

**GRAIN QUALITY AND STANDARDS IN AGRICULTURAL MARKETING:**

**A CASE OF MAIZE IN SUMBAWANGA RURAL DISTRICT**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE**

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**ABSTRACT**

The study was conducted in Sumbawanga Rural District in Rukwa region. Its objective was to examine the influence of grain quality and standards in maize trading. Specifically, to find the significance of maize cleaning, grading and standardizing in grain marketing, to examine the significance of the road condition in determining maize buyers' accessibility to buying posts and the significance of the number of maize buyers in fluctuating farmers' maize selling price. Purposive multistage sampling technique was employed to get 180 respondents; 60 traders and 120 producers. A questionnaire and a checklist of questions were used to collect qualitative and quantitative data. Linear and logistic regression models were used to test the hypotheses and inferences were made at 5% level of significance. Maize cleaning reduced net marketing margin at a rate of 0.031; with  $p = 0.710$  it was thus found to be statistically insignificant. Grading of maize into classes was also statistically insignificant ( $p = 0.094$ ). However, it had a positive influence at a rate of 0.136 on the trader's net marketing margin. Standardizing of maize had no statistical significance on net marketing margin ( $p = 0.693$ ) although it had a positive effect on the net marketing margin at the rate of 0.033. Cleaning, grading and standardization of maize increased marketing costs and leaving them uncovered in the net marketing margins.

**DECLARATION**

I, Dennis Maghala, do hereby declare to the senate of the Sokoine University of Agriculture that this dissertation is my own original work and that it has not been submitted for a degree award at any other university.

Signature

Date

\_\_\_\_\_  
(MSc Candidate)

The above declaration is confirmed

Signature

Date

\_\_\_\_\_  
Professor Andrew E. Temu

(Supervisor)

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**DEDICATION**

To my parents Mr. Arbogast Venance Maghala and Mary Moses Maghala who laid the foundation of my education.

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**LIST OF ABBREVIATIONS**

%	Percentage
CGC	Canadian Grain Commission
CIDA	Canadian International Development Agency
DALDO	District Agriculture and Livestock Development Officer
D.R.	Democratic Republic
EAC	East African Community
FAO	Food and Agricultural Organization
Kg	Kilogram
Km	Kilometre
Km <sup>2</sup>	Square kilometre
ACT	Agricultural Council of Tanzania
MITM	Ministry of Industry, Trade and Markets
MoAC	Ministry of Agriculture and Cooperatives
NFRA	National Food Reserve Agency
RATES	Regional Agricultural Trade Expansion Support Program
T.sh	Tanzania shilling
°	Degree

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background information

MoAC (1997) identified maize as a major staple food for the population of rural and urban Tanzania. Its production accounts for about 31% of the total domestic food crop production. Average cultivation area of maize in Tanzania is 45% of the total country arable land (Katinila *et al.*, 1998); 46% of this cultivation area is found in the southern highlands of the country.

Maize cultivation is dominated by small-scale farmers (Amani and Maro, 1992). Its output accounts for 90% of the staple food market share (Mgina, 2001). It also accounts for 28% of the gross farm output from Tanzania's small-scale agricultural farming sector (Jayne *et al.*, 2002).

The crop is considered a food security synonym. However, 85% of the country's population uses its surplus for income generation (Jayne *et al.*, 2002). It was also identified as an export crop important in the southern highlands regions of Tanzania, which are geographically far from the main domestic markets but closer to lucrative markets across the national frontiers of Malawi, Zambia, Congo D.R., Rwanda and Burundi (MoAC, 1997).

Annual domestic maize production has been varying from as low as 1.8 million metric tonnes to more than 2.7 million metric tonnes with an average of about 2.3 million metric tonnes per annum (ACT, 2007).

Annual maize consumption is estimated at 2.7 to 3.1 million metric tonnes (RATES, 2003). However, the country is importing and exporting maize depending on the food security situation and volume of production.

### **1.2 Grain marketing in Tanzania**

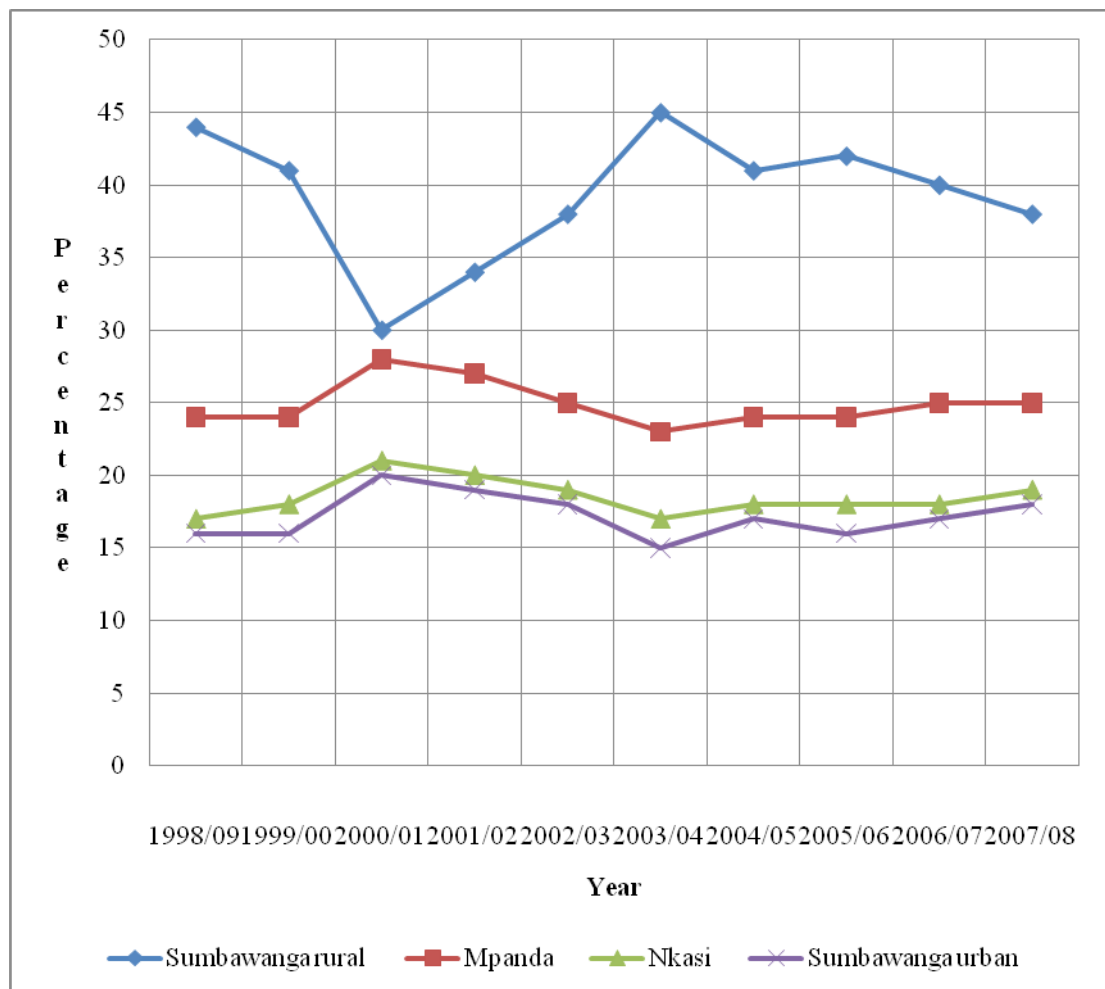
Grain marketing in Tanzania is dominated by a large number of small-scale quasi-professional private traders (Coulter, 1994). Their participation in grain marketing came into being during and after trade liberalization in 1980s. This led to trading competitive environment in entry and exit conditions to players and posed competitive environment in the commodity pricing (MITM, 2008).

