

**INFLUENCE OF INTEGRATION OF OPEN-AIR MARKETS ON FOOD
SECURITY IN MERU SOUTH AND MBEERE DISTRICTS, KENYA**

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DECLARATION

I declare this thesis is my original work and has never been presented in any other university or other award.

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DEDICATION

I dedicate this thesis to my mother, Mama Ann Mary Gatobu and my late dad, Mzee Abraham Gatobu, who taught me values that are and will remain a source of my eternal inspiration.

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LIST OF ABBREVIATIONS AND ACRONYMS

- ASALS:** Arid and Semi-Arid Lands
- I.C.T:** Information and Communication Technology
- KFSSG:** Kenya Food Security Steering Group
- MIB:** Market Information Branch
- NCPB:** National Cereals and Produce Board
- Rn:** The Nearest Neighbour Statistics

ABSTRACT

The relationship between agricultural marketing systems and food security has continued to attract a lot of attention both locally and globally. This has been due to realization that increased food production does not automatically lead to improved food security. Markets and marketing components have been viewed to have influence on food security, however, the degree of influence varies from region to region and it's determined by a number of factors. This study was, therefore, conducted to determine the influence of integration of open-air markets on food security in Mbeere and Meru South districts of Eastern Province, Kenya. The study analyzed the spatio-temporal distribution of open-air markets, computed price disparities for maize and beans retail prices and assessed factors that influenced market operations and how each factor influenced food availability and accessibility in the area. The primary data were collected using semi-structured interview schedules administered to traders while secondary data were collected mainly from the Ministry of Agriculture (MoA) and local government offices. Simple random sampling was used to sample markets in which surveys were administered; purposive sampling to sample open-air markets upon which retail prices for maize and beans were collected and systematic sampling was used to sample traders who were interviewed. In total one hundred and thirty one traders were interviewed in both districts. Data generated was coded, keyed in excel and analyzed using Statistical Package for Social Scientists (SPSS). Nearest neighbours' indices was used to compute the nearest neighbour distance between markets. The study revealed that the nearest neighbour statistics (R_n) was 1.53 and 1.62 for open air markets in Meru South and Mbeere Districts respectively. Since the R_n values were more than 1, the markets were evenly distributed. The calculated Z-scores values were 4.13 and 3.24 respectively which were all significant at 0.05 confidence level. These results showed that open air markets and market days within the study area were uniformly distributed. On average, each market place had two markets days in a week. These results further showed that the spatio-temporal distribution of open air markets was sufficient to efficiently serve all participants in the region. The analyses of price disparities revealed existence of high price differences between some markets either within the same district or across the two districts. The high price differences indicated that the open air markets were poorly integrated. However, the poor market integration witnessed in the area did not result from the spatio-temporal distribution of the markets but from a range of factors which includes; transportation challenges, lack of storage facilities, lack of standardized unit of measurement, lack of access to adequate capital and poor market information flow. Each of these factors had profound influence on food security by influencing food availability and accessibility in the area. Therefore to enhance the contribution of open-air markets in promoting food security, the study has recommended both institutional and infrastructural interventions. These include improvement of the rural transport network to ensure efficient flow of goods especially from surplus regions to deficit regions, formulation of policies to regulate pricing, standardizing of units of quantity measurement, establishment of effective and efficient mechanism for enhancing market information flow and addressing the storage challenges. In addition, there is need to enhance the operation of National Cereals Produce Board (NCPB) within the study area to help in price regulation and quality checking. This will guarantee reasonable prices and which will benefit both farmers and consumers.

CHAPTER ONE

1. INTRODUCTION

1.1 Background to the Study

Markets contribute to the four pillars of food security namely food availability, food access, food stability and food utilization. Markets enhance food availability by facilitating movement of food between surplus and deficit production areas (KFSSG, 2008). Therefore developing an understanding of which areas in a country or a region produce surpluses and where these surpluses end up (final markets and final consumers) is a more informative starting point for analysis of food availability and food access (Megan and Patricia, 2009). According to Getachew and Simon (2007), it is also important to understand whether markets within a country or region are well integrated. This is because, when markets are well integrated, then food flow from surplus to deficit areas is enhanced (Getachew and Simon, 2007). Agricultural market stability depends largely on the scope of the market (Funing and Jing, 2001); the larger the geographical area of the market, the smaller the total fluctuation will be, as the variations in all sub-regions will cancel each other out. For the same logic, the larger the grain reserves are, the more fluctuations will be absorbed inter-temporally. A further inference is that the larger the market area, the smaller the reserve capacity will be required to achieve the same security level. Therefore, the level of market integration is likely to have significant impact on food security, both inter-regionally and inter-temporally (Funing and Jing, 2001).

