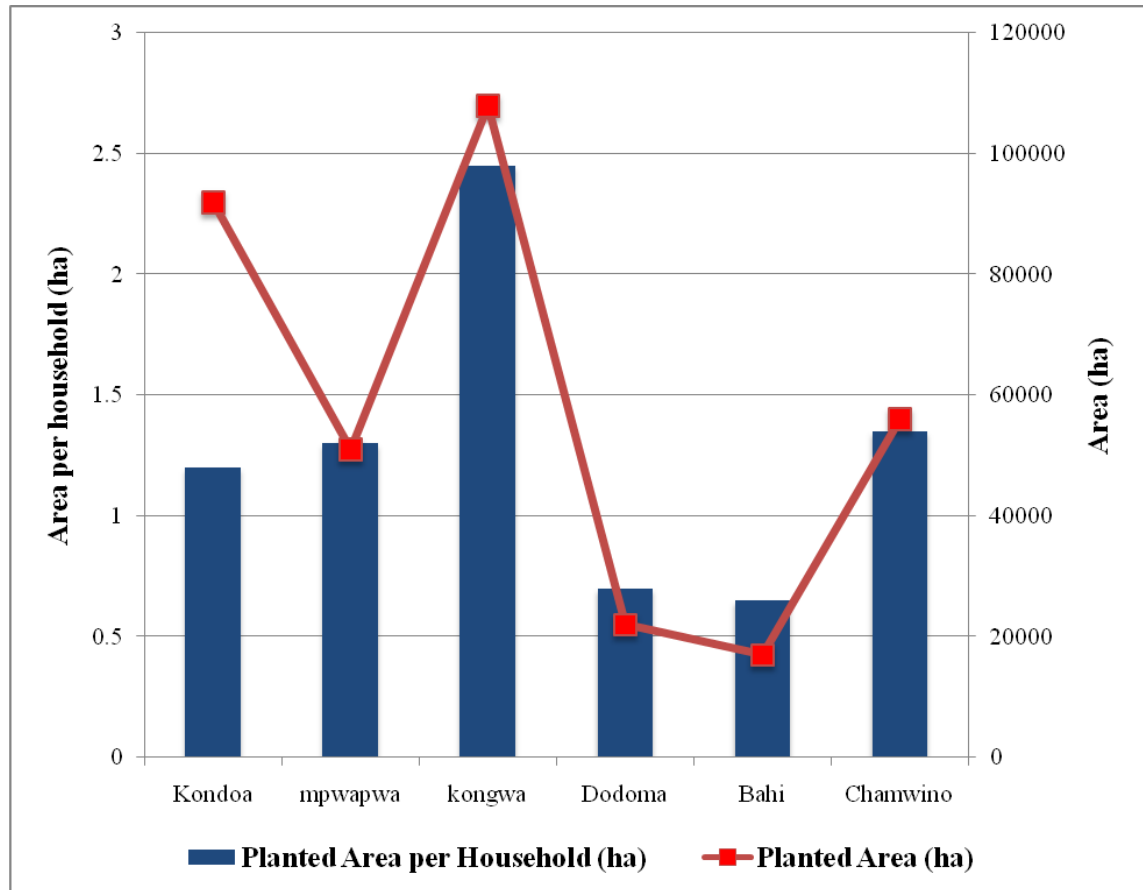
3.1 Introduction

This chapter consist of description of the study area, research design, population, sampling techniques and sample size, data collection methods, data reliability and validity issues and data analysis techniques.

3.2 The study area

This study was conducted at Dodoma region in Kongwa District Council including the KIGM and the surrounding villages. This was because Kongwa is the leading maize producing district in the region with a planted area of about 108,568 ha during 2007/2008 season (URT, 2012). Also in Kongwa district it is where the KIGM belongs which is the largest international market in Tanzania where the market approximately collects between 74,205 to 116,205 Tons of maize annually (Ismail *et al.* 2015).

Figure 3.1: Total area planted maize in Dodoma region per growing household in the district



Source: (URT, 2012)

3.3 Research design

As research design refers to the conceptual structure within which research is conducted and it includes the plan for the collection, measurement and analysis of data (Kothari, 2004); the study adopted a survey research design which enabled the researcher to gather data from several households at a particular period in time regarding the study topic. The strength of using survey lies on the fact that it enabled the researcher to collect data from a large population in an economical way, can be used to establish relationship between studied variables and facilitate generalization of the results to the population (Greener, 2008.). Also survey research design facilitates the collection of quantitative data which can be analysed by using both descriptive and inferential statistics (Saunders et al. 2009).

3.4 Target population

To assess transaction costs on post harvest maize value chain performance the target population of this study were the smallholder farmers producing maize crop in Kongwa district Council in Dodoma region. The study targeted small holder farmers because they are the ones who are affected highly with transaction costs as they are vulnerable to poor road infrastructure, long distance to the market, inadequate market information and weak institutional set up (Wilson & Lewis, 2015).

3.5 Sample size and Sampling techniques

3.5.1 Sample size

The selected sample size was 88 smallholder farmers selected from three villages in Kongwa district namely Lengitojo, Makawa and Kibaigwa which enabled the researcher to get accurate data relating to study topic. The sample size constituted 10% of the target population as 10% sample size is considered as an optimal and most favourable representation of the target population for analysis (Okoth, 2012).

Table 3.1: Sample size composition

S/NO	Village	Target Population	Sample size	Percentage
1	Kibaigwa	350	35	10
2	Lengitojo	258	26	10.1
3	Makawa	275	27	9.8
	Total	883	88	10

Source: Research data (2018)

3.5.2 Sampling technique

Multi stage sampling technique was adopted by the researcher to select the respective sample. In the first stage Kongwa district was purposively selected as it is the highest annual maize production district in the region comprising of largest maize planted area and highest number of smallholders farmers growing and selling maize crop (URT, 2012). In the second stage three villages were selected basing on the distance from KIGM namely Lengitojo, Makawa and Kibaigwa. Lastly, maize producing smallholder farmers households were randomly selected in each selected village from the list given by Village executive officers giving a sample size of 88 farming households. The

researcher adopted this sampling technique from various authors who conducted related studies on agriculture and specifically maize crop including (Musah *et al.* 2014, Oparinde and Daramola, 2014; Okoye et al, 2016; Soliu, 2014)

3.6 Types and sources of data

In this study both primary and secondary data were collected by the researcher. Secondary data was used to triangulate primary data in order to increase reliability and validity of data.

3.6.1 Primary Data

These are data collected directly for the first time through various methods such as questionnaires, interviews and schedules (Krishnaswami, 2006). In the study Primary data was collected directly from the smallholder maize farmers in the district through questionnaire and interview methods. Data concerning respondents profile, transportation costs, middlemen costs and information costs incurred and factors influencing the given costs; and effects of transaction costs on post harvest maize value chain performance were collected as primary data of the study.

3.6.2 Secondary Data

Secondary data was collected from published and unpublished reports from various sources such as President Office-Regional Authority and Local Government (PO-RALG), KDC office website, KIGM offices, bulletins, journals, research papers and articles relevant to the study. From the sources the researcher collected data on the district maize production status, prevailing market prices for several years, information on households growing maize crop, quantity for maize sold in the respective markets and transaction cost challenges facing farmers in the district and the mechanisms adopted to minimize the challenges.

3.7 Data collection Methods

The researcher used various methods of data collection to get relevant data as per study topic. The data collection techniques used were:

3.7.1 Questionnaire

The researcher prepared close ended questionnaires which targeted to achieve the research objectives. The respondents sampled were supplied with questionnaire to fill and the answers obtained were used to form the primary data of the study. The questionnaire comprised of four sections where section one involved background characteristics of respondents, section two to four focused on transportation cost, information costs and middlemen costs on post harvest maize value chain performance respectively and the last section focused on the effects of transaction costs on post harvest maize value chain performance.

3.7.2 Personal interview

The researcher used interview to the sampled respondents to obtain additional data and in depth elaboration of the topic under study which was not captured in the questionnaire. This was because an interview is a decisive discussion between two or more people which facilitate the collection of valid and reliable data that are significant to the study research questions and objectives (Saunders et al. 2009). Data relating to how the transaction costs affects the post harvest maize value chain performance, reasons for incurrence of the given transaction costs and factors affecting the extent of the given transaction costs were obtained through the interview method.

3.7.3 Documentary Sources

The researcher reviewed different documents both published and unpublished data concerning transaction cost on maize in order to obtain data for the topic under study. Various documents were reviewed including brochures, price chats and crops receiving books of KIGM. This provided information on prevailing level of prices, quantity of maize brought for sale and information on how the market operates and the mechanisms undertaken to ensure efficiency of the market operations. Documentary review technique was important because enabled the collection of secondary data which was not possible to be obtained through questionnaire and interview.

3.8 Data Validity and Reliability

3.8.1 Data Validity

Validity indicates the degree to which a measuring instrument measures what is supposed to measure (Kothari, 2004). To ensure validity of this study the measuring instruments that are questionnaire and interview guide were pre-tested through carrying out a pilot study to check the accuracy of the instruments if it measures what is supposed to measure. The measuring instruments were tested to the few selected respondents and the necessary changes were made where necessary.

3.8.2 Data Reliability

Reliability refers to the extent to which data collection techniques or analysis procedures provide consistent results (Saunders *et al.* 2009). Cronbach's alpha was used to test the reliability of the study. Different items of the study were correlated with each other to ensure there is internal consistency. The researcher tested each independent variable indicator to ensure that the correlation results are as the accepted reliability estimates proposed by various studies which is 0.7 and above (George and Mallery, 2003). The study was proved reliable as the Cronbach alpha coefficient of all variables was above 0.7 as per table 3.1.

Also, triangulation technique were employed where the researcher used multiple data collection techniques and obtained data from both primary and secondary sources. Triangulation involve use of two or more data-collection methods within one study in order to help ensure that the data are telling you what you think they are telling you (Saunders *et al.* 2009), thus triangulation enriches and confirm the results from the data collected and instil confidence that the data collected are reliable (Greener, 2008).