However, traders have not been able to exploit the opportunities offered by surplus of maize produce in rural production potential areas (Eskola, 2005). Capturing such opportunities depends on the existing pattern of relationship between producers and traders in the marketing system (Tracey-White, 2005). This pattern is affected by agricultural marketing infrastructural system and adherence to physical marketing functions. Theoretically, the two attributes are providing prerequisites to viable rural economic development (CIDA, 2007). They lead to informal marketing barriers associated with high cumulative transaction costs and lower trader's net margin. They finally affect farmer's income shares from their surplus (Eskola, 2005).

### **1.3 Production and marketing potential in the study area**

Rukwa is a region that has the potential to produce maize enough to meet annual regional food security. Maize surplus contributes substantial regional market share.

In the 1993/94 season, maize accounted for about 45% of total volume of the agricultural produce in the region. About 62% of it was produced in Sumbawanga Rural District (Nguruse, 2007). This study has revealed on relatively same information. Maize production trend examined in the period of ten year from 1998/99 to 2007/08 show that the District is still high in maize production. The Figure 1 below describes this trend for Rukwa Region.



**Figure 1: Percentage of maize production in the Rukwa Region**

#### **1.4 Problem statement and justification of the study**

Beside its reasonable market share, maize entering grain market does not adhere to sets of quality and standards. The District marketing system is lacking grain quality and standards inspectorate mechanism at various levels of grain marketing.

According to NFRA in Rukwa region, there is a great quantity of maize which is sold without adhering to quality and standards. However, there is no information available to provide details on the amount of maize which enters various levels of the marketing process without adhering to quality and standards.

Despite the lack of this information, it has been vivid that maize producers and traders are getting something less in their net revenue. This proposition come forward due to the fact that for each bag of maize sold at NFRA, there is a constant reduction of 1.43% of the weight. This is done in order for the NFRA to compensate for losses it may encounter due to lack of quality and standards in maize brought there for sale. A similar case may be happening in some other maize markets.

Thus, this study aims to examine the economic performance of maize producers and traders in Sumbawanga Rural District. It also looks at the need and significance of establishing, strengthening and maintaining adherence to maize quality and standards in the study area.

## **1.5 Objectives**

### **1.5.1 General objective**

The general objective of this study was to examine the performance of maize producers and traders in Sumbawanga Rural District.

### **1.5.2 Specific objectives**

- i. To examine the significance of adhering to facilitating functions in maize marketing in Sumbawanga Rural District;
- ii. To examine the net marketing margin of maize traders in the study area;
- iii. To examine the costs incurred for different facilitating functions in maize marketing in the study area.

## **1.6 Research hypothesis**

- i. Cleaning of maize has a significant effect on increasing the trader's net marketing margin;
- ii. Grading/sorting of maize has a significant effect on increasing the trader's net marketing margin;
- iii. Standardizing maize bags into uniform weights has a significant effect on increasing the trader's net marketing margin.

## **1.7 Anticipation of the study**

Maize cleaning, sorting and standardizing were expected to have a substantial positive effect on traders net margins, given that the costs of adhering to these functions are less than the benefits accruable from doing so.



## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 An overview of the chapter**

This chapter has reviewed the literature pertaining to the attributes of maize standards and quality. It has also reviewed the institutional responsibility to maize standards and quality. It reviews and presents model assessment as used in food marketing studies. Finally, it suggests the model used by this study. However, its detail is discussed in chapter three on the methodology.

#### **2.2 Grain marketing**

Grain marketing covers the process of purchasing and selling which lead to creation and exchange of values for a commodity (Kotler and Armstrong, 2006). It is the performance of business activities involved in the flow of a commodity from the production (supply) point to consumption (demand) point (Kohl and Uhl, 1990). Babatunde and Oyatoye (2007) narrates that marketing of agricultural produce begins on the farm and it may be completed with delivery of fresh or processed produce to traders, manufacturers or final consumers. Thus, marketing is an intervention which involves a channel of the net capital surplus out from the rural agricultural sector (Ashimogo, 1994). In doing so it integrates the farming community into the market economy through communication and exchange of agro-produce (Dhital, 2004). This provides a resort to marginal farmers and thus agricultural marketing becomes and remains an important economic endeavour in the agricultural sector.

Efficiency in grain marketing depends on a set-up of inter-dependent interventions among marketing participants and related institutions. Their network, operation and the marketing infrastructural facilities make up the agricultural marketing system.

### **2.3 Grain marketing systems**

Broadly, a marketing system involves the interrelationships of the marketing institutions. These are organizations and enterprises which participate and perform various functions in the marketing process (FAO, 2002). Kohl and Uhl (1990) classify these functions into exchange functions (i.e. buying and selling), physical functions (i.e. storage, transportation and processing) and facilitating functions (i.e. quality and standardization, financing, risk bearing and marketing intelligence). These provide an arrangement for performing various activities involved in the flow of a commodity in the marketing chain (Acharya and Bhatnagar, 2007).

Basing on the nature of this study, there is less literature on exchange functions and physical functions that has been reviewed by this study. Instead, its literature has made an intensive review on the facilitating functions, specifically on the quality and standardization. Thus, the following sections of this chapter present a literature on grain quality, standards and the associated attributes.

#### **2.3.1 Maize standardization**

Most countries have developed national grain standards in order to provide a trading guideline for internal and external environment. This pertains to establishing, implementing and maintaining uniform measures on the basis of quality and

quantity in order to simplify the mode of exchange. It enables buyers to specify their wants and suppliers to communicate what they are able to supply given defined prices (FAO, 2006). In the absence of grain quality, quantity and sets of standards, grain trading becomes expensive to conduct or impossible altogether (Jaffee and Henson, 2006).

Grain standards and defined regulation provides a guideline as to what is to be exchanged. It elaborates the procedures that must be followed to facilitate the exchange of produce. Furthermore, it ensures that such exchanges comply with sets of standard and provide a critical factor in determining market access (Jaffee and Henson, 2006).

A wide range of measures have been suggested and employed on the conditions under which grains are produced and controlled to maintain the characteristics of the final product (Ferris *et al.*, 2006). This aims to manage risks associated with human health from contaminants, pest residual and disease-causing organisms.

### **2.3.2 Grain quality**

Grain quality expresses an aspect which links grain individual characteristics and behaviour when subjected to processing and various environments. According to (Shipman *et al.*, 2004), the quality attribute of grains entails two aspects: soundness and purity. The former pertains to the general condition of grains in the sense of its density, moisture content, colour, broken or cracked kernel, mouldiness (odour), insect infestation and kernel deterioration; while the later pertains to the inclusion of

substances other than the natural kernel such as husks, stems, weed seeds, other grains, stones and insects.

In grain marketing, soundness and purity implies to responsibilities of the marketing participants in channelling of the commodity. Grain traders and stockists for instance, want dry, clean grain, neither infested nor damaged. Grain millers want clean grain in homogeneous batches, not too hard to grind and which provides a high yield of milling products. Processors never mind about hulled or broken grains of homogeneous size, free from any impurities and parasitic odours and insect infestation.

The final consumers are sensitive to colour, texture, aroma and the taste of the product on the table (FAO, 2002). Thus the grain quality and standards sends a clear indication of the desirability of grain requirements to producers and traders. This provides a common definition for the product value and allows the market to apply uniform language for efficient trading (Shipman *et al.*, 2004).

### **2.3.3 Quality characteristics of maize**

Maize quality characteristics have two attributes; the intrinsic characteristics of a grain variety and the environmental or process induced characteristics (Aman and Maro, 1992).

Aman and Maro (1992) explain that intrinsic quality characteristics of maize are more genetic such that neither producer nor trader can easily do anything to modify.

Alteration of this quality aspect is only achieved through agronomic researches pertaining to one or several particular qualities of greater interest. For this case, a literature of this study has discussed no details pertaining to intrinsic quality characteristics of maize.

Environment or process induced characteristics are within the control of the maize producers and traders given sets of grades and standards which define market quality requirements and desirability (Bryceson, 1993).