In Kenya, open-air markets play a fundamental role in ensuring food availability and accessibility especially in the rural areas (Wambugu, 2005). However, market liberalization has left many poor farmers in marginal areas with poor infrastructure and few marketing outlets which have put them at a disadvantage. Farmers are unable to sell their produce at good prices and are unable to buy for food due to high prices during the deficit or dry seasons. This has eroded most farmers ability to cope with incidences of food insecurity. This scenario is likely to persist when the main markets in the area are poorly integrated. Thus considering the importance of open-air markets to most rural and peasant society of Kenya, and with regard to both economic growth and food security, it's important to evaluate their degree of integration

and appropriate measures for enhancing their operations towards improving food security and steering economic growth in the area.

1.2 Statement of the Problem

In Mbeere and Meru South districts, incidences of food insecurity have persisted despite increased agricultural yields. People in these areas have continued to encounter difficulties in availability and accessibility of quality food especially during the low production seasons and low production areas. Markets and marketing structures have at one point been viewed as some of the factors contributing to this scenario. However, no adequate information exists to explain this. In this regard, this study aimed at generating in-depth information in understanding the influence of integration of open air markets on food security in Mbeere and Meru South districts.

The study analyzed spatio-temporal distribution of the open-air markets, evaluated markets price disparities for maize and beans (main food crops grown, traded and consumed in the area) and determined factors that influenced market operations and how each of these factors influenced food availability and accessibility.

1.3 Research Questions

This study was guided by the following research questions:

- i) How are open-air markets in Mbeere and Meru South districts distributed in space and time?
- ii) Does the price disparity within open-air markets influence food security?
- iii) What are the factors that influence effective operations of open-air markets and how do these factors influence food security?

1.4 Research Objectives

The main objective of this study was to determine the degree of integration of open-air markets and its influence on food insecurity in Meru South and Mbeere Districts.

Specific objectives:

- i) To determine spatio-temporal distribution of open-air markets in Meru South and Mbeere Districts
- ii) To evaluate the market price disparities and their influence on food security.
- iii) To examine the factors that influence operations of open-air markets and assessing the influence of each factor on food security.

1.5 Research Hypotheses

- i) Open air markets in Mbeere and Meru South District are not evenly distributed in space and time.
- ii) There exist no price disparities for maize and beans retail prices within open-air markets of Mbeere and Meru South districts and hence price disparities do not influence food security in the area.

1.6 Justification of the Study

In Mbeere and Meru South Districts, small-scale farmers have adopted the use of integrated organic soil nutrient replenishing inputs such as *tithonia diversifolia*, *calliandra calothyrsus* as well as inorganic fertilizers to enhance crop production. This has resulted to increased farm yields especially maize and beans, main food crop produced in the area. However, despite increased yields, studies have revealed that incidences of food insecurity still persist. This has triggered for a need to investigate other factors that may be contributing to the scenario in the region; marketing systems being one of these factors. This study therefore analyzed the degree of integration of open-air markets and its influence on food security in Meru South and Mbeere Districts. The study focused on open-air markets since they are used by majority of small holder farmers in the area to dispose off their surplus yield or to purchase the food deficits.

1.7 Conceptual Framework

The level of food security is determined by food availability and access. Markets in one way or another influences these two factors. Food availability refers to supplies available at both the household level and at a more aggregate (regional or national) level. On the other hand, food access is influenced by the aggregate availability of food through the impacts on supplies in the market and market prices. It’s also determined by the ability of households to obtain food from either their own production or other sources. In this regard, food access is a function of the physical environment, social environment and policy environment which determine how effectively households are able to utilize their resources to meet their food security objectives. Therefore to clearly understand the influence of markets on food security, there is need for an elaborate framework that provides a broader context for this evaluation. The framework should clearly demonstrate the links between markets and food security components. Markets, natural environments, policies and social systems interlink and play a major role in food security. This is demonstrated in Figure. 1.1