Table 3.2: Cronbach's Alpha coefficients

Items	Cronbach's Alpha
Distance to the markets	.772
quality of the roads	.787
local availability of transport facilities	.797
nature of information source	.784
type of information sought	.858
cost causative factor	.853
frequency of sell	.806
type of middlemen cost	.813
cost causative factor	.761

Source: Research data (2018)

3.9 Performance Indicators

Sales volume, Post harvest losses and Profitability per bag of maize were used as performance measures to determine the effect of transaction cost on performance of post harvest maize value chain in the study. Sales volume was measured in bags of maize sold per farmer (Mwagike, 2015). Profitability as indicator of efficiency was measured as the difference between selling price and total post harvest transaction costs incurred per bag of maize sold (Mwangi, 2015). Lastly, post harvest losses were determined by the difference between bags of maize harvested versus the quantity of maize final used for consumption or sale (Canwat, 2014).

Table 3.3: Variables and their measurement

Research Objectives	Variables	Indicators	Measurement scales
i) To assess the transportation costs on post-harvest maize value chain in Kongwa District Council in Dodoma region.	Transportation costs	Distance to the markets Quality of the roads Local availability of transport facilities	Nominal Ordinal
ii) To assess the information costs on post-harvest maize value chain in Kongwa District Council in Dodoma region.	Information costs	Nature of information source Type of information sought Cost causative factor	Nominal Ordinal
iii) To assess the middlemen costs on post-harvest maize value chain in Kongwa District Council in Dodoma region.	Middlemen costs	Frequency of sell Type of middlemen cost Cost causative factor	Nominal Ordinal

Source: Researcher (2018)

3.10 Data analysis Methods

The study used both qualitative and quantitative method of analysis to analyse the collected data basing on the nature of the data collected in the study area.

3.10.1 Qualitative analysis

Qualitative data collected through interview were analysed through description, narrations, explanations and interpretations where by respondents responses were interpreted by the researcher and explained to make a meaning. Qualitative data focused on several themes including the type of transaction costs incurred, the main cause of incurring the given type of transaction costs and how the costs affect post harvest maize value chain performance do.

3.10.2 Quantitative analysis

Quantitative data collected through questionnaire was analysed in form of descriptive and inferential statistics.

3.10.2.1 Descriptive statistics

This involved the use of frequency distribution tables where frequencies and percentages basing on respondents responses were displayed. Type of responses, frequencies and percentages of the responses regarding transaction costs on post harvest maize value chain performance in KDC smallholder farmers were analysed. This enabled the researcher to describe and make comparison of the variables in numerical means (Saunders *et al.* 2009)

3.10.2.2 Inferential statistics

This entailed the testing of hypotheses by using several tests of significance to determine at what level of validity conclusion from the sample can be drawn (Kothari, 2004). In the study the researcher used chi-square tests and multiple regression analysis as the selected types of inferential statistics.

3.10.2.2.1 Chi-square test

The first to the third objectives were analysed by using Chi -square test technique where the relationship between the given transaction cost namely transportation costs, information costs and middlemen costs and post harvest maize value chain performance was established. The researcher used the chi-square test because the variables were grouped into categorical variables and thus it allows the researcher to test how possible the two variables are connected (Saunders et al. 2007).

3.10.2.2.2 Multiple regression analysis

Multiple regression analysis was used to determine the effect of transaction costs on post harvest maize value chain performance. Independent variables used in the study were the transaction costs variables namely transportation costs, information costs and middlemen costs each tested separately against the dependent variables constituting of post harvest value chain performance indicators namely profit, sales volumes and post harvest losses as adopted by other scholars who conducted similar studies of assessing the effects of independent variables on the dependent variable (Mwagike, 2015;

Mwangi, 2015). Multiple regression assumptions namely normality, homoscedasticity and multicollinearity were tested by the researcher before the conduct of the analysis.

In equation form the multiple regression models is presented as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where Y= the dependent variable performance, X_1 , X_2 and X_3 represents the independent variables namely transportation costs, information costs and middlemen costs respectively, while β_1 , β_2 and β_3 are variables coefficients of determination, ε is the error term estimated and α is the constant figure.

CHAPTER FOUR

PRESENTATION OF THE FINDINGS

4.1 Introduction

This chapter presents the study findings relating to the problem under study, the research objectives and research hypotheses. Multiple data collection approaches such as interview, questionnaires and documentary review were used in the collection of data at Kongwa district council. The data presented were analyzed by using the statistical software known as IBM SPSS Statistics version 20.

4.2 Response rate

During data collection a total of 88 questionnaires were distributed and administered to the selected maize small holder farmers in the KDC sampled villages. All the 88 questionnaires were returned and used for analysis. Therefore this made the response rate for this study to be 100%.

4.3 Transportation costs on post-harvest maize value chain performance

The first research objective was to assess transportation costs on post-harvest maize value chain performance. It was hypothesized that there is a significant relationship between transportation costs and post harvest maize value chain performance. To meet this objective the researcher formulated various questions on questionnaires in relation to the distance to the market, nature of the road used, local availability of means of transport, means of transport used and nature of ownership, transportation costs incurred, factor influencing extent of transportation costs and impact of transportation cost on post harvest maize value chain performance as follows:

4.3.1 Distance from the farm to the market

The researcher aimed at finding how far in distance from the farm to the market, and this was because distance has influence on the rate of transportation costs to be incurred. Table 4.1 shows that 59.1% equivalent to 52 respondents are more than 100km from the

market, while about 26 respondents equivalent to 29.5% are within 50-100km and 11.4% equivalent to 10 respondents are less than 50 km from the market.

Table 4.1: Distance in Kms are you from the nearest local maize market

Response	Frequency	Percent
Less than 50 kms	10	11.4
50-100 Kms	26	29.5
More than 100 Kms	52	59.1
Total	88	100.0

Source: Research data (2018)

4.3.2 Nature of road condition

Also, the researcher wanted to know the nature of the road condition on which farmers uses to transport their maize harvest to the KIGM. The researcher asked this question because nature of road condition has influence on amount of transportation cost incurred. The results from Table 4.2 shows that 58 respondents representing 65.9% indicated that the nature of road condition is poor, while 23.9% equivalent to 21 respondents said the nature of the road is somehow meaning neither good nor bad. 10.2% equivalent to 9 respondents indicated that the road condition is good while neither of the respondents indicated that the road condition is very good

Table 4.2: What is the nature of the road condition to the market place

Response	Frequency	Percent
Good	9	10.2
Somehow	21	23.9
Poor	58	65.9
Total	88	100.0

Source: Research data (2018)

4.3.3 Availability of means of transport

In this question the researcher wanted to find out on local availability of means of transport if means of transport are readily and easily available or not. The researcher asked this question because local availability of means of transport ha impact on the rate of transport costs to be incurred. Table 4.3 indicated that 38 respondents corresponding to 43.2% responded that means of transport are moderate available, 28 corresponding to 31.8% responded that means of transport are frequent available while 25% corresponding to 22 respondents responded that means of transport are rarely available.

Table 4.3: Nature of availability of means of transport

Response	Frequency	Percent
Frequent available	28	31.8
Moderate available	38	43.2
Rarely available	22	25.0
Total	88	100.0

Source: Research data (2018)

4.3.4 Ownership of means of transport

The researcher aimed at finding out on the nature of ownership of the means of transport used by the respondent to transport their crop to the market. This was analyzed because the nature of ownership of means of transport has impact on amount of transportation costs incurred. The results indicated that 71 equivalent to 80.7% of respondent hired the means of transport used, 4.5% personally owned the means of transport used while 13 equivalent to 14.8% of respondent used friend borrowed means of transport as stipulated on table 4.

Table 4.4: The nature of ownership of the used means of transport

Response	Frequency	Percent
Personal owned	4	4.5
Friend	13	14.8
Hire	71	80.7
Total	88	100.0

Source: Research data (2018)

4.3.5 Means of transport used

The study wanted to know on the means of transport used to transport maize crop to the market. This was due to the fact that transport cost differs basing on nature of means of transport. The results indicated that 86 representing 97.7% of respondents uses trucks as means of transport, 2 respondents representing 2.3% uses motorcycle while non uses bicycle or any other means of transport.

Table 4.5: Means of transport do you usually use to transport maize

Response	Frequency	Percent
Motorcycle	2	2.3
Trucks	86	97.7
Total	88	100.0

Source: Research data (2018)

4.3.6 Amount of transportation cost incurred

The researcher aimed at knowing the amount of transportation cost incurred to transport one bag of maize per trip. The results indicated that 40 respondents equivalent to 45.5% incur between 2,000-7,000Tshs, while 48 respondents equivalent to 54.5% incur between 7,000 -15,000Tshs to transport one bag of maize per trip. Neither of the respondents incurred less than 2,000Tshs and more than 15,000Tshs.

Table 4.6: Amount of transportation costs incurred to transport one bag of maize per trip

Response	Frequency	Percent
2000 – 7,000	40	45.5
7,000 - 15,000	48	54.5
Total	88	100.0

Source: Research data (2018)

4.3.7 Factor influencing amount of transport cost incurred

The study also aimed at understanding the most influential factor influencing amount of transportation costs incurred by the farmers. The results indicated that 66 representing 75% of respondents pointed out that the amount of transportation costs incurred is influenced by nature of the road, 19 representing 21.6% indicated that it is due to the distance to the market while 3 respondents representing 3.4% indicated that local availability of transport influences the amount of transportation costs incurred.

Table 4.7: Factor influencing the rate of transportation costs incurred

Response	Frequency	Percent
Nature of the roads	66	75.0
Distance to the market	19	21.6
Availability of means of transport	3	3.4
Total	88	100.0

Source: Research data (2018)

4.3.8 Transportation costs and post harvest maize value chain performance

The researcher used three post harvest maize value chain performance indicators to survey the association between transportation costs and post harvest maize value chain performance as follows:

4.3.8.1 Transportation costs on sales volume of maize crops

Table 4.8 indicates that 22 equivalent to 25% of respondents strongly agreed that transportation costs has impact on sales volume of maize crop, 36 equivalent to 40.9% agreed, 10 equivalent to 11.4% were neutral meaning that neither agreed nor disagreed on whether has impact on sales volume, 20 equivalent to 22.7% disagreed and none of the respondents strongly disagreed. This implies that transportation costs influences the level of sales volume of maize crop.