In general maize characteristics are influenced by soil and climatic conditions during the growing season. The process of cultivation, weather conditions at harvest, techniques used in harvesting and storage are other characteristics influencing factors. Such factors subject maize into physical and environmental induced characteristics which affects its standards and quality (Semple *et al.*, 2002). These characteristics include the presence of immature grains, infested and damaged grains, foreign matters from animals, plants and mineral origin as well as the level of moisture content (FAO, 2006). Grains which are internally or superficially damaged and contain foreign matters lower the prime quality of maize and render its rejection at the market.

There are developed guides which specify the maximum limits in which defects in maize are tolerable. Beyond these limits the product is regarded as of low quality and undesirable in the market. These limits are described in the next section.

### 2.3.4 Tolerable limit of defects in maize

Defined tolerable limits of defects provide a guide for grain standards and quality. They classify rules and measurement established for consistent use to provide a specific system of classification which uniformly and consistently identifies the quality attributes (FAO, 2002).

Regulatory requirements for the import and export of maize in the East African Community had set up the maximum tolerable limits for defects in maize grains (EAC, 2005). These are also applicable in the inter-country maize trade (RATES, 2003). Table 1 below describes the percentage by weight in which grain defects are tolerable.

**Table 1: Percentage of maximum defect tolerance in maize**

Defect specification	Maximum limit (% by weight)	
	Grade 1	Grade 2
Moisture content	13.5	13.5
Foreign matters	0.50	1.00
Inorganic matters	0.25	0.50
Broken grains	2.00	4.00
Pest damaged grains	1.00	3.00
Rotten and diseased grains	2.00	4.00
Discoloured grains	0.50	1.00
Immature/chalky grains	1.00	2.00
Total defective grains	4.00	5.00
Live insect infestation	Nil	Nil

Source: EAC grain import and export regulation (2005)

### **2.3.5 Grain operation and services**

In markets close to the source of grains, customers preferences and the laws of supply and demand controls the quality of grain (Semple *et al.*, 2002). In contrary, where grain is traded over long distances, where the customer does not have a direct influence on the quality, regulatory standards must be established and imposed to protect customers' rights.

Operations and services to attain grain quality and standards are therefore introduced in the marketing channel (Ferris *et al.*, 2006). Beside the principles of maize agronomy, there are common operations and services that maize producers and buyers have to adhere to. These are cleaning, sorting (or grading) and packing (weight standardization).

#### **2.3.5.1 Cleaning of maize**

Harvested produce needs to be cleaned before it is send to a next stage. This is done in order for it to conform to the processing and consumption requirements (Acharya, 2007).

Winnowing is a simple way which is normally applied to clean maize (FAO, 2006). However, the method is tedious, inefficient and may cause great losses of grains. This method increases the prime quality of maize by removing impurities, foreign materials, moulds and insect residues (Ferris *et al.*, 2006). In doing so it improves its market value.

### **2.3.5.2 Sorting or grading of maize**

Maize grains are classified into grades according to certain qualities of interest which are established to meet the market needs (RATES, 2003). Sorting of maize results to a better selling price and helps the customer to find a standard quality product at a fair price.

Since the task of grain sorting is costing, labour intensive and time consuming, producers and traders are normally willing to do so only if buyers are prepared to pay a high price for a product which conforms to quality and grades (Ferris *et al.*, 2006).

### **2.3.5.3 Maize packing and weight standardization**

After cleaning and sorting, the market may require maize to be packed in bags or containers of certain units of specified weight. Depending on the market requirements the common units of weight specified for maize includes 25Kg, 50kg and 100Kg (Robbins, *et al.*, 2005). When adhered, these standards of weight reduce the number of intermediaries who would need to physically confirm on the quantity of the product as it flows through the chain (Ferris *et al.*, 2006). It then allows distant sellers and buyers to negotiate on transaction while they know how much they are buying at a specified price.

When marketing participants are adhering to operations and services of cleaning, sorting and packing into standard weighs, they present a wide range of economic benefits which hold opportunities in grain marketing (Hurburgh, 2003).



Acharya (2003) estimated that practice in these activities created over 250,000 jobs in rural areas. When studying agricultural marketing and rural credit in India, Acharya (2006) noted that if these activities are done, they can help in avoiding unnecessary daily transportation of about 400,000 kg of organic wastes from the villages to urban market centres. Alternatively these wastes would increase the availability of rich organic matters in rural farming fields. These activities offer challenges and opportunities to maize producers and traders. However, this may hold very practical only when there are responsible institutional arrangements in the agricultural marketing system.

### **2.3.6 Institutional responsibilities in grain quality**

An institution responsible for quality and standards in the agricultural marketing system should deliver the assurance program for inspection and certification (CGC, 2008). This institution must identify and elaborate the relationship between the physical and biochemical properties of grains and their impact on the market.

CGC (2008) narrates tasks that an institution responsible for grain quality and standards in the agricultural marketing system should abide with. These are:-

- i. To develop methods required in evaluating grain quality; support the sale and market development of grains by providing technical advice and information to grain producers and traders on quality of commercial grain in order to ensure that they meet the described tolerable limits of defects;

- ii. To investigate and respond to inquiries and complaints related to matters within the institution regulation, order, law and jurisdiction regarding grain quality characteristics;
- iii. To regulate the grain industry in order to ensure fair treatment of producers and the integrity of grain transactions to maintain its quality as it is moved along marketing channels;
- iv. To offer guidelines, regulation and orders for licensing eligible grain dealers, developing and setting grain quality and standards, inspecting grains and grain handling facilities to ensure that grains are free from foreign matters and insect infestations as well as collecting and publishing statistics on grain handling, storage and movement.  
  
Moreover, the offer must be on administering, mediating and resolving producer complaints concerning grain transactions; and finally
- v. To operate the grain inventory accounting system, provide grain quality data and facilitate the flow of marketing information on behalf of the grain trading system.

In most of the developing countries however, there are weaknesses in the institutional arrangements and responsibilities pertaining to grain quality and standards (Amani, 2005). Grain systems are complex, fragmented and dominated by small-scale producers and traders. Quality control becomes difficult when a large quantity of grain is passing through multitude of intermediaries. An interaction and cooperation between production industry and the standards managing institutions is often lacking (CGC, 2008). In such a case, adherence to maize quality and standards has been hampered in almost all the nodes of the marketing chain.

## **2.4 Model assessment**

This section reviews approaches that some other relating studies have employed in their analyses. Several studies conducted in food marketing show traders, rural farmers and the rural economy are performing better. Different approaches and methodologies have been suggested and adopted. More often, researchers studying food marketing have employed the Structure-Conduct-Performance model to analyse the market behaviour and the relationship that exists between production, marketing and consumption.

When studying production and marketing of staples in the Democratic Republic of Congo, Goossens (1996) used the Structure-Conduct-Performance model to test his hypothesis that “the high marketing margin is due to internal behavioural characteristics of a trade firm.” He found that product quality attributes influenced the behaviour of traders and their marketing margins.

In a study of agricultural marketing and rural credit in India, Acharya (2006) used operational efficiency as an attribute of the Structure-Conduct-Performance model to measure the relative size of marketing costs and margins. He found that 64% of the operational cost was for performing activities that would enable the product to meet specified grades and standards. He also found that there was a saving of 77% of the marketing costs due to adhering to a set of quality attributes and standards.

In order to draw a logical inference, this study has employed a regression analysis. The objective of employing this approach is to build-up a mathematical model that

makes accurate predictions and inferences about the effects of cleaning, sorting and standardization in maize marketing in the study area.

The use of regression analysis is criticized by econometrician for producing biased parameters (Gujarat, 2002 and Haji, 2008). This is due to dual causation which leads to violation of some important assumptions of the classical regression model. However, it is useful when the analysis is limited to examine the presence and direction of causal relationship.

Researchers in the study area have conducted studies on crop and livestock production and marketing. Most of them have studied the aspects of supply for livestock and agro-inputs, modes of production, marketing and supply of the produces. However, there is no study that has been conducted to specifically examine the significance of quality and standards in the agricultural marketing.