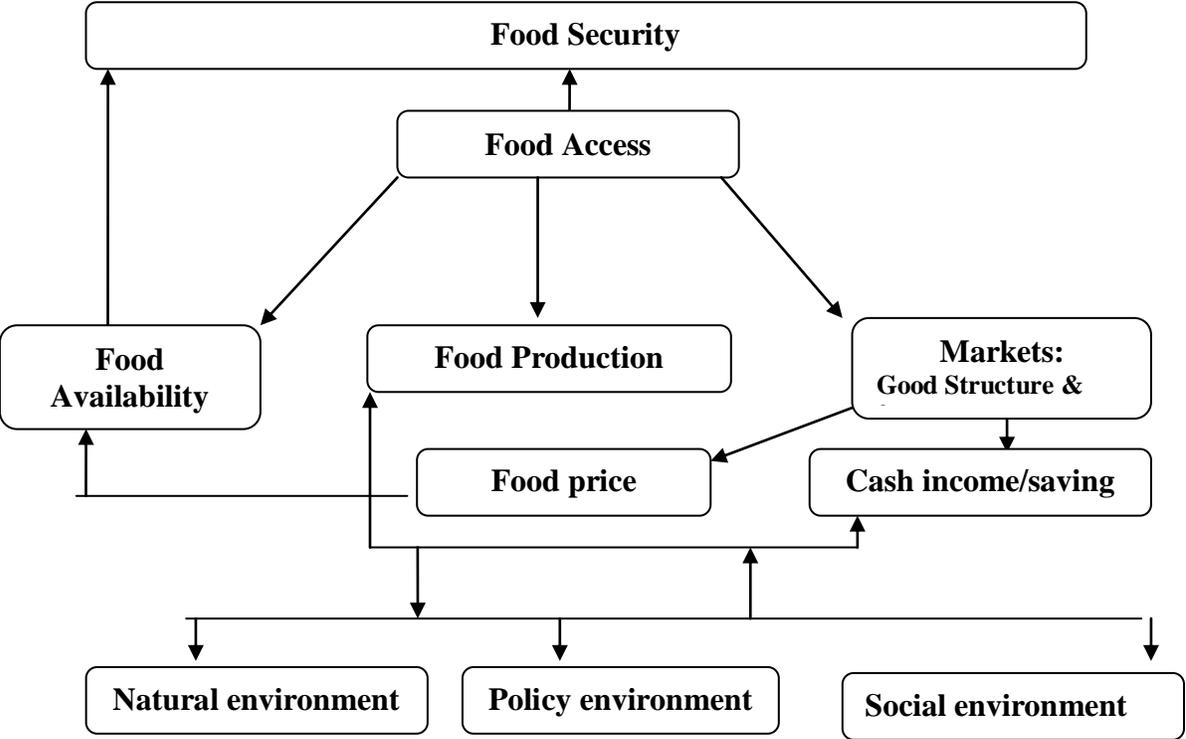


Figure 1: Conceptual model for marketing system influence on food security

1.8. Definition of Terms

Food Access: Individuals have adequate incomes or other resources to purchase or barter to obtain levels of appropriate foods needed to maintain consumption of an adequate diet/nutrition level.

Food availability: Sufficient quantities of appropriate, necessary types of food from domestic production, commercial imports or donors that are consistently available to the individuals or are within reasonable proximity to them or are within their reach.

Food security: Availability and accessibility of quality food at all time by all households.

Market days: Official market days designated for each market place

Market Integration: An indicator (s) that explains how much different markets are related to each other.

Open-air markets: Gazetted market places with few or no permanent structure where sellers and buyers periodically meet.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Overview

Food is a basic need and food security is a major concern not only to the Government of Kenya but to the world at large. Food security is defined as ‘access by all people at all times to enough food for active healthy life’ (World Bank, 1995). Food production and marketing systems are generally viewed to play a role on food security in any region. Markets either formal or informal contribute to the four pillars of food security namely food availability, food access, food stability and food utilization (KFSSG, 2008). Markets determine the price of food to consumers and the income most producers receive from the sale of their products. They also promote the stability of food supply by ensuring food flow from surplus production area to deficit areas.

In Kenya, markets and trade are critical in bridging the consumption gap caused by structural deficiency in the production of major cereals and pulses by enabling food distribution from surplus to deficit areas (KFSSG, 2008). It’s important for the government and policy makers to have in-depth understanding of the market systems including, their degree of market integration, and the characteristics of market participants, state of infrastructure, available services and relationships among others (Megan and Patricia, 2009). This is crucial in evaluating and consistent monitoring of the food security status in any region. Market integration is therefore viewed to play an important role in food security as it determines the level of food distribution from surplus to deficit regions, commodity prices and incomes from sale of productive resources (KFSSG, 2008).