Table 4.8: Transportation costs on sales volume of maize crop

Response	Frequency	Percent
Strongly agree	22	25.0
Agree	36	40.9
Neutral;	10	11.4
Disagree	20	22.7
Total	88	100.0

Source: Research data (2018)

4.3.8.2 Transportation costs on post harvest losses

The findings from Table 4.9 revealed that 17 corresponding to 19.3% of respondents strongly agreed that transportation costs leads to post harvest losses, 30 corresponding to 34.1% agreed, 7 corresponding to 8% were neutral, 28 corresponding 31.8% disagreed and 6 corresponding to 6.8% of the respondents strongly disagreed.

Table 4.9: Transportation costs on post harvest losses

Response	Frequency	Percent
Strongly agree	17	19.3
Agree	30	34.1
Neutral;	7	8.0
Disagree	28	31.8
Strongly disagree	6	6.8
Total	88	100.0

Source: Research data (2018)

4.3.8.3 Transportation costs on profit earned by farmers

The findings from Table 4.10 indicated that 25 equivalent to 28.4% and 40 equivalent to 45.5% of respondents strongly agreed and agreed respectively that transportation costs has impact on profit earned by farmers, 8 equivalent to 9.1% of respondents were neutral, 12 equivalent to 13.6% disagreed and 3 equivalent to 3.4% of the respondents

strongly disagreed. This implies that transportation costs has an association and influences the level of profit earned by farmers.

Table 4.10: Transportation costs on profit earned by farmers

Response	Frequency	Percent
Strongly agree	25	28.4
Agree	40	45.5
Neutral;	8	9.1
Disagree	12	13.6
Strongly disagree	3	3.4
Total	88	100.0

Source: Research data (2018)

4.4 Information costs on post-harvest maize value chain performance

The second research objective was to assess information costs on post-harvest maize value chain performance. It was hypothesized that there is a significant relationship between information costs and post harvest maize value chain performance. To meet this objective the researcher formulated various questions on questionnaires in relation to the main source of information used to obtain market information, amount of information costs incurred by the farmers per season, the main cause of information cost incurred by farmers, the information costs contributing to high total information costs and the impact of information cost on post harvest maize value chain performance as follows:

4.4.1 Main source of information used to obtain market information

The researcher aimed at finding the main source of information used to obtain market information. The results indicated that 10 respondents corresponding to 11.4% of respondents obtain information from friends, 42 corresponding to 47.7% from middlemen, 14.8% from formal sources like employees of KIGM and 23 respondents equals to 26.1% obtain information from other sources like price chats.

Table 4.11: Source of information used to obtain market information

Response	Frequency	Percent
Friends	10	11.4
Middlemen	42	47.7
Formal sources	13	14.8
Other	23	26.1
Total	88	100.0

Source: Research data (2018)

4.4.2 Approximation of information costs incurred by farmers per season of sale

Information costs has high impact on performance of post harvest maize value chain thus the study aimed to find out on the approximation of information costs incurred by farmers per season. The results as per Table 4.12 indicated that 59 respondents equivalent to 67% incur less than 10,000Tshs per season, 29 equivalent to 33% of respondents incur 10,000-50,000Tshs and none incur more than 50,000Tshs per season.

Table 4.12: Approximation of information costs incurred by farmers per season

Response	Frequency	Percent
Less than 10,000 shs	59	67.0
10,000-50,000	29	33.0
Total	88	100.0

Source: Research data (2018)

4.4.3 Main cause of information costs incurred by farmers

The researcher also wanted to know what influences the amount of information costs incurred by farmers. The results indicated that 72 respondents who are 81.8% of respondents incur information costs due to long distance from households to the market, 12.5% due to lack of ownership of means of transport and 5 who are 5.7% of respondents incur information cost due to quality of the roads.

Table 4.13: The main cause of information costs experienced by farmers

Response	Frequency	Percent
Quality of the roads	5	5.7
Distance from households to market	72	81.8
Ownership of means of transport	11	12.5
Total	88	100.0

Source: Research data (2018)

4.4.4 The main contributor of total information costs

The study aimed at identifying which type of information sought is the main contributor of high information costs. Table 4.12 indicated that costs on screening and searching potential buyers contribute to 14.8%, 10.2 % from search on favourable time to sell products and 75% from search costs on price and quantity.

Table 4.14: Information costs contributing to high portion of total information costs incurred by farmers?

Response	Frequency	Percent
Costs on screening and searching for potential buyers	13	14.8
Search costs on price and quantity	66	75.0
Costs at the favourable time to sell the products	9	10.2
Total	88	100.0

Source: Research data (2018)

4.4.5 Information costs and post harvest maize value chain performance

The study examined the relationship between Information costs and postharvest maize value chain performance by using three post harvest maize value chain performance indicators as follows:

4.4.5.1 Information costs on sales volume of maize crops

The survey data as per table 4.15 indicated that 4.5% of respondents strongly agreed that information costs has impact on sales volume of maize crop, 36.4% agreed, 3.4% were neutral meaning that neither agreed nor disagreed on whether has impact on sales volume, 55.7% disagreed and none of the respondents strongly disagreed.

Table 4.15: Information costs on sales volume of maize crop

Response	Frequency	Percent
Strongly agree	4	4.5
Agree	32	36.4
Neutral;	3	3.4
Disagree	49	55.7
Total	88	100.0

Source: Research data (2018)

4.4.5.2 Information costs on post harvest losses

Table 4.16 indicated that 4 equivalent to 4.5% of respondents strongly agreed that information costs has impact on sales volume of maize crop, 27 equivalent to 30.7% agreed, 6.8% were neutral, 51 equivalent to 58.0% disagreed and none of the respondents strongly disagreed.

Table 4.16: Information costs on post harvest losses

Response	Frequency	Percent
Strongly agree	4	4.5
Agree	27	30.7
Neutral;	6	6.8
Disagree	51	58.0
Total	88	100.0

Source: Research data (2018)

4.4.5.3 Information costs on profit earned by farmers

Table 4.17 indicated that 27.3% of respondents strongly agreed that information costs has impact on sales volume of maize crop, 31.8% agreed, 8% were neutral, 32.9.0% disagreed and none of the respondents strongly disagreed.

Table 4.17: Information costs on profit earned by farmers

Response	Frequency	Percent
Strongly agree	24	27.3
Agree	28	31.8
Neutral;	7	8.0
Disagree	29	32.9
Total	88	100.0

Source: Research data (2018)

4.5 Middlemen costs on post-harvest maize value chain performance

The third research objective was to assess middlemen costs on post-harvest maize value chain performance. It was hypothesized that there is a significant relationship between middlemen costs and post harvest maize value chain performance. To meet this objective the researcher formulated various questions on questionnaires in relation to how frequent they sell through middlemen, cause of decision to sell through middlemen, amount of middlemen incurred per farmer and the main contributor of middlemen costs and the impact of middlemen costs on post harvest maize value chain performance as follows:

4.5.1 Frequency of sell through middlemen

The analysis revealed that 62 respondents equivalent to 70.5% usually sell their crops through middlemen, 15 equals to 17% rarely sell through middlemen and only 11 respondents equivalent to 12.5% do not sell their crops through middlemen.

Table 4.18: frequency of times farmers sell their crops through middlemen

Response	Frequency	Percent
Usually	62	70.5
Rarely	15	17.0
None	11	12.5
Total	88	100.0

Source: Research data (2018)

4.5.2 Cause of decision to sell through middlemen

The results indicated that long distance to the market influences farmers decision to sell through middlemen reported by 25 respondents equals to 28.4%, lack of accurate information on arrival of buyers by 7 respondents equals to 8% and lack of accurate information about price and quantity needed by 56 respondents equals to 63.6%. This implies that most farmers decide to sell through middlemen because they do lack accurate information about price and quantity needed the information which is highly possessed by middlemen.

Table 4.19: The choice contributing to decision to sell through middlemen

Response	Frequency	Percent
Long distance from farm to the market	25	28.4
Lack of accurate information about price and quantity	56	63.6
Lack of accurate information on arrival of buyers	7	8.0
Total	88	100.0

Source: Research data (2018)

4.5.3 Approximation amount of middlemen cost incurred by farmers per sale

The study also wanted to find out how much middlemen costs is incurred by farmers per each sale. 12.5% indicated that they incur less than 10,000Tshs, 28.4% incur 10,000-50,000Tshs while 59.1% incur more than 50,000Tshs.

Table 4.20: Amount of middlemen costs incurred by farmers per sale

Response	Frequency	Percent
Less than 10,000 shs	11	12.5
10,000-50,000	25	28.4
More than 50,000	52	59.1
Total	88	100.0

Source: Research data (2018)

4.5.4 The main contributor of total middlemen costs

The results indicated that 21 respondents equivalent to 23.9% reported that middlemen costs incurred by farmers is influenced by search and screening costs, 37 equivalent to 42% by communication costs, 6.8% by contractual costs and 24 respondents equivalent to 27.3% reported that is influenced by monitoring costs. This implies that high middlemen costs are contributed by communication costs through quest for information on price, quantity and arrival and availability of buyers.

Table 4.21: The main contributor of total middlemen costs incurred by farmers

Response	Frequency	Percent
Search and screening costs	21	23.9
Communication costs	37	42.0
Contractual costs	6	6.8
Monitoring costs	24	27.3
Total	88	100.0

Source: Research data (2018)

4.5.5 Middlemen costs and post harvest maize value chain performance

The researcher used three post harvest maize value chain performance indicators to examine the relationship of middlemen costs and post harvest maize value chain performance as follows:

4.5.5.1 Middlemen costs on sales volume of maize crops

The findings revealed that 5 respondents corresponding to 5.7% of respondents strongly agreed that middlemen costs has impact on sales volume of maize crop, 45 corresponding to 51.1% agreed, 10 corresponding to 11.4% were neutral meaning that neither agreed nor disagreed on whether has impact on sales volume, 31.8% disagreed and none of the respondents strongly disagreed.