This study is going to cover this gap. In doing so, the study has considered institutional and microeconomic environment as exogenous constraints; and the attributes of grain quality and standards characteristics as endogenous constraints.

A detailed review of the methodology, analytical tools and test statistics are covered in the next chapter.

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 The study area**

Sumbawanga Rural District is one of the five Districts in Rukwa region. It lies within the western arc of the East African Rift Valley. It is found in the South-West highlands of Tanzania in Latitude 7.8<sup>0</sup> and 9<sup>0</sup> South; and Longitude 31<sup>0</sup> and 32.3<sup>0</sup> East. The District borders Nkasi District in North, Mbozi District (in Mbeya Region) in South-East, the country of Zambia in South and the Lake Tanganyika in South-West.

The District has three agro – ecological zones which are the Ufipa plateau, Lake Rukwa basin and the Lake Tanganyika shores. In total, the agro-ecological zones covers an area of 13,586 km<sup>2</sup> of the entire region with 12 414 km<sup>2</sup> of land and 1,172 km<sup>2</sup> of water. 68% of the District area is potential for agricultural interventions for various crops such as maize, paddy, beans, sunflower, cassava, finger millet, groundnuts, sugarcane, palm oil, coconut and a variety of vegetables.

Sumbawanga district has been chosen as a case study due to its potential for producing maize surplus, enough to supply a substantial share in grain markets in southern highland regions and the bordering countries of Zambia, The Democratic Republic of Congo and Malawi.

### **3.2 Research design**

The research design for this study was cross-sectional. Data were collected at a single point in time.

### **3.3 Sampling procedure**

Purposive multistage and random sampling techniques were employed in this study. Of the three maize producing zones in the district, the Ufipa plateau was selected purposively. This is due to its potential for producing maize surplus for the market as compared to the other two zones. Using the same technique, three trading centres at Matai, Laela and Sumbawanga were selected in the Ufipa plateau. A simple random sampling technique was used to obtain a total of sixty maize traders; twenty traders came from each of the trading centres: Matai, Laela and Sumbawanga.

A random sampling technique was used to determine four villages. These were Msanzi, Katuka, Lula and Katonto. Each of these villages provided a sample of thirty maize producers. Thus a unit of study was one hundred and twenty maize producers.

Both, maize traders and producers were visited and interviewed in their respective areas of business operation and residence.

### **3.4 Data collection**

A structured questionnaire was used to collect both qualitative and quantitative data from traders and maize producers. Secondary data were collected from relevant

sources such as the Sumbawanga District Council, the Rukwa Regional Secretariat Office and the National Food Reserve Agency in the Rukwa Region.

A check-list of questions was used to fetch information needed from these sources.

A check-list of questions was also used to fetch some other relevant information in the selected villages of study, where the Village Executive Offices were visited and administered for gathering required information.

### **3.5 Data analysis**

Descriptive statistics were used to describe various characteristics and attributes of the market. Quantitative data were analyzed using the linear regression models for the postulated hypotheses.

#### **3.5.1 Regression analysis**

This study employed the linear regression model to investigate the relationship that exists between the net marketing margin of traders and adhering to practice in facilitating functions such as cleaning, sorting and standardizing of maize for trading. It was employed to test three different hypotheses, whose parameter estimates were able to be included in a single model.

The first hypothesis states that “Cleaning of maize has a significant effect in increasing the trader’s net marketing margin”, the second hypothesis states that “Sorting of maize has a significant effect in increasing the trader’s net marketing margin” and the third hypothesis states that “Standardizing maize bags into uniform weights has a significant effect in increasing the trader’s net marketing margin”.

Cleaning, sorting and standardizing were treated as dummy variables in the model and their corresponding coefficients estimated.

The ordinary least square technique was used to estimate the model. This was used because the data were limited in examining the presence and direction of the technical causal relationship among the dependent and independent variables.

The linear regression model for the three hypotheses is specified as follows;

$$Nm = \alpha + \sum_{i=1}^6 \beta_i X_i + \varepsilon_o \quad \dots\dots\dots (i)$$

Where:  $Nm$  = Net marketing margin,

$\alpha$  = An intercept (a constant value),

$\varepsilon_o$  = An error term,

$\beta_1 - \beta_6$  = Scalar parameter to be estimated,

$X_1 - X_6$  = factors influencing net margin which include:-

Physical marketing services as dummy variables such that;

1 for cleaning and 0 if otherwise,

1 for grading and 0 if otherwise,

1 for standardizing and 0 if otherwise

The  $t$ -statistic ( $t_i$ ) and the level of significance obtained from the results after running an analysis in SPSS were used to infer as whether to reject or accept the hypotheses. Hypothesis testing was done at 5% level of significance, a typical SPSS default significance level in empirical workings of social statistics.



At this level, the alternative hypothesis is accepted when  $P$ -value from the analysis results is less than the corresponding level of significance ( $p = 0.05$ ). Basing on this proposition, three attributes: cleaning, sorting and standardizing are inferred as statistically significant to effect on the net marketing margin of traders. This is only true when the cost of their operation and services is less than the revenue they bring after selling of maize.

#### **3.5.1.1 Expected signs of the parameter estimates**

The definition that an econometric analysis gives is logically necessary to fit on the economic theories pertaining to the causal-relationship between variables. However, the interpretation of this causal-relationship can base on either economic theory or logical judgment or both of the two. The following description explains the anticipated relationship between the explained and the explaining variables basing on the estimated coefficients.

- i. Coefficients attached to cleaning, sorting and standardizing attributes were expected to be positive. Practice in cleaning was expected to increase the value of maize and consequently the net marketing margin given that its cost of operation is less than the revenue fetched by selling clean maize.
- ii. Practice in sorting of maize was expected to fetch high cumulative returns due to product categories according to the market quality and standards needs. This was expected to have a positive direction with the net marketing margin of a trader only if the returns it cause to a trader was large enough than the costs of conducting an activity of maize sorting into grades/classes.

- iii. When maize is bought from producers, they are normally not balanced to the standard weight. Traders are taking advantage of this behaviour to increase their returns per bag of maize. If a trader is standardizing maize into uniform weights, the whole maize consignments result into more bags than it was once purchased from the producers in the village. This would result into increased net marketing margins of a trader.

The following chapter presents and discusses the results of the above analyses.

## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1 An overview of the chapter**

This chapter presents and discusses the results of the analyses. It is organized into an overview for maize quality and standards. Then it presents the attributes of maize quality and standards. These are cleaning, sorting (grading), and standardization of maize into uniform weights. In its working, the chapter presents the direction that has been determined and inferences that has been drawn for each of these attributes.

#### **4.2 Adherence to maize quality and standards**

A reasonable number of grain traders adhere to maize quality and standards. Descriptively, 73.3% of traders were standardizing their maize into uniform bags of 100kg before selling them; 60% of traders were cleaning their maize prior to selling while a relatively few traders, only 8.3% were grading their maize into classes.

Generally, 66.80% of maize traders in the study area agreed that adhering to maize quality and standards is a criterion for agreeing the maize selling price, depending on the target customer. Most of traders claimed to adhere to maize cleaning not for maximizing their net margin but for avoiding commodity rejection from some of the customers. (Table 2 and Table 3 below summarises these results).

**Table 2: Practice in maize quality and standards attributes**

Quality attribute	Response	Frequency	Percentage
Practice in maize cleaning	Yes	36	60.0
	No	23	38.3
Practice in maize standardization into uniform weights	Yes	44	73.3
	No	16	26.7
Practice in grading of maize into classes	Yes	5	8.3
	No	53	88.3

**Table 3: Weight of a bag of maize before and standardization**

Weight attribute per bag	Minimum	Maximum	Mean
Weight before standardization	90	200	106.28
Weight after standardization	100	100	100.00

Attributes which contribute to the quality and standards of maize which were practiced by the traders, were regressed against the net marketing margin in order to determine if they have a statistical significant influence.