In the past, open-air markets were characterized by pervasive government controls (Wambugu 2005). Pan-seasonal and pan-territorial fixed prices for food grains were the order of the day and inter-district movement controls prevailed. These interventions resulted in major market distortions. Spatial and temporal market integration were impaired, producer incentives were stifled and consumers adversely affected. Various reforms of agricultural markets aimed at

improving market integration to bring larger agricultural incomes that would have significant multiplier effects to consumer and poor farmers have been implemented. In regions where these reforms have been well implemented, living standards of many poor rural farmers have been improved.

2.2 Agricultural Markets Operations and Food Security

Over the last two decades, many governments in sub Saharan Africa have embarked on various market reforms to improve commodity market performance (Awudu, 2007). Economists have particularly been interested in the speed and degree of transmission of price shocks between markets or levels of the supply chain since that plays a role in signalling the presence of market failures (Balcombe and Morrison, 2002). Integration of spatially separated markets ensures that a regional balance occurs between food-deficit and food-surplus areas. Markets that are isolated may convey inaccurate price information that might distort producer marketing decisions and contribute to inefficient product movements resulting to food deficit or high prices. Such information is quite crucial for the formulation of intervention strategies to prevent food insecurity (Goletti and Babu, 1994).

Increased incomes from agricultural yield motivate farmers to invest in their natural resource base, however despite the growing enthusiasm about market orientation for increasing domestic food security and improved income, the transition towards producing for market is not only complex but also constrained by a range of biophysical and economical factors (Kaari and Ashby, 2004). It has been argued that the management of agricultural market reform requires an understanding of the operation of local markets, the strategies and responses of private traders, and how they both relate to changes in the institutional and policy environment of markets (Kherallah et al., 2002). Such an understanding is crucial to the design, implementation, and evaluation of marketing policies, institutions, and marketing infrastructure required for the development of grain markets. The key challenge now is to move beyond market liberalization to the issue of how to design input and output markets to catalyze small-scale productivity and income growth (Jayne et al., 2002). It should also be noted that there exist a strong inter-relationship between increasing productivity of agricultural sector and the development of an efficient marketing system and between the marketing systems and productivity of other sectors of the economy (Wambugu, 2005).

2.3 The Market Equilibrium Theory and Food Security

Market equilibrium plays a major role in agricultural food supply and demand. Two aspects are involved in market equilibrium. The first is concerned with the adjustment and reaction of the market caused by changes of demand and supply conditions and the second one is concerned with costs of creating spatio-temporal and form utilities. These two are believed to have significant influence on food security of any region (Barrett and Li, 2002). The price theory states that, prices of a commodity will go up when there is an increase in demand or a decrease in supply and vice versa. Based on this theory, there's always a reaction in the market when there's a change in demand or supply. How slowly or quickly the market adjusts to such changes is an important aspect since it determines the volumes available for sale or purchase hence influences food security. It does not however follow that the actual costs of marketing will also change as a result of change in demand and supply.

According to equilibrium theory, differences in prices between the spatial markets, between seasons, and between forms of a product should approximate the corresponding cost of transportation, storage and processing. If they don't, then the market is inefficient. This inefficiency can be due to: rigidities in the flow system; unfavourable market structure; and unbecoming behaviour on the part of traders (Barrett and Li, 2002). However it is possible for prices to go up because the actual costs of marketing have gone up. If the spatial, temporal and price differences are equal to the corresponding transformation costs plus a normal (socially allowable) profit, then the market is operating efficiently and its assumed to promote food security. Measurement of market integration can be viewed as basic data for an understanding of how specific markets work (Ravallion, 1986). In analyzing price behaviour we study pricing efficiency while in estimating and analyzing cost and margins we study operational efficiency of a marketing system. Both aspects influence greatly the food security of the region.