Table 4.22: Middlemen costs and sales volume of maize crop

Response	Frequency	Percent
Strongly agree	5	5.7
Agree	45	51.1
Neutral;	10	11.4
Disagree	28	31.8
Total	88	100.0

Source: Research data (2018)

4.5.5.2 Middlemen costs on post harvest losses

The findings revealed that only 3 respondents equalling to 3.4% of respondents strongly agreed that middlemen costs leads to post harvest losses, 23 equalling to 26.1% agreed, 10.2% were neutral, 39 equalling to 44.3% disagreed and 14 equalling to 15.9% of the respondents strongly disagreed.

Table 4.23: Middlemen costs and post harvest losses

Response	Frequency	Percent
Strongly agree	3	3.4
Agree	23	26.1
Neutral;	9	10.2
Disagree	39	44.3
Strongly disagree	14	15.9
Total	88	100.0

Source: Research data (2018)

4.5.5.3 Middlemen costs on profit earned by farmers

Table 4.24 shows that 16 and 55 respondents equivalent to 18.2% and 62.5% of respondents strongly agreed and agreed respectively that middlemen costs has impact on profit earned by farmers, 7 equivalent to 8% were neutral, 10 equivalent to 11.4% disagreed and none of the respondents strongly disagreed.

Table 4.24: Middlemen costs and profit earned by farmers

Response	Frequency	Percent
Strongly agree	16	18.2
Agree	55	62.5
Neutral;	7	8.0
Disagree	10	11.4
Total	88	100.0

Source: Research data (2018)

4.6 Effects of transaction costs on post harvest maize value chain performance

The last research objective was on the impact of transaction costs on post harvest maize value chain performance. To meet this objective the researcher formulated various questions on questionnaires in relation to whether transaction cost affect post harvest maize value chain performance, which transaction costs have high impact on post harvest maize value chain performance and the main effect of transaction costs on performance in terms of profit earned, sales volume and post harvest losses

4.6.1 Whether transaction costs has impact on post harvest maize value chain performance

The study wanted to find out from respondents on whether transaction cost has impact on post harvest maize value chain performance. Table 4.25 indicated that 80 respondents equivalent to 90.9% of respondents agreed that transaction costs has impact on post harvest maize value chain performance, 2 equivalent to 2.3% responded No and 6 equivalent to 6.8% responded I don't know.

Table 4.25: Whether transaction cost has impact on post harvest maize value chain performance.

Response	Frequency	Percent
Yes	80	90.9
No	02	2.3
I don't know	06	6.8
Total	88	100.0

Source: Research data (2018)

4.6.2 Transaction costs with high impact on post harvest maize value chain performance

The study wanted to find out among transportation cost, information costs and middlemen costs which one has high impact on post harvest value chain performance. The results indicated that transportation costs has high impact reported by 55 respondents equivalent to 62.5%, followed by middlemen costs reported by 27 equivalent to 30.7% of respondents and lastly information costs reported by only 6 respondents equivalent to 6.8%.

Table 4.26: Transaction cost with high impact on post harvest maize value chain performance

Response	Frequency	Percent
Transportation costs	55	62.5
Information costs	6	6.8
Middlemen costs	27	30.7
Total	88	100.0

Source: Research data (2018)

4.6.3 Main effect of transaction costs on post harvest maize value chain performance

Table 4.27 indicated that 30 respondents equivalent to 34.1% of respondent said that transaction costs has high effect on sales volume, 49 equivalent to 55.7% reported that has effect on profit earned by farmers and 9 equivalent to 10.2% that leads to post harvest losses. This implies that transaction costs incurred has high impact and affect profit earned by farmers that is the difference between post harvest costs incurred and income earned.

Table 4.27: Main effect of transaction costs on post harvest maize value chain performance

Response	Frequency	Percent
Has impact on sales	30	34.1
Has impact on profit earned by farmers	49	55.7
Leads to post harvest losses	9	10.2
Total	88	100.0

Source: Research data (2018)

4.7 Hypothesis Testing

The study comprised of three research hypotheses formulated from the study objectives. The research hypotheses were tested as follows:

4.7.1 Testing of the first hypothesis

The first hypothesis of the study stated that:

H₀ There is no significant relationship between transportation cost and post harvest maize value chain performance.

H₁ There is significant relationship between transportation cost and post harvest maize value chain performance.

The researcher tested this hypothesis by examining the association between transportation cost and post harvest maize value chain performance by using a chi square test. Each transportation cost indicator used in the study was tested to establish the existing association with post harvest maize value chain performance. Nature of road condition, distance to the market and nature of availability of means of transport were tested with post harvest maize value chain performance indicators which were grouped into two categories (profit earned and other indicators).

Table 4.28 shows the results of a chi-square analysis on the association between transportation costs and post harvest maize value chain performance:

Table 4.28: Results of chi-square analysis on the association between performance of post-harvest and transportation costs

Transportation costs	Performance of post-harvest value chain		Total	χ^2 -value	DF	P-value
Road condition	Profit	Other indicators				
Good	59	14	73			
Poor	8	7	15	5.157	1	0.023**
Distance in Kilometers						
Less than 100 Kms	57	16	73			
More than 100 Kms	15	0	15	4.018	1	0.045**
Availability of transport						
Frequently available	46	27	73			
Rarely available	10	5	15	0.072	1	0.789NS

**Significant at $p < 0.05$

From table 4.28 chi square test results supported that there was a significant association between nature of road condition and post harvest maize value chain performance as the p-value is equal to 0.023. Also, there was an association between distance to the market and post harvest maize value chain performance at P-value equals 0.045. However, the study failed to establish the association between availability of means of transport and post harvest maize value chain performance making the relationship insignificant ($P > 0.05$). Thus, the results support the hypothesis that there was a significant association between transportation costs and post harvest maize value chain performance.

Therefore the null hypothesis is rejected and the alternative hypothesis was accepted since the two transportation costs variables are associated.

4.7.2 Testing of the second hypothesis

The second hypothesis of the study stated that:

H₀ There is no significant relationship between information cost and post harvest maize value chain performance.

H₁ There is significant relationship between information cost and post harvest maize value chain performance.

The researcher tested this hypothesis by examining the association between information cost and post harvest maize value chain performance by using a chi square test. Each information cost indicator used in the study was tested to establish the existing association with post harvest maize value chain performance. Type of information sought, source of information costs and information cost causative were tested with post harvest maize value chain performance indicators which were grouped into two categories (profit earned and other indicators).

Table 4.29 shows the results of a chi-square analysis on the association between information costs and post harvest maize value chain performance:

Table 4.29: Results of chi-square analysis on the association between performance of post-harvest and Information costs

Information costs		Performance of post-harvest value chain		Total	χ^2 -value	DF	P-value
Information contents	costs	Profit	Other indicators				
Search costs on price and quality		46	27	73			
Others		11	4	15	0.581	1	0.446NS
Source of information							
Middlemen		53	20	73			
Other sources		14	1	15	2.943	1	0.086NS
Main cause of information costs							
Distance from households to market		16	57	73			
Other causes		1	14	15	1.857	1	0.173NS

****Significant at $p < 0.05$**

Table 4.29 shows that there is no association between all the three information costs indicators with post harvest maize value chain performance as P value was greater than 0.05 for all the three variables ($P=0.446$, 0.086 and 0.173). Thus, the results do not support the hypothesis that there was a significant association between information costs and post harvest maize value chain performance.

Therefore the null hypothesis is accepted and the alternative hypothesis rejected since all the three information costs variables are not associated.

4.7.3 Testing of the third hypothesis

The third hypothesis of the study stated that:

H₀ There is no significant relationship between middlemen cost and post harvest maize value chain performance.

H₁ There is significant relationship between middlemen cost and post harvest maize value chain performance.

The researcher tested this hypothesis by examining the association between middlemen cost and post harvest maize value chain performance by using a chi square test. Each middlemen cost indicator used in the study was tested to establish the existing association with post harvest maize value chain performance. Frequency of sell through middlemen, middlemen cost causative and type of middlemen costs incurred were tested with post harvest maize value chain performance indicators which were grouped into two categories (profit earned and other indicators).

Table 4.30 shows the results of a chi-square analysis on the association between middlemen costs and post harvest maize value chain performance:

Table 4.30: Results of chi-square analysis on the association between performance of post-harvest and Middlemen costs

Middlemen costs	Performance of post-harvest value chain		Total	χ^2-value	DF	P-value
Middlemen costs contents	Profit	Other indicators				
Communication costs	54	19	73			
Others	4	0	15	4.979	1	0.026**
The use of middlemen						
Usually	57	16	73			
Rarely	15	0	15	4.018	1	0.045**
Decision to sell through middlemen						
Lack of accurate information about price	56	17	73			
Other causes	15	0	15	4.330	1	0.037**

**Significant at $p < 0.05$

From table 4.30 chi square test results supported that there was a significant association between middlemen cost incurred and post harvest maize value chain performance as the p-value is equal to 0.026. Also, there was an association between frequency of sell through middlemen and post harvest maize value chain performance at P-value equals 0.045. Moreover, frequency of sell through middlemen had an association with post harvest maize value chain performance at P equals 0.037. Thus, the results support the hypothesis that there was a significant relationship between transportation costs and post harvest maize value chain performance.

Therefore the null hypothesis is rejected and the alternative hypothesis was accepted because all the three middlemen costs variables are associated with post harvest maize value chain performance.

4.7.4 Testing of the fourth hypothesis

The fourth hypothesis of the study stated that:

H₀ There is no significant relationship between transaction costs and post harvest maize value chain performance.

H₁ There is significant relationship between transaction costs and post harvest maize value chain performance.

The researcher tested this hypothesis by examining the association between transaction costs and post harvest maize value chain performance by using multiple regression technique. Each performance indicator variable namely profit, sales volume and post harvest losses were tested against the three transaction costs variable namely transportation costs, information costs and middlemen costs to establish their association.