#### 4.2.1 Cleaning of maize

The postulated hypothesis that “Cleaning of maize has a significant effect in terms of increasing the trader’s net marketing margin” is not accepted at  $t_i = 0.374$  in which  $t_i > t_c$ . Maize cleaning is insignificant at  $p_s = 0.710$ . It is inferred that the practice of maize cleaning does not have a statistically significant effect on increasing the net marketing margin of a trader. Instead it reduces the net marketing margin at the rate of 0.031 T.sh per bag. This indicates that the activity just adds up to non-compensated marketing costs (Table 4 below has a summary of these results).

**Table 4: Regression results for net marketing margin of maize traders**

<b>Factors determining net marketing margin of a trader</b>	<b>Standardized Coefficients</b>	<b>t-statistic</b>	<b>Significance level</b>
Practice in cleaning	-.031	-.374	.710
Practice in grading maize into classes	.136	1.710	.094
Practice in standardizing maize bags into uniform weights	.033	.397	.693
Purchasing price for one bag of a maize	-.661	-7.288	.000
Selling price of one bag of maize	.718	8.531	.000
Total marketing cost per bag of maize	-.496	-6.322	.000

At the buying posts and villages, maize is bought at the same price across buyers regardless of its quality and standards. Given the high competition amongst maize buyers in the posts and villages, once one trader rejects maize on the ground of it being dirty, other buyers happen to take it regardless of the quality and standards. As such, the grain marketing system as a whole does not adhere to grain quality and standards.

Only 6.4% of the traders bought maize from farmers in relatively good quality. These traders needed not to re-clean them before selling to the next market. The rest of traders bought maize from farmers in their dirty state.

Some markets, especially the NFRA, are deducting a constant amount of 2.0kg on each bag of maize brought there for sale. They are doing so for all the consignment regardless of its quality and standards. This has rendered maize traders to find that cleaning is unnecessary for them to practice.

#### 4.2.2 Grading/sorting of maize

The hypothesis that “Grading of maize into classes has a significant effect in increasing the trader’s net marketing margin” is not accepted since  $t_i > t_c$  where  $t_i = 1.710$ . With  $p = 0.094$ , grading of maize is found not statistically significant in increasing the net marketing margin of traders. However, when adhered it increases the net marketing margin at a rate of 0.136 T.sh per bag. Besides, this increase does not have a statistical significance.

Cleaned and graded maize was found to fetch higher selling price at a mean difference of 2 243.81 T.sh. as compared to maize not cleaned and standardized (Table 5 below). About 16% of the traders who adhered to cleanliness and grades were selling to food processors and institutes such as hospitals, colleges and schools. These traders sold their maize at a relatively high price.

**Table 5: Maize marketing costs, margins and selling price**

Costs and margins	Minimum	Maximum	Mean
Trader's capital in maize business	100 000	10 000 000	1 677 233
Total marketing cost of a bag of maize (x 1,000)	2.58	17.55	7.38
Trader's marketing margin per bag of maize (x1,000)	-.33	20.67	9.24
Trader's net marketing margin per bag of maize (x 1,000)	-10.78	13.44	1.86
Maize purchasing price for one bag of a maize (x 1,000)	13.833	37.667	22.67
Maize selling price of one bag of maize (x 1,000)	16.500	39.167	27.21
Selling price good quality maize (x 1,000)	15.667	40.333	27.028.99
Selling price for maize not adhering to quality standards (x 1,000)	11.000	39.000	24.785.18

#### 4.2.3 Standardization of maize

The hypothesis that “Standardization of maize bags into uniform weights has a significant effect in increasing trader’s net marketing margin” was also not accepted at  $t_i = 0.397$ . It is inferred from here that the practice of standardizing maize into uniform weights does not have a statistically significant influence on the trader’s net marketing margin at  $p_i = 0.693$ . However, the influence of standardizing maize into uniform weights had a positive effect on the trader’s net marketing margin at the rate 0.033 T.sh per bag.

A single bag of maize purchased from a maize producer had a mean weight of 106.28kg. About 73.30% of maize traders they standardized their maize to a weight of 100.00kg. In so doing they got an extra of 6.28kg of maize per each bag of maize they purchased from producers. This proposes that for every 16 bags of maize that a trader has purchased, there was an extra bag after standardizing. However, an extra of 6.28kg per each standardized bag does not have a statistical significance on increasing the net marketing margin of a trader.

From these findings, adhering to the attributes of maize quality and standards does not have statistical significance in terms of influencing the traders’ net marketing margin. However, grading and standardizing maize have shown to increase the net marketing margin while the attribute of cleaning maize lowers it. Detailed conclusion and recommendations that this study has come up with are given in the next chapter.

## **CHAPTER FIVE**

### **5.0 CONCLUSION AND RECOMMENDATION**

#### **5.1 An overview of the chapter**

This chapter presents a conclusion that the study has reached. The presentation refers to the real situation in the study area and the inferences drawn from the postulated hypotheses and objectives. The chapter then presents some recommendations for key players in the agricultural marketing system to adhere in order to maximize maize producers' and traders' performance in grain marketing in the study area.

#### **5.2 Conclusion**

The findings of this study have revealed that there is no pattern of collaboration and responsibilities among maize producers, traders and institutions responsible for grain quality and standards in the agricultural marketing system. The guides for the importance and significance of establishing and adhering to quality and standards, and the mode of implementing and maintaining them have been documented. These are found in the policy documents which were developed by the Ministry of Agriculture, Food Security and Cooperatives and the Ministry of Industry and Trade of Tanzania. Also, the Tanzania Food and Drugs Authority and the Tanzania Bureau of Standards have documented them. More over at the District level, there are sets of guides and by-laws which were developed for the aim of stressing on adherence to quality and standards. However, these guides and documents do not have any practical implementation in the agricultural marketing system in the District.

Lack of practical implementation of the developed guidelines has distorted the quality and standards in the whole system of agricultural marketing. As such, key



marketing players, especially the producers and small-scale traders find no any significance in adhering to sets of specified grain quality and standards in their business operations.

### **5.3 Recommendations**

Grain quality and standards should start as earlier as possible in the production season during the farming and field preparation. Moreover, in order for the production industry to produce and maintain quality and standards of the produce, markets have to specify their wants in advance. Thus there should be a perfect flow of information which expresses the market needs earlier before the production season commences. This will ensure that farmers are producing what is required by the market. Besides, this study is suggesting more on the following:-

- i. Seed producing agencies should ensure that the seeds they produce are reaching to farmers at time and a relatively reasonable price for them to afford. Moreover, these agencies have to licence some groups of farmers to produce certified seeds so that there would be a good spread of quality declared seeds in the district;
- ii. Agricultural extension services have to disseminate to producers some more advanced package on grain agronomy and processing. Such extension services also, have to be aware of the technologies for harvesting, packaging and storing of the produce in order to ease for maintaining of grain quality and standards;
- iii. There should be definite price segregation for produce at the market on the basis of their quality. This will automatically drive producers and traders to adhere to sets of grain quality and standards in order to hunt for high prices of their produce;

- iv. The guides which were once developed by the Ministry of Agriculture, Food Security and Cooperatives, the Ministry of Industry and Trade, the Tanzania Food and Drugs Authority and the Tanzania Bureau of Standards have to be in place for use. Responsible institutions, especially the Sumbawanga District Council have to interpret these guides and ensure that they are available to key grain marketing players, specifically the grain producers and traders in the District;
- v. When due, a set of by-laws which were developed by the District Council will have to be reinforced. However, this will only be effective and efficient if the rest of the marketing system have played their role and the market has endorsed price segregation for the produce on the basis of its defined quality and standards.