2.4 Spatial Price Analysis

In spatial price analysis, the terms spatial market efficiency and spatial market integration are widely used, sometimes interchangeably (Barrett et al., 2000). However, there has been a growing recognition that these terms are related but not equivalent, and that there is a need to distinguish between them (McNew and Fackler, 1997; Fackler and Goodwin, 2001; Barrett et al., 2000; Barrett and Li, 2002). Spatial market efficiency is an equilibrium condition whereby all potential profitable spatial arbitrage opportunities are exploited. Spatial efficiency is concerned with whether the optimal amount of trade is occurring. This optimality condition requires that spatial price differentials be less than or equal to transfer costs. If there is no trade, a spatial price differential less than transfer cost is also consistent with spatial market efficiency. However, if the spatial price differential is greater than transfer cost the market is inefficient either with or without trade (Asfaw, et al, 2004). On the other hand, spatial market integration is defined as the extent to which demand and supply shocks arising in one location are transmitted to other locations (Fackler, 1996; McNew, 1996; McNew and Fackler, 1997; Fackler and Goodwin, 2001). Observing direct trade flows between two spatially distinct markets is a sufficient but not necessary condition for some degree of spatial market integration (Barrett et al., 2000; Barrett and Li, 2002). Direct trade linkages between regions are not necessary for spatial integration because if regions belong to a common trading network then price shocks may be transmitted indirectly through the network (Fackler and Goodwin, 2001). Markets that are not well integrated may transmit inaccurate price information that distorts marketing decisions and contributes to inefficient product movements.

2.5 Measuring Marketing Efficiency

No single measure is in itself sufficient to lead to a conclusion about the efficiency of a marketing system. Four conceptual tools namely; the theories of market equilibrium, industrial organization, the economics of regulation and the concept of flow system will give a theoretical guide. It has been argued that the traditional subject matter of the agricultural marketing has been to assess the performance of the markets and providing consequent policy recommendations. (Limbu, 1993)

2.6 Organization of Maize Marketing System

Maize marketing system in Kenya has evolved considerably since independence. Today there are four types of market intermediaries observed; assemblers, wholesalers, dis-assemblers and retailers (Wambugu, 2005).

a) Assemblers (bulk builders)

Assemblers are usually the first commercial purchasers of grains in marketing chain. They usually begin as farmers who later graduate to the next level in the system. They bulk up surpluses of the neighbouring farmers to capture scale economies in transport to local markets. All they require to start off the maize business is to rent stall or a shop, acquire a license from county council and a weighing scale. Assemblers buy grains from farmers, bicycle and donkey traders and sell to wholesalers, dis-assembles and retailers. Assemblers in the surplus regions turn into dis-assemblers during the slack maize harvesting seasons.

b) Wholesalers

These are traders who buy grains from surplus areas (usually from assemblers) and transport the grains to deficit areas where they sell to dis-assemblers, retailers or millers. Most wholesalers are also integrated backwards into assemblers; they purchase most grains (maize and beans) in the post harvest months directly from farmers. Some wholesalers are involved in other business and the grains trade only at the peak harvesting seasons. In the peak harvest season, most wholesalers prefer to sell maize to large scale millers because they have the ability to buy large volumes and pay immediately.

c) Dis-assembler (bulk breakers)

Dis-assemblers' buy grains from large scale wholesaler in the deficit areas and breakdown the volume for resale to small scale retailers and consumers. Dis-assemblers are usually local traders who normally operate in local shops, and open-air periodic markets. Most of dis-assemblers are also involved in maize and beans retailing to consumers. They also assemble maize during the short harvest period in the generally deficit areas in which they operate. Assemblers in the surplus regions turn into dis-assemblers during the slack maize harvesting seasons.

d) Retailers

These are market players who buy and sell grains in small quantities and sell directly to consumers for home consumption. They normally use tins to measure the quantity and are mainly found in the deficit regions with a few of them in low income residential urban areas. The retailers in surplus regions are sometimes overshadowed in business by the assemblers who take over dis-assembling and retailing activity during slack period. In deficit region these retailers purchase maize and beans from dis assemblers or directly from wholesalers.

2.7 Knowledge Gap

Previous studies by Nyoro (1999), Argwings-kodhek (1994), NCPB (1995) and Ngugi et al. (1997) have documented pricing inefficiency for open-air markets without considering factors that affect integration of these markets and their relevant influence on food security. Wambugu (2005) carried out a research on integration of maize markets in Kenya while analyzing main factors that influenced the degree of integration of these markets. However, his study did not analyze these factors in reference to food security. However, all the studies were aimed at understanding the agricultural markets. On the other hand, most research related to food security aspects carried out within the study area focused largely on the bio-physical factors that influenced food production and how best to increase yields. These studies had basic idea on improving food security through production and not markets. It is however important to understand that, if the surplus yields are not disposed through well integrated markets, then farmers' income and saving power is eroded hence they are unable to cope with food prices during the deficit seasons. In addition, high prices of food during harvesting compromises the ability of consumers to purchase adequate food for storage. This study is therefore aimed at filling the knowledge gap in understanding how markets integration; the case of open-air market in Meru South and Mbeere district influenced food security. The study generated in depth information that the government officials and other stakeholders need to use in improving rural open-air market towards enhancing food security.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Site Description