4.7.4.1 Testing multiple regression assumption

Most statistical tests are guided by the assumptions on the study variables which if not met may lead to over or under estimation of the significance level or Type I or Type II error (Osborne and Waters, 2002). Thus, the researcher in this study checked on the following multiple regression assumptions:

4.7.4.1.1 Multicollinearity

This assumption lies on the fact that the independent variables used in the study should be independent from each other (George and Mallery, 2003). The researcher tested multicollinearity assumption by using the correlation matrix as it is stated that the correlation coefficient which is very close to 1 ($r \geq 0.9$) signifies that the independent variables are strongly related to each other which indicate multicollinearity problem whereas if the coefficient is not close to 1 ($r < 0.90$) indicate there is no multicollinearity problem (Williams, 2015). From the correlation matrix table 4.31 the largest correlation coefficient is $r=0.615$ which is less than 0.9 indicating that the multicollinearity problem do not exist as the independent variables of the study are not correlated to each other.

Table 4.31: Multicollinearity Correlation Matrix

		Correlations			
		Performance	Transportation cost	Information cost	Middlemen cost
Pearson Correlation	Performance	1.000	.615	.211	.577
	Transportation cost	.615	1.000	.060	.615
	Information cost	.211	.060	1.000	.119
	Middlemen costs	.577	.615	.119	1.000

4.7.4.1.2 Homoscedasticity

This assumption signifies that the variance of errors is the similar across all independent variables and can be tested by visual examination of the scatter plots of the standardized residuals by the regression standardized predicted value (Osborne and Waters,2002).

Thus, in the study in order to check for homoscedasticity the researcher looked at the final output of the graph so as to check the variation in the residual or errors if they are the same at each point of the model. If homoscedasticity exists the residuals should be randomly evenly scattered around the horizontal line as indicated in Appendix IV

4.7.4.1.3 Normality

To ensure significant relationships and tests across variables multiple regressions tests assumes that the variables are normally distributed around the diagonal line (Osborne, 2001). For testing normality the researcher looked at P-P Plot of the model whereas, if the dots are very close to the diagonal line it indicated that they are closer to normal and normality exists while if the dots are spread away from the diagonal line it indicates that there is no normality as residuals are not well distributed. From the figure 2 in appendix IV the graph shows that the dots are close to the diagonal line indicating that normality exists.

The multiple regression analysis results are presented as follows:

4.7.4.2 Model analysis on effect of transaction costs on profit

Multiple regression analysis was used to determine the effect of transaction costs on profit indicator of post harvest maize value chain performance. The post harvest value

chain performance was analysed in terms of transportation costs, information costs and middlemen costs as follows:

Table 4.32: Model Summary on effect of transaction costs on profit

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.691a	.477	.457	7.80634

a. Predictors: (Constant), transportation costs, information costs, middlemen costs

b. Dependent Variable: Performance

R square tells us how much variance of post harvest value chain performance in terms of profit is explained by transportation costs, information costs and middlemen costs. From the findings in table 4.32 the value of R square was 0.477 indicating that there was variation of 47.7% on post harvest value chain performance profit indicator due to changes in transportation costs, information costs and middlemen costs. R is the correlation coefficient which shows the association between the study variables. From the findings shown in table 4.31 it is stipulated that there exists relationship between the study variables as shown by R value 0.691.

Table 4.33: ANOVA on effect of transaction costs on profit

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4340.046	3	1446.682	23.740	.000 ^b
	Residual	4753.234	78	60.939		
	Total	9093.280	81			

a. Dependent Variable: performance

b. Predictors: (Constant), transportation costs, information costs, middlemen costs

The model is significant at F= 23.74 and P=0.000 indicating that post harvest value chain performance profit indicator can be predicted by transportation costs, middlemen costs and information costs and signifying that there is a significant relationship between the studied variables.

Table 4.34: Coefficient Analysis on effect of transaction cost on profit

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1	(Constant)	14.445	7.172	2.014	.047
	Transportation costs	-.572	.122	-.491	.000
	Information costs	-.040	.049	-.068	.419
	Middlemen costs	-.946	.339	-.287	.007

a. Dependent Variable: performance

From Table 4.34 it was revealed that holding transportation costs, information costs and middlemen costs, post harvest value chain performance in terms of profit would be at 14.445. All factors were found to have negative regression coefficients ($-\beta$), indicating that they have negative impact on profit. A unit increase in transportation costs would lead to a decrease in profit by 0.491, a unit increase in information costs would decrease the profit by 0.068 and a unit increase in middlemen costs would decrease the profit by 0.287.

Transportation cost was found to have high effect to profit when other variables variances are controlled for as it has the largest Beta standardised coefficient of 0.491. Only transportation costs and middlemen costs variables were significant as their significance value was less than 0.05 ($p < 0.05$).

4.7.4.3 Model analysis on effect of Transaction costs on sales volume

Multiple regression analysis was used to determine the effect of transaction costs on sales volume indicator of post harvest maize value chain performance. The post harvest value chain performance was analysed in terms of transportation costs, information costs and middlemen costs as follows:

Table 4.35: Model Summary on effect of transaction costs on sales volume**Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.721 ^a	.520	.511	.558	.520	59.120

a. Predictors: (Constant), Transportation costs, information costs, middlemen costs

b. Dependent Variable: Performance

R square tells us how much variance of post harvest value chain performance in terms of sales is explained by transportation costs, information costs and middlemen costs.

From the findings in table 4.35 the value of R square was 0.520 indicating that there was variation of 52% on post harvest value chain performance sales indicator due to changes in transportation costs, information costs and middlemen costs. R is the correlation coefficient which shows the association between the study variables. From the findings shown in table 4.35 it is stipulated that there exists relationship between the study variables as shown by R value 0.721.

Table 4.36: ANOVA on effect of transaction costs on sales volume**ANOVA^a**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	55.217	3	18.406	59.120	.000 ^b
Residual	51.058	164	.311		
Total	106.275	167			

a. Dependent Variable: performance

b. Predictors: (Constant), transportation costs, information costs, middlemen costs

The model is significant at F= 59.12 and P=0.000 indicating that post harvest value chain performance sales indicator can be predicted by transportation costs, middlemen costs and information costs and signifying that there is a significant relationship between the studied variables.

Table 4.37: Coefficient Analysis on effect of transaction cost on sales volume**Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.400	.209		1.915	.057
Transportation costs	-.520	.117	-.595	-4.448	.000
Information costs	-.013	.122	-.015	-.110	.913
Middlemen costs	-.423	.060	-.383	-7.008	.000

a. dependent variable: Performance

From Table 4.37 it was revealed that holding transportation costs, information costs and middlemen costs, post harvest value chain performance in terms of sales volume would be at 0.4. All factors were found to have negative regression coefficients ($-\beta$), indicating that they have negative impact on sales volume. A unit increase in transportation costs would lead to a decrease in sales by 0.595, a unit increase in information costs would decrease the sales by 0.015 and a unit increase in middlemen costs would decrease the sales by 0.383.

Transportation cost was found to have high effect to sales when other variables variances are controlled for as it has the largest Beta standardised coefficient of 0.595. Only transportation costs and middlemen costs variables were significant as their significance value was less than 0.05 ($p < 0.05$).

4.7.4.4 Model analysis on effect of Transaction costs on post harvest losses

Multiple regression analysis was used to determine the effect of transaction costs on post harvest losses as a post harvest maize value chain performance. The post harvest value chain performance was analysed in terms of transportation costs, information costs and middlemen costs as follows:

Table 4.38: Model Summary on effect of transaction costs on post harvest losses**Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.734 ^a	.538	.530	.547

a. Predictors: (Constant), Transportation costs, Information costs, middlemen costs

b. Dependent Variable: Performance

R square tells us how much variance of post harvest value chain performance in terms of post harvest losses is explained by transportation costs, information costs and middlemen costs. From the findings in table 4.38 the value of R square was 0.538 indicating that there was variation of 53.8% on post harvest value chain performance post harvest losses indicator due to changes in transportation costs, information costs and middlemen costs. R is the correlation coefficient which shows the association between the study variables. From the findings shown in table 4.38 it is stipulated that there exists relationship between the study variables as shown by R value 0.734.

Table 4.39: ANOVA on effect of transaction costs on post harvest losses**ANOVA^a**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	43.743	3	14.581	38.022	.000 ^b
Residual	63.276	165	.383		
Total	107.019	168			

a. Dependent Variable: Performance

b. Predictors: (Constant), Transportation costs, Information costs, Middlemen costs

The model is significant at F= 38.022 and P=0.000 indicating that post harvest losses performance indicator can be predicted by transportation costs, middlemen costs and information costs and signifying that there is a significant relationship between the studied variables.

Table 4.40: Coefficient Analysis on effect of transaction cost on post harvest losses**Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.091	.213		5.128	.000
Transportation costs	-.515	.131	-.590	-3.944	.003
Information costs	-.187	.065	-.174	-2.865	.075
Middlemen costs	-.015	.136	-.016	-.108	.914

a. Dependent Variable: Performance

From Table 4.40 it was revealed that holding transportation costs, information costs and middlemen costs, post harvest value chain performance in terms of post harvest losses would be at 1.091. All factors were found to have negative regression coefficients ($-\beta$), indicating that they have negative impact on post harvest losses. A unit increase in transportation costs would lead to a decrease in post harvest losses by 0.590, a unit increase in information costs would decrease the post harvest losses by 0.174 and a unit increase in middlemen costs would decrease the postharvest losses by 0.016. Transportation cost was found to have high effect to post harvest losses when other variables variances are controlled for as it has the largest Beta standardised coefficient of 0.590. Only transportation costs variable was significant as their significance value was less than 0.05 ($p < 0.05$).

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter provides a comprehensive discussion of the study findings basing on research objectives of the study. The general objective of this study was to assess the impact of transaction costs on post harvest maize value chain performance.