#### **5.4 Areas for further studies**

This study had its concentration on the attributes which leads to quality and standards of grains. It had a look on whether there could be the significance of imposing them in the agricultural marketing system. The study has drowned inferences and made a conclusion and recommendations. However, there are other components left uncovered, which all together has a cumulative effect in influence the performance of grain producers and traders in agricultural marketing.

Hence, this study suggests that a research be conducted for sustainable rural agricultural marketing. A researcher for this study will be expected to present views for sustainable networking and collaboration among key marketing participants for agricultural produce. This research may include a vital component of processing of agricultural produces in the plan for sustainable agricultural marketing.

Further, researches can be conducted to find the profitability on production and marketing of maize versus paddy. The nature of this study may be a comparative analysis. Such a research is suggested in order to provide a base for respective producers to decide which one of the two crops needs an intensive investment given the available opportunities. However, the findings of this study are not expected to discourage on the production of either of the two crops.

The Sumbawanga Rural District also has the potential in livestock production. Here there are areas which also needs to certain socio-economic researches at house hold level. Such studies can be conducted my look on the socio-economic impact of cattle on household livelihood of the “*Wasukuma*” community.

Other studies may have a nature of both the socio-economic and scientific. This study may be that of conserving the *Ufipa* cattle population in Sumbawanga Rural District. This study is suggested because the nature and the population of the *Ufipa* cattle is at risk due to interventions in the crop farming industry.

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## APPENDICES

### Appendix 1: Questionnaire for maize traders in Sumbawanga rural district

**Date of interview:** \_\_\_\_\_

Trader's name: \_\_\_\_\_

Sex: i) Male ; ii) Female

Education level: \_\_\_\_\_

Business centre: \_\_\_\_\_

Ward: \_\_\_\_\_

Village: \_\_\_\_\_

Number of years in maize business: \_\_\_\_\_

Total business capital: \_\_\_\_\_

If your capital is from bank loan, the interest rate is \_\_\_\_\_

Time specific to pay back the whole bank loan. \_\_\_\_\_ months

#### Maize purchasing and transportation

1. From whom do you normally purchase maize?
  - a. Maize producers
  - b. Other traders
2. Please, mention the villages from which you purchased your maize in the last business season, with their respective distances.

Number	Villages	Distance (in kilometres)
1.		
2.		
3.		

3. Who is purchasing maize for you?
  - a. I use agents to purchase maize for me
  - b. I myself do the maize purchasing
4. Please, mention different means of transport that you use from the village of maize purchasing to your business centre/godown/store.

	Means of transportation			
	Lorry	Pick-up	Tractor	Ox-cart
Village of purchase				
Destination point				
Distance travelled (Km)				
Transport cost per bag				
Levy for a maize bag				

5. In average, how many bags of maize did you purchased in a single business journey to maize producing villages? \_\_\_\_\_ Bags.
6. How many business journeys did you made in the last maize business season?
7. How many days do you take in collecting one maize consignment? \_\_\_\_\_ days
8. In average how much of money do you consume as living costs while collecting maize consignments in the villages? \_\_\_\_\_ Shillings.
9. Is there a difference in transportation costs per bag during the rainy and dry season?
  - a. Yes
  - b. No
10. If there is a difference, please mention the reason causing such a difference.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
11. Please, specify the difference in transportation costs for different types of transportation means in wet and dry seasons

			Transportation costs			
			Dry season		Wet season	
Means of transport	Distance	Loading and unloading costs	Lowest cost	Highest cost	Lowest cost	Highest cost
Lorry						
Pick-up						

Tractor						
Ox-cart						

12. How many months are there in a single maize business trading season? \_\_\_\_

Months

13. How many months in such a business season that you can go for maize purchases without facing any obstacles in your journey? \_\_\_\_ Months

14. Please, mention those months

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

15. If in a business season there are any obstacles that you face when travelling to maize purchasing villages, which are they?

a. \_\_\_\_\_

b. \_\_\_\_\_

16. Please, mention the following requirements and their respective costs: -

a. One maize packing sack, \_\_\_\_ shillings,

b. If you buy a role of sisal sewing ropes, how many roles did you used?

c. The cost of one role of sisal rope in \_\_\_\_ shillings,

d. If you buy pieces of sisal ropes for sewing maize sacks, how many pieces do you need?

e. The cost of one piece of sisal rope in \_\_\_\_ shillings,

f. Please, mention the total cost for drugs you are using for storing maize, \_\_\_\_ Shillings,

g. Mention the labour cost for packing and sewing a maize sack, \_\_\_\_ shillings,

h. If an agent is doing for you the whole task of maize purchasing, please mention the cost you are paying for collecting a single bag of maize, \_\_\_\_\_ shillings.

17. Please, mention the purchasing price of maize during the wet and the dry season.

**Wet season**

Lowest buying price was \_\_\_\_\_  
 Medium buying price was \_\_\_\_\_  
 Highest buying price was \_\_\_\_\_

**Dry season**

Lowest buying price was \_\_\_\_\_  
 Medium buying price was \_\_\_\_\_  
 Highest buying price was \_\_\_\_\_

18. What is an average weight of a single bag of maize when purchased? \_\_\_\_\_  
 Kilograms

**Maize quality and storage**

19. Do you find good quality when purchasing maize (*i.e. containing neither dusts nor broken maize seeds?*) – If the answer is yes, then go to question number 28.

a. Yes

b. No

20. Do you normally clean and remove impurities present in maize that you buy?

a. Yes

b. No

21. Do you sort maize on the basis of their colour and broken seeds?

a. Yes

b. No

22. Do you normally grade your maize?

a. Yes

b. No

23. If you do remove the impurities, sorting and grading, which means do you use?

a. Hired labour

b. Processing machine

24. When do you practice the above mentioned activities?

a. During maize purchasing in the village

b. At the moment of maize storing

c. During selling to customers who are coming to my store

d. At the market after transporting them from the villages

25. If you are applying labour, mention the cost of cleaning, sorting and grading a single bag of maize. \_\_\_\_\_ Shilling.

26. If you applying a machine, please mention the cost of cleaning, sorting and grading a single bag of maize using a machine. \_\_\_\_\_ Shillings.

27. If you neither clean, sort nor grading your maize, please mention the reasons rendering you not practicing such activities.

a. \_\_\_\_\_

b. \_\_\_\_\_

28. Do you think that maize quality and grading is a criterion for deciding maize selling price?

a. Yes

b. No

29. If the answer is no, please explain the reason why you think maize quality and grading is not a criterion to decide on maize price.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

30. Is there any disturbance that you face when selling maize which is unclean and not graded?

- a. Yes
- b. No

31. If the answer is yes, please mention those disturbances.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

32. Do you normally pack and sew maize bags on the basis of uniform weight?

- a. Yes
- b. No

33. If the answer is yes, which weight do you normally pack and sew?

- a. Fifty kilograms per bag
- b. One hundred kilograms per bag
- c. One fifty kilograms per bag

34. Do you normally store your maize before selling them?

- a. Yes
- b. No

35. Where do you normally store your maize?



- a. In the village godown
- b. In my own store/godown
- c. In the store/godown owned by the cooperatives
- d. In the market store/godown
- e. In the private store/godown

36. If you are paying the storage costs on the per bag basis, please mention the cost of storing a single bag of maize per month, \_\_\_\_\_ shillings.

37. If you are paying the storage cost on the basis of a storage room, please mention the cost of hiring a storage room per month, \_\_\_\_\_ shillings.

38. For how many months do you store your maize before selling them? \_\_\_\_\_ Months.

39. Please, tick on the reasons that make you store maize before selling them.

- a. Waiting for a good and reasonable selling price
- b. Having no need for cash at the moment
- c. Any other reasons: -

i. \_\_\_\_\_

ii. \_\_\_\_\_

iii. \_\_\_\_\_

iv. \_\_\_\_\_

40. Is there any reason that hinders you from increasing your capital in maize business?

- a. Yes
- b. No

41. If the answer is yes, please mention those reasons.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

**Selling of maize**

42. Which criteria do you consider when fixing maize selling price?

- a. Relying on the market price
- b. Basing on the business operating costs
- c. Other criteria: -
  - i. \_\_\_\_\_
  - ii. \_\_\_\_\_
  - iii. \_\_\_\_\_
  - iv. \_\_\_\_\_

43. Where do you meet your customers/buyers of your maize?

- a. They come to buy at my store/godown
- b. I go to meet them at the auction/market
- c. Outside in other districts/regions
- d. Crossing borders to other countries

44. If you brought your maize to the market for sell, please mention the market levy for a single bag of maize, \_\_\_\_\_ shillings.