3.1.1 Meru South District

The district covers an area of 1092 km². The area is in upper midland 2 and 3 (UM2 and UM3), a predominantly maize growing area. The altitude is approximately 1500 m above sea level with an annual mean temperature of 20⁰ C. Annual rainfall varies between 1200 and 1400mm. The rainfall pattern is bimodal, falling in two seasons, with the long rains between March and June and short rains between October and December. The soils are Humic Nitisols, deep, well weathered with moderate to inherent fertility (Jaetzold *et al.*, 2006). The farming system in the area is characterized by integration of both animals and crops. The main food crops are maize, beans, millet, sorghum and pigeon peas. According to the district development plan 2007, open air markets in the district are not well developed though bulk of agricultural products especially grains and fruits are traders here. Food insecurity is frequent especially on lower parts of the district. Figure 3.1 shows the map of Meru South District

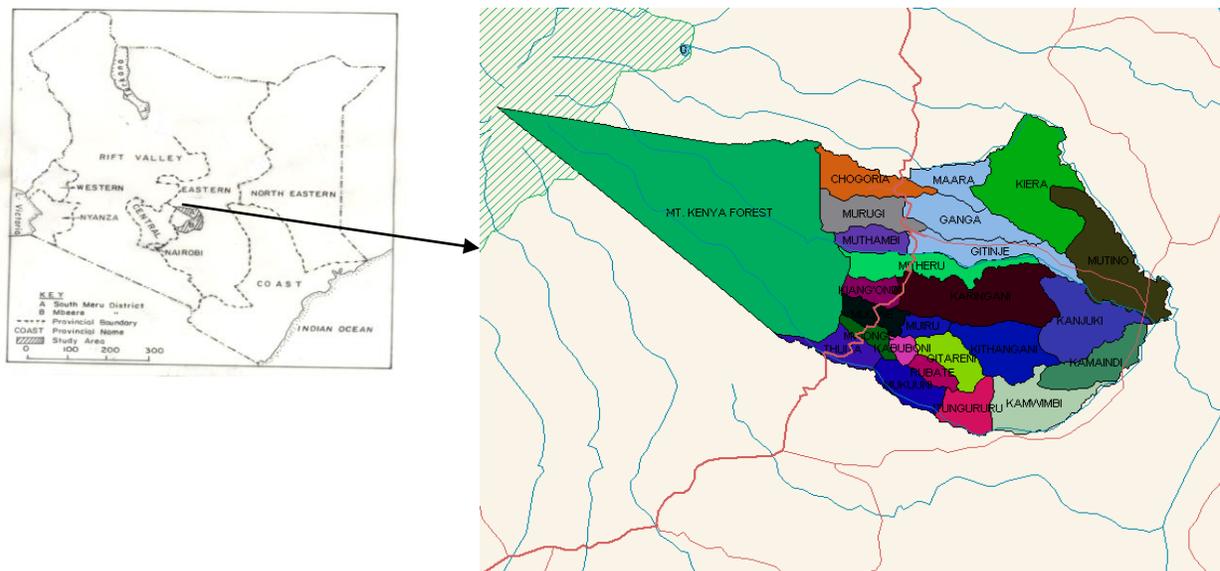


Figure 3.1: Location of Meru South District

replenishment technologies'. The main outcome of the project was increased maize and beans production in among smallholder farmers in Mbeere and Meru South Districts. However, despite the increased yields in both districts, the ultimate project expectation of enhanced food security in the area was not fully achieved. This triggered the need to investigate other factors that could have contributed to this scenario. In this regard, this study chose these two districts to determine the degree of integration of open air markets, the main markets used by most small-scale farmers in the area and while assessing the influence of the integration on food security.

3.2 Target Population and Sampling Procedure

The study targeted traders operating in simple randomly selected open-air markets in Meru South and Mbeere Districts. These markets included, Chuka, Kaanwa, Itugururu and Keria in Meru South District and Siakago, Kiritiri, Mutuibare and Makima in Mbeere District.