5.2 Transportation costs and post harvest maize value chain performance

In the study transportation cost was used as one of the factor affecting post harvest maize value chain performance in terms of profit, sales and post harvest losses. Various indicators were used to measure transportation costs including distance to the market, quality of the road used, local availability of means of transport and nature of ownership of means of transport basing on similar studies which hypothesized that when these indicators are poor then transport costs tend to be high (Wandschneider and Yen, 2006; Canwat, 2014; Ismail *et al.* 2015). Post harvest maize value chain performance was measured though three indicators profit, sales volume and post harvest losses.

The study hypothesized that transportation costs are significantly related to post harvest maize value chain performance. Under this hypothesis, the results of the study found that there was a significant association between transportation costs and post harvest maize value chain performance at $P < 0.05$. This finding supports the study of Kaminski *et al* (2013) which explained that there is a significant relationship between transportation costs and maize value chain and competitiveness.

The study found out that distance to the market has an influence on transportation costs incurred with P value of 0.045. This supports Ismail *et al* (2015) study which pointed that there is a positive correlation between distance to the market and transportation costs. It was reported that the costs incurred by respondents residing in less than 50 km was 2000-5000 per 100kg bag, where as those residing between 50 and 100 kms were charged between 5000-8000 per bag and those residing in more than 100 km were charged between 8,000 to 10,000 per bag.

This finding is in line with the study of Ismail *et al* (2015) which pointed out that the longer the distance from respondent households to the market the higher the transportation costs incurred.

Moreover, the study revealed that high transportation cost is highly contributed by poor quality of the roads to the market area with chi square test P value of 0.023. Majority of the respondent pointed this as the greatest contributor of the high transportation costs as most of the roads are poor and not easily passable during rainy and non rainy season due to lack of maintenance. Through interview the respondents pointed that:

Poor road quality leads to high transportation costs because the vehicle owners in calculation of the costs to be charged top up the unforeseen costs such as vehicle repair and maintenance costs, vehicle breakdown and more time that will be used to transport the crop regardless of distance.

This supports the study of Nkhori (2004) which pointed out that when roads quality is poor transporters tend to increase the transport fees and charges to compensate for damages to their vehicles resulting from the use of such roads, hence reduce the price that farmers could receive from buyers.

However, local availability of means of transport was found to be not a contributor of transport costs in the study area. 75% of the respondents indicated that regardless of the distance and quality of the roads the means of transport ranges from frequent to moderate available. Through interview it was reported by farmers that:

Transporters are aware of the specific times of the year after harvesting where most farmers usually bring their crops to the markets for sale, thus they usually make their means of transport available to reap the high transportation season benefits as the outcome this reduces the unavailability of means of transport problems.

This finding negate various studies which pointed out that transportation costs is proportional to local accessibility of means of transport and usually when road quality is poor means of transport are not easily accessible making transport costs to be high (Wandschneider and Yen, 2006; Canwat, 2014)

Generally, Transportation costs was found to affect post harvest maize value chain performance by affecting all the post harvest value chain performance indicators in terms of profit earned by farmers, sales volume and post harvest losses.

Through interview the respondents revealed that due to high transportation costs other farmers decide to sell on the farm gate and incur post harvest losses as they either fail to sell all the crops at once or transport them to the market. High transportation costs also made some farmers to bring only a small amount of harvested maize crop to the market which affect the level of sales volume. Besides, transportation costs incurred are usually very high where at the end of the day the profit received is usually very low and this affects the income of the farmers. This finding supports the study of Wilson and Lewis (2015) in the maize value chain a report from the Southern Highlands Food Systems Programme in Tanzania which pointed out that transportation costs particular for maize crop in the country are very high which affect the profit earned and income of farmers. Also Suzuki and Sexton (2005) study which explained that high transportation cost is among the long time known source of agriculture inefficiency and leads to decreasing the profit of farmers selling commodities to buyers.

5.3 Information costs on post harvest maize value chain performance

Information cost was used as one of the factor affecting post harvest maize value chain performance in terms of profit, sales and post harvest losses. Various information on amount of information costs incurred, sources of obtaining information costs, the main causative of information costs and the magnitude of effects to the post harvest maize value chain was obtained from respondents.

The study hypothesized that information costs is significantly related to post harvest maize value chain performance. Under this hypothesis, through chi square tests the results of the study found that there was no a significant association between information costs and post harvest maize value chain performance as $P > 0.05$. These findings are in contrary with the study of Omiti *et al* (2009) which indicated that there is a significant relationship between market information and sales volume of maize farmers. Also the findings are in contrary with Osebeyo and Aye (2014) which found that market information cost has an influence on market participation of maize smallholder's farmers.

Through interview it was revealed that in the study area the main source of information is highly from middlemen and less from other sources like price chats present in wards in which the ward executive officers publish the daily prevailing KIGM crops market price, the information sent to them by KIGM employee through their mobile phones. Further the farmers emphasized by saying that,

We normally use middlemen because they possess real time price information direct from buyers and not approximated or average price as other sources. You might find that the average price in the market indicated in the price chats for 1kg of maize is 385Tshs but the middleman informs that the price is 400Tshs which this represents the exact amount the buyer is willing to pay.

The possession of real time information by middlemen is in line with the transaction costs theory which point out that information asymmetry is one of the causes of transaction costs as one part possesses accurate information than the other party (Rossignoli, 2015; Minarelli *et al.* 2016). Also this supports the study of Mwagike and Mdoe (2015) which pointed out that transaction costs in form of information costs affect farmers decisions to sell direct to buyers and rely to middlemen.

However, the amount of information costs incurred by farmers was found to be very low as most respondents pointed out that they incur less than 10,000Tshs as information costs per whole season of sale which is negligible amount per each bag sold. The respondents were quoted saying that,

We incur a very small amount of transaction costs as information costs because the information sought is mainly obtained through mobile phone communication, which due to various affordable communication offer bundles offered by various telecommunication service providers it make the amount used in information search and inquiry to be very small.

This opposes the study of Silva *et al* (2008) which found that information related costs constituted 70 percent of the total transaction costs, which is 15 percent of the total production cost incurred by the farmers. And supports Alam and Kausar (2016) study that information costs is unobservable type of transaction costs which may be difficult to be noticeable during the given transaction.

The study revealed that the high portion of information costs is from information search on price and quantity of maize needed by buyers. And from interview it was further portrayed that each buyer in the market has its own price thus farmers should contact the middlemen to know on the prevailing prices from various buyers and the quantity they want and are ready to purchase. This is in line with the bounded rationality source of transaction cost theory which explain that as actors are bounded in terms of their knowledge and information processing it makes farmers involve a lot of traders and incur search cost and costs of involving great number of trading partners so as to ascertain the information given and get the favourable trading partner (Besanko, *et al.* 2010)

Moreover, the study pointed out more that the main cause of information costs is long distance from the farm to the market. Due to long distance from the farm to the market it make farmers incur information costs as they are needed to recharge their phones with airtime and incur communication costs on seeking information on price, quantity and arrival of buyers from various sources especially middlemen. This is in line with the study of Nkhori (2004) which pointed out that long distance from farmers households to the market restrict farmers from making precise selling decisions and thus incur transaction costs in form of information costs.

Thus, as revealed from respondents that the amount of information costs incurred is not very high due to the nature of information sought by farmers and sources of information used; This type of transaction costs was found to have low impact on post harvest maize value chain performance affecting less only the profit indicator of post harvest maize value chain performance.

5.4 Middlemen costs and post harvest maize value chain performance

In the study middlemen costs was tested on its impact on post harvest maize value chain performance by affecting profit earned, sales volume and post harvest maize value chain performance. The study hypothesized those middlemen costs are significantly related to post harvest maize value chain performance. Under this hypothesis, the results of the study found that there was a significant association between middlemen costs and post harvest maize value chain performance at $P < 0.05$.

This finding supports the study of Ismail *et al* (2015) which pointed out that there is a significant relationship between middlemen costs and market participation influence factors of maize small holder farmers. .

The study revealed that most of farmers (70.5%) do sell their crops through middlemen and not direct to buyers. This supports the study of Mwagike and Mdoe (2015) which pointed out that most of the farmers in rural areas do usually sell their crops through middlemen. From interview respondents revealed that:

Only few, long term, experienced and large quantity maize possessors are the ones who sell their crops direct to buyers because they have direct communication with potential buyers knowing their arrival and quantity needed, but majority of us we do sell our crops through middlemen.

Respondents revealed that they decide to sell their crops mainly through middlemen because they are the ones who possess accurate information on price and quantity needed by buyers as they have direct communication with potential buyers. Due to information gap and low contact between farmers and buyers, middlemen acts as a bridging gap by communicating direct with buyers on the level of price they are willing to pay and the quantity willing to buy, the information communicated later to the farmers. This supports the study of Holloway *et al* (2000) which indicated that Middlemen possess precise information about the market and traders thus in order for farmers to access they have to pay either by cash or by reducing price of the produce.

From the interview it was pointed out that middlemen charge 2-3 Tshs per each kg of maize making approximation of 200-300 Tshs per 100kg bag of maize. Apart from the charges the respondents revealed out that due to absence of direct contact between the farmer and the buyers, sometimes middlemen benefits by giving a false price as you may find the trader is willing to pay 400tshs per kg but the middlemen when negotiating with the farmer stick that the trader has 390tsh. This supports the study of Ismail *et al* (2015); Wilson and Lewis (2015) which point out that due to price information gap and less contact of farmers with buyers make middlemen use this opportunity by being exploitative to the farmers making them get low prices while they capture high profit. The respondents further lamented that:

The middlemen usually get double profit through double collection; that is, the 2 or 3Tshs collected in each 1 kg sold by the farmer and from the residual of the false price they inform farmers in which high price is collected from the trader and less is paid to the farmer; where in both scenarios the farmer is the one who is at loss.

The giving of false information by middlemen to favour their interests is in line with the transaction cost theory as it indicate opportunism behaviour which is among the main cause of high transaction costs as it calls for more acute mechanism to reduce the effects of the behavior (Besanko, *et al.* 2010; Rasheli, 2016).