45. Please, fill in the table below if you transported your maize.

Destination point	Distance (Km)	Levy charged per bag	Transport means	Transportation costs	
				In dry season	In wet season

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46. How many days do you spend in selling and finishing the whole maize consignment? \_\_\_ Days.

47. Mention the average living costs per day that you are spending when selling your maize, \_\_\_\_\_ shillings.

48. Please, tick in front of each of the customers you sold your maize in the last season.

- a. Another maize trader
- b. Final consumer
- c. Processors of maize products
- d. Cooperative societies
- e. Institutes (*like schools, colleges, hospitals, church etc*)

49. Do you have a uniform selling price to all of your customers?

- a. Yes
- b. No

50. If the answer is no, please mention the different prices you sold your maize to your different customers.

<b>Maize customer</b>	<b>Selling price of a bag of maize</b>
Another maize trader	
Final consumer	
Processors of maize products	
Cooperative societies	
Institutes ( <i>like schools, colleges, hospitals, church etc</i> )	

51. Please, mention the highest, mid and lowest selling price of maize on the basis of their quality and grades

**Cleaned and graded maize**

Lowest buying price was \_\_\_\_\_

Medium buying price was \_\_\_\_\_

Highest buying price was \_\_\_\_\_

**Un-cleaned and un-graded maize**

Lowest buying price was \_\_\_\_\_

Medium buying price was \_\_\_\_\_

Highest buying price was \_\_\_\_\_

52. Please, mention the factors that lead to fluctuations in maize selling price.

a. \_\_\_\_\_

b. \_\_\_\_\_

53. Please, explain briefly on the difference of trading condition in the period of last ten years, five years before 2003 and five years after 2003.

a. \_\_\_\_\_

b. \_\_\_\_\_

54. Which business problems do you normally experience in the whole maize marketing system?

a. Lower maize selling price

b. Poor road condition which hinders maize transportation

c. Other problems: -

i. \_\_\_\_\_

ii. \_\_\_\_\_

iii. \_\_\_\_\_

55. Please, suggest the means for solving the problems and obstacles which are in the grain marketing system, which would make you a successful maize trader.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

**THANKS FOR YOUR COOPERATION AND YOUR TIME SPENDING**

## Appendix 2: Questionnaire for maize producer in Sumbawanga rural district

Date of interview: \_\_\_\_\_  
 Producer's name: \_\_\_\_\_ Sex: i) Male []; ii) Female [  
 Producer's age: \_\_\_\_\_ years Education level: \_\_\_\_\_  
 Ward: \_\_\_\_\_ Village: \_\_\_\_\_  
 Year started maize production activities: \_\_\_\_\_  
 Total number of years engaged in maize production: \_\_\_\_\_ years.

### Ownership of the farming plots

1. If you have the farming plots of your own, how many acres do you own?  
 \_\_\_\_\_ Acres.
2. If you do hiring of the farming plots, how many acres do you normally hire?  
 \_\_\_\_\_ Acres.
3. In totality, how many acres of farming plots (both own and hired plots) do  
 you often use for maize cultivation? \_\_\_\_\_ Acres.
4. Please, mention the location of your farm plots and their respective distance  
 from the area of your residence.

Plot location		
Plot size (acres)		
Distance from residence (Km)		

5. If you are hiring farming plots, how much does it cost to hire one acre of a plot?  
 \_\_\_\_\_ Shillings.

### Agro-inputs and farming activities

6. Please, mention the requirements of industrial fertilizers as specified in the table below.

Fertilizer	Number of bags required per acre	Buying price of a single bag	Total purchasing costs
DAP			
UREA			
CAN			

7. If you applied manure, mention the quantity of manure in kilograms that you applied per acre of a plot. \_\_\_\_\_ Kilograms of manure. (The price of one kilogram of manure is \_\_\_\_\_ shillings.)
8. Which kind of maize seeds did you use in the past season?
- a. Locally produced seeds
- b. Hybrid seeds from research institutes
9. If you applied the locally produced seeds, how many tins of seeds did you applied per acre? \_\_\_\_ tins. (One tin of maize seeds is equivalent to \_\_\_\_\_ kilograms)
10. What was the price of a single tin of locally produced seeds? \_\_\_\_\_ Shillings.
11. If you applied the hybrid maize seeds, how many bags of these seeds were required per acre? \_\_\_\_ Bags. (One bag is equivalent to \_\_\_\_\_ kilograms)
12. The price of a single bag of hybrid seeds was \_\_\_\_\_ shillings.
13. Please, mention the cost of farming requirements and activities as specified in the table below.

Requirements	Costs
Pesticides and insecticides required per acre	
Weeding activity per acre	
Harvesting activity per acre	
Transportation of agro-inputs to the farming field	
Security in the farm	

### Maize harvest and storage

14. How many bags of maize did you harvested per acre in the last production season? \_\_\_\_\_ Bags. (A single bag of maize is equivalent to \_\_\_\_\_ kilograms)
15. Do you normally clean and remove impurities present in maize that you buy?
- a. Yes
- b. No
16. Do you sort maize on the basis of their colour and broken seeds?
- a. Yes
- b. No
17. Do you normally grade your maize?
- a. Yes
- b. No
18. If you do remove the impurities, sorting and grading, which means do you use?
- a. Hired labour
- b. Processing machine
19. When do you practice the above mentioned activities?
- a. Just after maize harvest
- b. When storing the harvested maize



c. During selling to maize buyers

20. If you are cleaning and sorting maize basing on the per bag measures, how much does it cost? \_\_\_\_\_ Shillings.

21. If you do cleaning and sorting of maize basing on the per acre measures, how much does it cost to clean and sort a bunch of maize harvested in an acre? \_\_\_\_\_ Shillings.

22. If you neither clean, sort nor grading your maize, please mention the reasons rendering you not practicing such activities.

a. \_\_\_\_\_

b. \_\_\_\_\_

23. Do you think that maize quality and grading is a criterion for deciding maize selling price?

a. Yes

b. No

24. If the answer is no, please explain the reason why you think maize quality and grading is not a criterion to decide on maize price.

a. \_\_\_\_\_

b. \_\_\_\_\_

25. Do you normally pack and sew maize bags on the basis of uniform weight?

a. Yes

b. No

26. If the answer is yes, which weight do you normally pack and sew?

a. Fifty kilograms per bag

b. One hundred kilograms per bag

- c. One fifty kilograms per bag [ ]

27. Please, mention the following requirements and their respective costs: -

- a. One maize packing sack, \_\_\_\_\_ shillings,
- b. If you buy a role of sisal sewing ropes, how many roles did you used?
- c. The cost of one role of sisal rope in \_\_\_\_\_ shillings,
- d. If you buy pieces of sisal ropes for sewing maize sacks, how many pieces do you need? \_\_\_\_\_ Pieces.
- e. The cost of one piece of sisal rope in \_\_\_\_\_ shillings,
- f. Please, mention the total cost for drugs you are using for storing maize, \_\_\_\_\_ Shillings,
- g. Labour cost for packing and sewing a maize sack, \_\_\_\_\_ shillings

28. If you are packing your maize and sew the sacks at the place of your maize storage, mention the transportation cost per trip of maize to your storage points.

<b>Transport means</b>	<b>Number of maize trips</b>	<b>Cost per single trip</b>	<b>Distance travelled</b>
Lorry			
Tractor			
Ox-cart			

29. If you do packing and sewing of the maize sacks while in the farm field after harvest, mention the cost of transporting a single bad of maize to the point of your maize storage.