The formula below by Mugenda and Mugenda(2003).

;

$$n = \frac{z^2 pq}{d^2}$$

Was used to calculate the sample size where:

n = the desired sample size

z = the standard normal deviate at 95% level of confidence which is 1.96

p = the proportion in the target population estimated to have the characteristics being measured. i.e. approximated 85% of the total traders in the open-air markets were retailers

q = 1- p

d = level of statistical confidence, in this case 0.05

Sample size calculation:

$$n = [(1.96)^2 (0.85) (0.1)] / (0.05)^2 = 131$$

Simple random sampling was used to select open-air markets in which interview schedules were administered. A list of all open-air markets in each district was collected from respective

local authority offices. In Mbeere District, 4 out of the 12 operating open-air markets were sampled while in Meru South, 4 out of 9 were sampled. The study randomly sampled four markets in each district since this represent over 30% of the markets.

The study systematically sampled and interviewed maize and beans traders present in the respective markets during the data collection time. The date of data collection was selected to correspond with the market day of the specific sampled open-air market. An average of 16 traders, both retailers and wholesalers were interviewed in each of the sampled open-air markets. For this study, any trader selling or buying more than 1 bag of beans and 3 bags of maize per market day was considered as wholesalers. Anybody trading below this figure was considered as retail traders. The traders categorizing criteria was developed using the data collected by the researcher during the pilot study. The researcher asked traders on the minimum number of bags one had to transact in a normal market day and how they categorized their business i.e either wholesale or retail.

Purposive sampling was used to sample markets in which retail prices for maize and beans were collected. In this case, markets which had a good record keeping system in place and had records for maize and beans retail prices for previous 4 consecutive years prior to start of this study were selected.

3.3 Pre-Testing of the Research Instruments

A pilot study was conducted to determine the ability of the research tools in gathering the appropriate data for this study. Five traders from two open-air markets not included in the main study in each district were used in this exercise. The piloting helped in pointing out weaknesses in the questionnaire which were rectified before the actual field work begun.

3.4 Data Collection Methods

In order to get a statistical measure of the patterns of market places within each district, distances were measured from each market place to its nearest neighbour market regardless of the size and day of meeting/ market. Distance between open-air markets was measured using

district map drawn to scale that show location of various open-air markets. Measurements were taken using curvimeter/opicometer. The numbers of market days were also recorded.

In order to calculate market retail price disparities among markets, data on average monthly maize and beans retail prices were required. These prices were gathered mainly from the monthly market reports prepared by the market information branch (MIB) within the Ministry of Agriculture and the local governments' markets information databases.

Data on the socio-economic factors that influenced market operations and food security in the area was obtained through administration of interview schedules to traders. This data was also used to evaluate the status the existing market and in evaluation of the interventions necessary for enhancing these markets operations.

Photograph taking and observations were also among other methods used to collect data.

3.5 Data Analysis

The research instruments were examined to ensure that they had been completed correctly and consistently. The data was then coded and a summary of tables prepared for all the responses. Secondary data was keyed in an excel sheet. Statistical analysis including computation of averages, frequencies and percentages were done using SPSS. Nearest neighbours' indices were computed using the nearest neighbour statistic as described by Henkel (1979).

$$R_n = \frac{r_n}{r_e} \quad (2.1)$$

And

$$r_e = \frac{1}{2\sqrt{n/A}} \quad (2.2)$$

Where:

r_n is the observed mean nearest neighbour distance between the maize and beans market

r_e is the expected mean nearest neighbour between the maize and beans markets and also between the market days assuming a random distribution in accordance with a Poissonian probability function:

n : is the number of maize and beans open-air markets within the study region.

A : is the area of the study region

The R_n values were tested for statistical significance by converting them into Z-scores. R_n values can be converted into Z-scores using the formula (Hammond and McCullagh, 1977):-

$$Z = \frac{r_n - r_e}{\delta r_e}$$

Where δr_e is the standard error of r_e and is given by the formula (King, 1969):

$$\delta r_e = \frac{0.26136}{\sqrt{n(n/A)}}$$

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Overview

The main objective of this study was to determine the degree of integration of open-air markets and assess its influence on food security in Meru South and Mbeere Districts. The study specific objectives were; (a) To determine the spatio-temporal distribution of open-air markets in Meru South and Mbeere districts (b) To evaluate the price disparities and their influence on food security (c) To examine factors that influence operations of open-air markets and their influence on food security. The results of the findings were discussed as per the objectives of the study.