Middlemen cost affect post harvest maize value chain performance by having high impact on profit earned by farmers and output sale than post harvest losses. The study revealed that middlemen charges affect the profit and income of farmers due to the charges charged per kg and the exploitation on price to be paid by buyers. Moreover, some other market operations charges like pass-gate charges and market levies required to be paid by middlemen are automatically bared by farmers. Also, affect level of sales volume because sometimes due to low price negotiated by middlemen it made farmers decide to sell only few bags and store the remaining crops on the warehouses waiting for favourable prices and as a result incur additional storage charges as it costs 2000-3000tshs to store one bag of maize in the KIGM warehouse per season. This is in line with the study of Ismail *et al* (2015) which indicated that middlemen make farmers subjected to low price, affect level of sales and enlarge the gap between price paid to farmers and that received by middlemen.

5.5 Effects of transaction cost on post harvest maize value chain performance.

In the study the three transaction costs variable namely transportation costs, middlemen costs and information costs were tested on their effect on the three post harvest performance indicators namely profit, sales and post harvest losses. From the study most respondents (90.9%) agreed and were aware that transaction costs have impact on post harvest maize value chain performance. This supports Alam and Kausar, (2016) study which stipulated that in developing countries despite the fact that maize production is escalating at a satisfactory rate, the crop value chain performance is still not adequate due to high transaction costs.

Through multiple regression it was revealed that there was significant relationship between transportation costs and post harvest maize value chain performance profit indicator by having a beta value of 0.491 and P value 0.000 ($P < 0.05$) and between middlemen costs and profit at beta value 0.287 and P value 0.007. However the study indicated that there was no significant relationship between information costs and profit indicator of post harvest maize value chain performance as beta value was 0.068 and P value 0.419. The study findings signifies that transportation costs and middlemen costs are the main transaction costs with effect on profit indicator of post harvest maize value chain performance and not the information costs.

In the relationship between transaction costs and sales post harvest performance indicator; transportation costs was found to have significant relationship with sales at beta value 0.595 and P value 0.000. Also, middlemen costs were found to have significant relationship at beta value 0.383 and P value 0.000. But, Information costs was proved to have no significant relationship with sales as the beta value was 0.015 and P value 0.913 ($P > 0.05$). The results indicated that only middlemen costs and transportation costs has significant relationship with sales post harvest performance indicator and not information costs.

Also, in testing the relationship between post harvest losses and transaction costs multiple regression indicated that transportation costs has significant relationship with post harvest losses performance indicator at beta value 0.590 and P value 0.03. However middlemen costs and information costs were found to have no significant relationship with post harvest losses as P value were 0.914 and 0.075 respectively ($P > 0.05$). Thus, only transportation costs were found to have significant relationship with post harvest losses performance indicator.

Among the three transaction costs variables used in the study transportation costs was found to be the main contributor of high transaction costs incurred by farmers thus affecting post harvest maize value chain performance more than middlemen and information costs as it had the significant relationship with all the three post harvest maize value chain performance indicators namely profit, sales and post harvest losses.

This was supported by frequency table presentations which indicated that transportation cost is the main transaction cost affecting post harvest maize value chain performance in terms of sales volume, profit and post harvest losses due to unfavourable transportation variables present in the study area including long distance to the market and poor quality of the roads. This supports the studies of Jagwe (2011) and Canwat (2014) which indicated that when road quality is poor, great distance from farm to market and transport means are not easily available, transport costs tend to be high making transportation costs being a major component of transaction costs affecting agriculture.

Moreover, among the three post harvest maize value chain performance indicators used in the study namely profit, sales volume and post harvest losses; Transaction costs incurred by farmers was found to affect more the profit indicator as it affected the profit incurred by smallholder farmers in the study area more than the other two indicators. This is in line with the study of Nkhori (2004) which indicated that transaction costs affect profit earned by farmers which consequently affect farmer's income. This was emphasized by respondents that,

In the past they had wide market from other East African countries especially Kenyan traders who were buying crops at favourable prices (the average price was between 550 to 650 Tshs) making the transaction cost impact on profit not very high observed as the revenue received was reasonable; but, currently they rely only on local traders who due to the country economic condition they pay a very low price (usually ranging from 350-400) making the output profit after the deduction of transaction costs from the revenue to be very low.

For example during the survey data the average price for 1 kg of maize ranged from 385-390Tshs with uncertainty of falling due to an increase in maize harvests unlike past years were it was reported to reach 600Tshs.

Generally, the study revealed that the transaction costs incurred by farmers made them earn less profit than anticipated, affect the level of sales volume and sometimes lead to post harvest losses which all act as restraints on post harvest maize value chain performance. This supports the transaction costs theory which state that there is always economic costs on each transaction incurred between the parties which calls for various mechanisms to be undertaken to reduce the impact of the costs (Abdul-Halim *et al.* 2012).

This finding supports the studies of Eskola (2005) and Sendall (2007) who found that costs incurred at each stage of transactions act as constraint towards value chain performance making high transaction costs a main hindrance towards crop value chain in developing countries.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

6.1 Introduction

This chapter explains about the summary of the study findings, give conclusions basing on the data collected as per research problem, objectives and hypotheses and offers recommendations from the researcher. It also show the contribution of the study to the policy makers and point out areas requiring further study by various researchers.

6.2 Summary of findings

The main objective of the study was to assess the transaction costs on post harvest maize value chain performance. Specifically, the study aimed at assessing the three type of transaction costs namely transportation, middlemen and information costs on post harvest maize value chain performance in KDC. Lastly, it focuses on assessing the effect of transaction costs on post harvest maize value chain performance by using three performance indicators namely profit, sales and post harvest losses.

Based on the study findings it was revealed that there was significant relationship between transportation costs and post harvest maize value chain performance. Most respondents pointed out that the amount of transportation costs incurred is very high which is highly contributed by long distance to the market and poor quality of the roads. Moreover, it was pointed out that transportation costs affect the post harvest maize value chain performance both in terms of profit and income earned by farmers, sales volume brought to the market and sometimes lead to post harvest losses in the farm and household storage.

Also, it was revealed that most farmers sell their crops through middlemen as are the ones who possess accurate information on price and quantity needed by buyers as they have direct contact with potential buyers. It was pointed out that middlemen costs affect post harvest maize value chain performance mainly by affecting the level of profit earned by farmers and sales volume decision by farmers as they charge high price per

bag and offer exploitative prices. Thus, there was a significant relationship between middlemen costs and post harvest maize value chain performance.

Moreover, the study depicted that due to long distance from the farm to the market the farmers also incur transaction costs in form of information costs and charges normally used to communicate price and quantity information by middlemen and other potential sources like KIGM employees. The information costs incurred had small impact on post harvest maize value chain performance by affecting the profit earned by farmers. However, through chi square test it showed that there was no significant relationship between information costs and post harvest maize value chain performance.

Lastly, among the three type of transaction costs through multiple regression analysis technique transportation costs was revealed to have high impact on post harvest maize value chain performance as it affect performance in terms of both profit, sales volume and post harvest losses. Also, it was revealed that transaction costs incurred by farmers in the study area has high effect on profit rather than the other two post harvest maize value chain performance indicators namely sales volume and post harvest losses.

6.3 Conclusion

Based on the findings, the study concluded that transaction costs have negative impact on post harvest maize value chain performance in Kibaigwa District Council. Transportation and middlemen costs were proved to have significant relationship and affected post harvest maize value chain performance in terms of sales volume by decreasing the number of maize bags sold and profit earned by smallholder farmers by reducing the residual income after cost deduction. Thus, as maize is the leading cultivated crop in the area transaction costs made smallholder farmers not to gain the anticipated social and monetary benefits from the crop and hence calls for various efforts to be undertaken to ensure the costs incurred are reduced.

Moreover, findings of the study contributed to transaction cost theory as they were in line with the main sources of transaction cost namely information asymmetry, opportunism and bounded rationality and were able to point out the major costs affecting post harvest maize value chain performance which supported the theory focus

of analysing the transaction costs and suggesting measures and mechanisms on how to reduce them.

6.4 Policy implications

The findings produced by this study possess practical implication for the government, Local government authorities, maize traders and smallholder farmers as the findings of the study could be used to create conducive environment for reduction of transaction costs in post harvest maize value chain. This facilitates the formulation and enactment of various policies regarding agriculture on reduction of transaction costs such as crop transportation policies so as to lead to agriculture value chain performance improvement.

6.5 Recommendations

The study recommend on various mechanisms to be taken by the government and appropriate bodies to improve rural roads infrastructure to ensure they are passable during both seasons of the year as it would facilitate the improvement of quality of the roads hence reduction in transaction costs incurred by farmers.

The Local Government Authorities under PO-RALG to ensure the creation of favourable and well equipped marketing area near the villages so as to reduce the distance to be travelled by the farmers to access the KIGM which is the only big and well furnished local markets in the area. This could lead to reduction of transportation costs caused by long distance to the market.

The KIGM should adopt appropriate mechanisms to ensure proper monitoring of middlemen behaviours and activities in the market so as to reduce exploitative behaviours to farmers and reduction of middlemen costs.

Information sharing mechanisms and sources used by the KIGM management should be improved so as to ensure farmers have accurate and timely information on price, quantity and quality needed and arrival of buyers. This would lead to reduction of information asymmetry problem hence reduction of information costs incurred by farmers.

6.6 Areas for further research

The study concentrated on transaction costs affecting the post harvest value chain performance of only maize crop in the country, other researchers could do similar studies by assessing transaction costs on other crops grown in the country. This is because agriculture is the backbone of the country and the key to industrialization thus assessing transaction costs on other crops will help the improvement of the sector.

Also as the study focused only on three transaction costs variables namely transportation, middlemen and information costs, thus other researchers assess other transaction cost variables affecting maize like storage costs.

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APPENDICES

APPENDIX I:

QUESTIONNAIRE FOR RESPONDENT

I am Prisca P Rutatola, a student from Mzumbe University main Campus at Morogoro Region undertaking master degree in Procurement and Supply Chain Management (Msc - PSCM).

The main objective of this study is to assess transaction costs on post harvest maize value chain performance. The data provided on this paper will be confidential as the study is intended for academic purpose only.

Questionnaire NO.....

This questionnaire is divided into four (4) parts please put a [$\sqrt{}$] mark on the best option among many on each questions that suits your opinion.