<b>Transport means</b>	<b>Number of maize bags</b>	<b>Cost per single trip</b>	<b>Distance travelled</b>
Lorry			
Tractor			
Ox-cart			


30. Where do you normally store your maize before selling them?

- a. In the village godown
- b. In my own store/godown
- c. In the store/godown owned by the cooperatives
- d. In the market store/godown
- e. In the private store/godown

31. If you are paying the storage costs on the per bag basis, please mention the cost of storing a single bag of maize per month, \_\_\_\_\_ shillings.

32. If you are paying the storage cost on the basis of a storage room, please mention the cost of hiring a storage room per month, \_\_\_\_\_ shillings.

33. For how many months do you store your maize before selling them? \_\_\_\_\_ Months.

34. Please, tick on the reasons that make you store maize before selling them.

- a. Scarcity of maize buyers in the village
- b. Waiting for a good and reasonable selling price
- c. Having no need for cash at the moment
- d. Any other reasons: -

i. \_\_\_\_\_

ii. \_\_\_\_\_

iii. \_\_\_\_\_

35. How many bags of maize do you reserve for your own food consumption?

\_\_\_\_\_.

**Selling of maize**

36. Which criteria do you consider when fixing maize selling price?

- a. Relying on the market price
- b. Basing on maize production costs
- c. Other criteria: -
- i. \_\_\_\_\_
- ii. \_\_\_\_\_
- iii. \_\_\_\_\_

37. Where do you meet your customers/buyers of your maize?

- a. They come to buy at my store/godown
- b. I go to meet them at the auction/market
- c. They come to buy at the farm field
- d. I go sell to the buyers buying centres

38. Please, estimate the number of maize buyers in the village, both the residents and those who come to buy maize from other places. \_\_\_\_\_ Buyers.

39. If you are travelling, going to sell your maize, please fill in the following table.

<b>Transport means</b>	<b>Number of bags</b>	<b>Point of destination</b>	<b>Distance travelled</b>	<b>Transport cost per bag</b>	<b>Number of journeys to the market</b>

40. How many days do you spend in selling and finishing the whole maize consignment? \_\_\_ Days.

41. Mention the average living costs per day that you are spending when selling your maize, \_\_\_\_\_ shillings.

42. Which problems and obstacles do you encounter when transporting your maize to the markets?

a. \_\_\_\_\_

b. \_\_\_\_\_

43. Please, specify the problems that you encounter when selling your maize at the market.

a. \_\_\_\_\_

b. \_\_\_\_\_

44. Please, tick in front of each of the customers you sold your maize in the last season.

a. Maize middlemen/brokers

b. Maize traders

c. Final consumer

d. Cooperative societies (e.g. SACCOS)

e. Institutes (*like schools, colleges*)

45. Do you have a uniform selling price to all of your customers?

a. Yes

b. No

46. If the answer is no, please mention the different prices you sold your maize to your different customers.

<b>Maize customer</b>	<b>Selling price of a bag of maize</b>
Maize middlemen/brokers	
Maize trader	

Final consumer	
Cooperative societies (e.g. SACCOS)	
Institutes ( <i>like schools, colleges</i> )	

47. Mention the highest, medium and lowest selling price of your maize in the past season

- a. The highest selling price was \_\_\_\_\_ shillings,
- b. The medium selling price was \_\_\_\_\_ shillings,
- c. The lowest selling price was \_\_\_\_\_ shillings.

48. Please, mention the factors that lead to fluctuations in maize selling price.

- a. \_\_\_\_\_
- b. \_\_\_\_\_

49. Which major problems do you encounter in the maize marketing system pertaining to transportation and selling of maize?

- a. Lower maize selling price
- b. Poor road condition which hinder maize transportation to markets/buyers points
- c. Scarcity of maize buyers in the village
- d. Distant maize markets/buyers points
- e. Other problems: -
  - i. \_\_\_\_\_
  - ii. \_\_\_\_\_

50. Besides being a maize producer, have you ever thought of being a maize trader?

- a. Yes
- b. No

51. If the answer is no, which do you think are the factors hindering you from being a maize trader.

a. \_\_\_\_\_

b. \_\_\_\_\_

52. Please, suggest the means for solving the problems and obstacles which are in the grain marketing system and business operation, which would make you a successful maize trader when rectified.

a. \_\_\_\_\_

b. \_\_\_\_\_

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4. Districts' rank from which normally bring clean, standard maize here for sale
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  
5. Give some general information pertaining to quality and standards of maize brought here for sale.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  
6. What percentage of weight do you normally reduce from each bag of maize in order to compensate for the found dusts and unwanted materials?

#### Appendix 4: Checklist for the Village Executive Office

1. Total number of households in the village \_\_\_\_\_
2. Number of households dealing with maize cultivation in the village \_\_\_\_\_
3. Number of acres for maize cultivation in the past agricultural season \_\_\_\_\_
4. Tonnes of maize harvested in the village in the past agricultural season  
\_\_\_\_\_
5. Tonnes of maize spared for food consumption in the village \_\_\_\_\_
6. Give a total of number of maize buyers/traders came into the village for  
maize purchasing \_\_\_\_\_
7. Total number of maize bags sold in the past season \_\_\_\_\_
8. Estimated an average weight of one single bag of maize sold here at the  
village in the last season \_\_\_\_\_
9. Village levy charged to each bag of maize was Tsh. \_\_\_\_\_
10. Average farmer's selling price of cleaned and sorted maize bag was Tsh.  
\_\_\_\_\_
11. Average farmer's selling price for maize not adhered to quality standards  
was T.sh \_\_\_\_\_
12. Outline problems that farmers meet in marketing of their maize.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
13. Outline the very basic requirements that farmers need to facilitate them  
engage successfully in maize business besides farming activity.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_

**Appendix 5: Percentage of staple food produced in Sumbawanga Rural District**

	1998/ 09	1999/ 00	2000/ 01	2001/ 02	2002/ 03	2003/ 04	2004/ 05	2005/ 06	2006/ 07	2007/ 08
<b>Maize</b>	53	58	55	39	47	55	48	55	46	43
<b>Beans</b>	9	7	8	7	12	8	13	13	16	17
<b>Sorghum</b>	9	5	4	4	6	3	4	5	3	4
<b>Paddy</b>	9	13	3	26	15	14	16	9	26	25
<b>Finger millet</b>	4	6	6	4	4	3	2	5	2	4
<b>Cassava</b>	16	11	23	20	16	18	15	13	7	7

Source: DALDO's Office, Sumbawanga rural

**Appendix 6: Quantity of maize bought by the NFRA in Rukwa region**

<b>Quantity of maize (Kg)</b>	<b>1999</b>	<b>2000</b>	<b>2003</b>	<b>2004</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Sumbawanga Urban</b>	-	-	-	809,155	5,920,241	-	2,404,847
<b>Sumbawanga Rural</b>	5,546,803	15,168,447	10,055,126	9,548,450	17,399,550	326,272	19,154,556
<b>Nkasi</b>	-	-	-	1,065,317	2,918,969		5,392,083
<b>Mpanda</b>	-	-	-	-	-	-	-
<b>Total Quantity</b>	5,546,803	15,168,447	10,055,126	11,422,922	26,238,760	326,272	26,951,486

Source: NFRA, Rukwa region (2008)

**Appendix 7: Percentage of maize produced by districts in Rukwa region**

District	1998/09	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
<b>Sumbawanga rural</b>	44	41	30	34	38	45	41	42	40	38
<b>Mpanda</b>	24	24	28	27	25	23	24	24	25	25
<b>Nkasi</b>	17	18	21	20	19	17	18	18	18	19
<b>Sumbawanga urban</b>	16	16	20	19	18	15	17	16	17	18

Source: DALDO's Office, Sumbawanga rural