PART 1: BACKGROUND INFORMATION OF RESPONDENTS

1. Gender

- a) Male () b) Female ()

2. Marital status

- a) Married () b) Single () c) Divorced () d) Widowed ()

3. Age

- Below 30 years () 30 – 50 years () 50 and above years ()

4. Household size

- 4 and below () 5 – 9 () 10 and above ()

5. Level of education

- None () Primary () Secondary () University ()
Other ()

PART 2: TRANSPORTATION COST ON POST HARVEST MAIZE VALUE CHAIN PERFORMANCE.

6. How far in Kms are you from the nearest local maize market
 - a) Less than 50 kms () b) 50 – 100 kms () c) More than 100 kms ()
7. What is the nature of the road condition to the market place
 - a) Very good (), b) Good (), c) Somehow (), d) Poor ()
8. What means of transport do you usually use to transport maize from farm to the storage area?
 - a) Animal transport () b) motorcycle () c) trucks () d) bicycle () e) other ()
9. What is the nature of ownership of the above used means of transport
 - a) Personal owned () b) Friend () c) Hire () d) Other ()
10. What means of transport do you usually use to transport maize from farm to the market area?
 - a) Animal transport () b) motorcycle () c) trucks () d) bicycle () e) other ()
11. What is the nature of ownership of the above used means of transport
 - a) Personal owned () b) Friend () c) Hire () d) Other ()
12. What is the nature of availability of the means of transport
 - a) Frequent available () b) Moderate available () c) Rarely available ()
13. What is the approximated cost of transporting one bag of maize per trip?
 - a) Less than 2,000 () b) 2,000- 7,000 () c) 7,000 – 15,000 () d) more than 15,000 ()

14. What influences the rate of transportation costs incurred? (Tick only the most appropriate response)

- a) Nature of the roads () b) Distance to the market () c) Availability of means of transport () d) other ()

15. For each statement below please circle the number that indicates your level of agreement or disagreement which best describes your opinion on the statement.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a) Transportation costs incurred has impact on sales volume of maize crop	1	2	3	4	5
b) Transportation costs leads to post harvest losses due to failure to sell on time	1	2	3	4	5
c) Transportation costs has impact on profit earned y farmers	1	2	3	4	5

PART 3: INFORMATION COST ON POST HARVEST MAIZE VALUE CHAIN PERFORMANCE.

16. What is the main source of information used to obtain market information?

a) Family () b) Friends () c) Middlemen () d) Formal sources like radio, Tv and newspapers ()

17. How much in Tshs is the approximation of information costs incurred by farmers per season?

a) Less than 10,000 shs() b) 10,000-50,000 () c) more than 50,000 ()

18. Which among the following is the main cause of high information costs experienced by farmers? (Order options according to their importance, with 1 being the most important)

Option	Order
a) Quality of the roads	
b) Distance from households to market	
c) Poor communication infrastructure	
d) Ownership of means of transport	

19. Which among the following information costs contribute to high portion of total information costs incurred by farmers?

(Order options according to their importance, with 1 being the most important)

Option	Order
a) Search costs on price and quantity	
b) Costs on screening and searching for potential buyer	
c) Costs on finding potential market areas	
d) Costs at the favorable time to sell the products	

20. For each statement below please circle the number that indicates your level of agreement or disagreement which best describes your opinion on the statement.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a) Information costs incurred has impact on sales volume of maize crop	1	2	3	4	5
b) Information costs leads to post harvest losses due to failure to sell on time	1	2	3	4	5
c) Information costs has impact on profit earned by farmers	1	2	3	4	5

PART 4: MIDDLEMEN COST ON POST HARVEST MAIZE VALUE CHAIN PERFORMANCE

21. How many times do you sell your crop through middlemen's?

a) Usually () b) rarely () c) None ()

22. Which among the following choice contributes to decisions to sell through middlemen.

(Order options according to their importance, with 1 being the most important)

Option	Order
a) Long distance from farm to the market	
b) Poor road infrastructure to transport crop to the market	
c) Lack of accurate information about price and quantity	
d) Lack of accurate information on arrival of buyers	

23. How much in Tshs is the approximation of middlemen costs incurred by farmers per sale?

a) Less than 10,000 shs() b) 10,000-50,000 () c) more than 50,000 ()

24. Which among the following middlemen costs contribute to high portion of total middlemen costs incurred by farmers?

(Order options according to their importance, with 1 being the most important)

Option	Order
a) Search and screening costs	
b) Communication costs	
c) Contractual costs	
d) Monitoring costs	

25. For each statement below please circle the number that indicates your level of agreement or disagreement which best describes your opinion on the statement.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a) Middlemen costs incurred has impact on sales volume of maize crop	1	2	3	4	5
b) Middlemen costs leads to post harvest losses due to failure to sell on time	1	2	3	4	5
c) Middlemen costs has impact on profit earned by farmers	1	2	3	4	5

**PART 5: EFFECT OF TRANSACTION COSTS ON POST HARVEST MAIZE
VALUE CHAIN PERFORMANCE**

26. Does transaction cost have impact on post harvest maize value chain performance?

a) Yes b) No c) I don't know

27. Which among the following transaction costs has high impact on post harvest maize value chain performance?

(Order options according to their importance, with 1 being the most important)

Option	Order
a) Transportation costs	
b) Information costs	
c) Middlemen costs	

28. What is the main effect of transaction costs on post harvest maize value chain performance?

(Order options according to their importance, with 1 being the most important)

Option	Order
a) Has impact on sales	
b) Has impact on profit earned y farmers	
c) Leads to post harvest losses	

APPENDIX II:

INTERVIEW GUIDE

- 1) What do you understand by the concept transaction costs?
- 2) What transaction costs do you incur on post harvest maize process?
- 3) What do you think to be the main reason for incurring the given transaction costs?
- 4) What are the effects of transaction costs incurred on post harvest maize value chain performance?
- 5) How do transaction costs affect sales of maize crop?
- 6) How do transaction costs affect profit earned by farmers?
- 7) How do transaction costs lead to post harvest losses?
- 8) What do you suggest to be appropriate measures to reduce transaction costs incurred?

APPENDIX III

PRELIMINARY QUESTIONNAIRE'S RESPONSES

Response rate

During data collection process the researcher issued 88 questionnaires which were self administered to the selected respondents at KDC. The researcher was able to retrieve all the 88 questionnaire issued from all respondents. The response rate was 100% and it was made possible because the researcher self administer the questionnaires to the respondents and made several follow-ups.

Sample characteristics

In this part the researcher summarized sample characteristics which included gender of respondents, age, household size and level of education.

Gender of respondents

Table 1 indicated that 80.7% of respondents were males while 19.3% were females. This implies that males are the ones who participate more in the cultivation of maize crop.

Table 1: Gender of respondents

Response	Frequency	Percent
Male	71	80.7
Female	17	19.3
Total	88	100.0

Source: Research data (2018)

Age of Respondents

Table 2 indicated that 18.2% has age below 30 years, 63.6% between 30-50 years and 18.2 above 50 years.

Table 2: Age of respondents

Response	Frequency	Percent
Below 30 years	16	18.2
30 – 50 years	56	63.6
50 and above years	16	18.2
Total	88	100.0

Source: Research data (2018)

Household size

Table 3 indicated that 6.8% of respondents had household size of 4 and below, 63.6% between 5-9% and 29.5% with 10 and above household size.

Table 3: Household size

Response	Frequency	Percent
4 and below	6	6.8
5-9	56	63.6
10 and above	26	29.5
Total	88	100.0

Source: Research data (2018)

Education level

Table 4 indicated that 5.7% did not even attend primary school, 46.6% had primary level education, 40.9% had secondary school education and 6.8% had university level education. The level of education has impact on negotiation skills possessed by farmers.

Response	Frequency	Percent
None	5	5.7
Primary	41	46.6
Secondary	36	40.9
University	6	6.8
Total	88	100.0

Source: Research data (2018)

APPENDIX IV:

MULTIPLE REGRESSION ASSUMPTIONS TABLES AND FIGURES

Figure 1: Homoscedasticity scatter plots

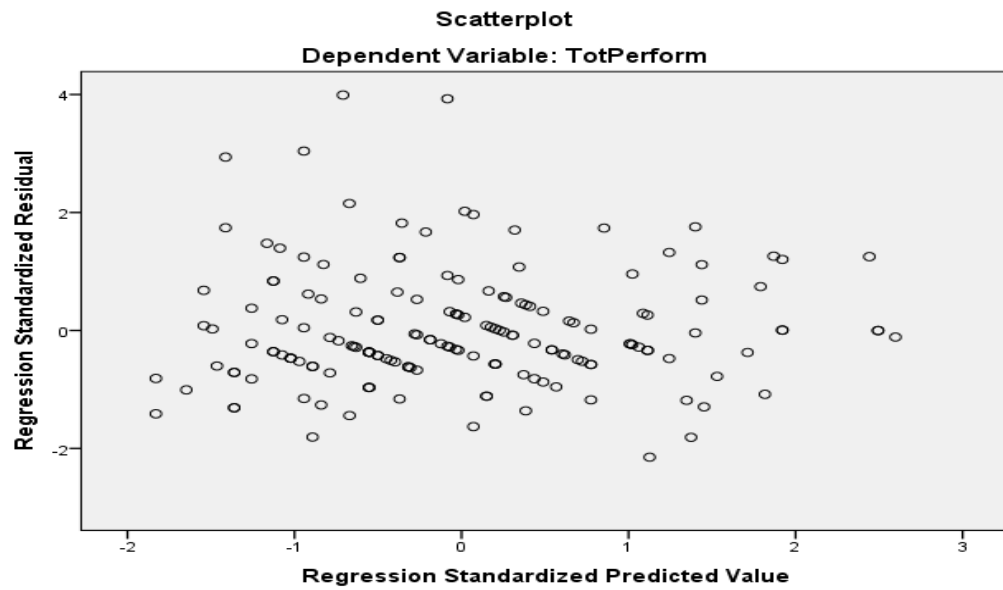


Figure 2: Normality