4.2 Spatio-Temporal Distribution of Open Air Markets

Figures 4.1 and 4.2 shows the distribution of open-air markets in Meru South and Mbeere Districts. Table 4.1 shows the market places and their respective market days. Table 4.2 shows the results of the calculated nearest statistics for open air markets in Mbeere and Meru South Districts.

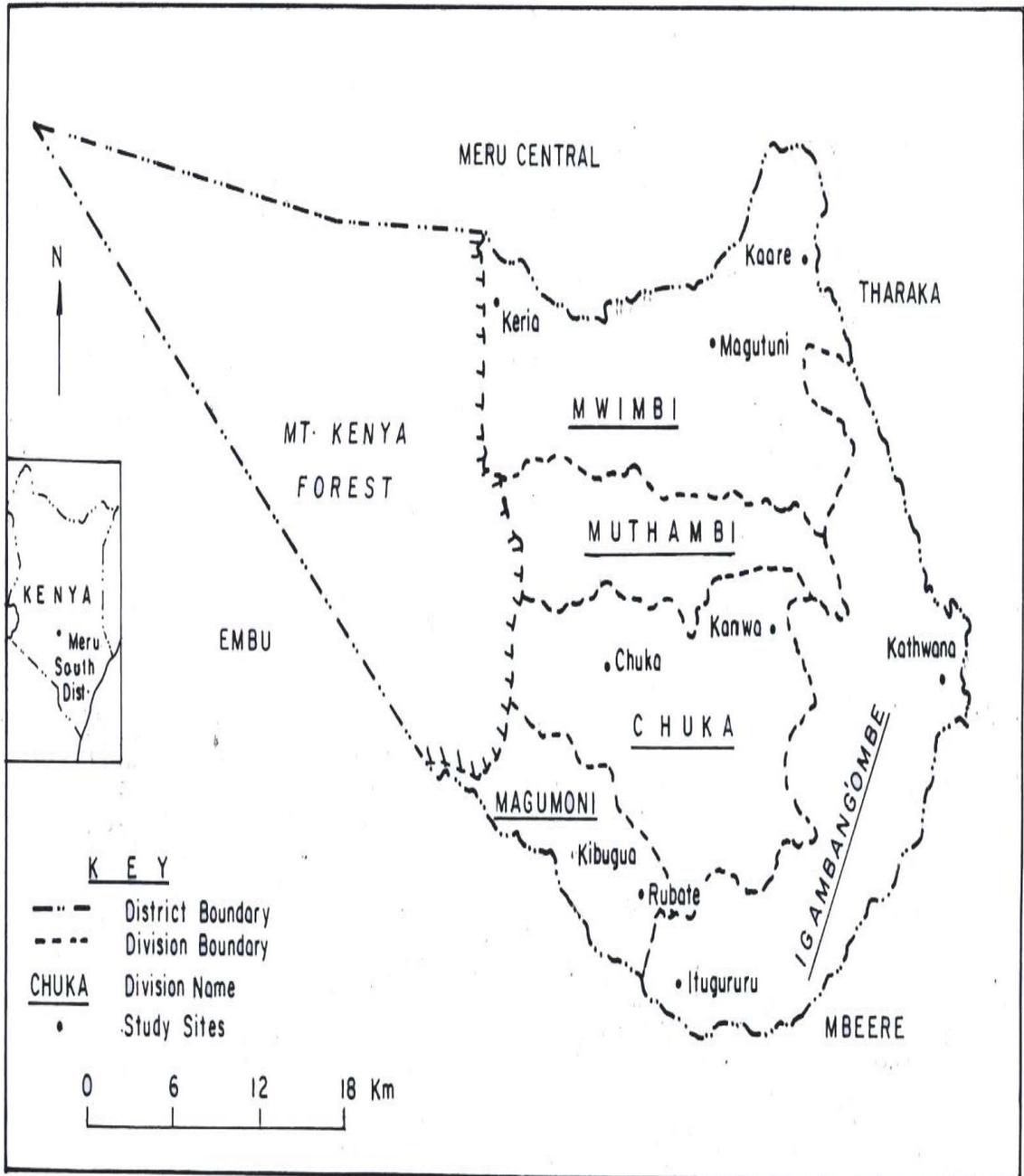


Figure 4.1: Open-air markets and their distribution within Meru South District.
Source: Draft drawn by author 2009.

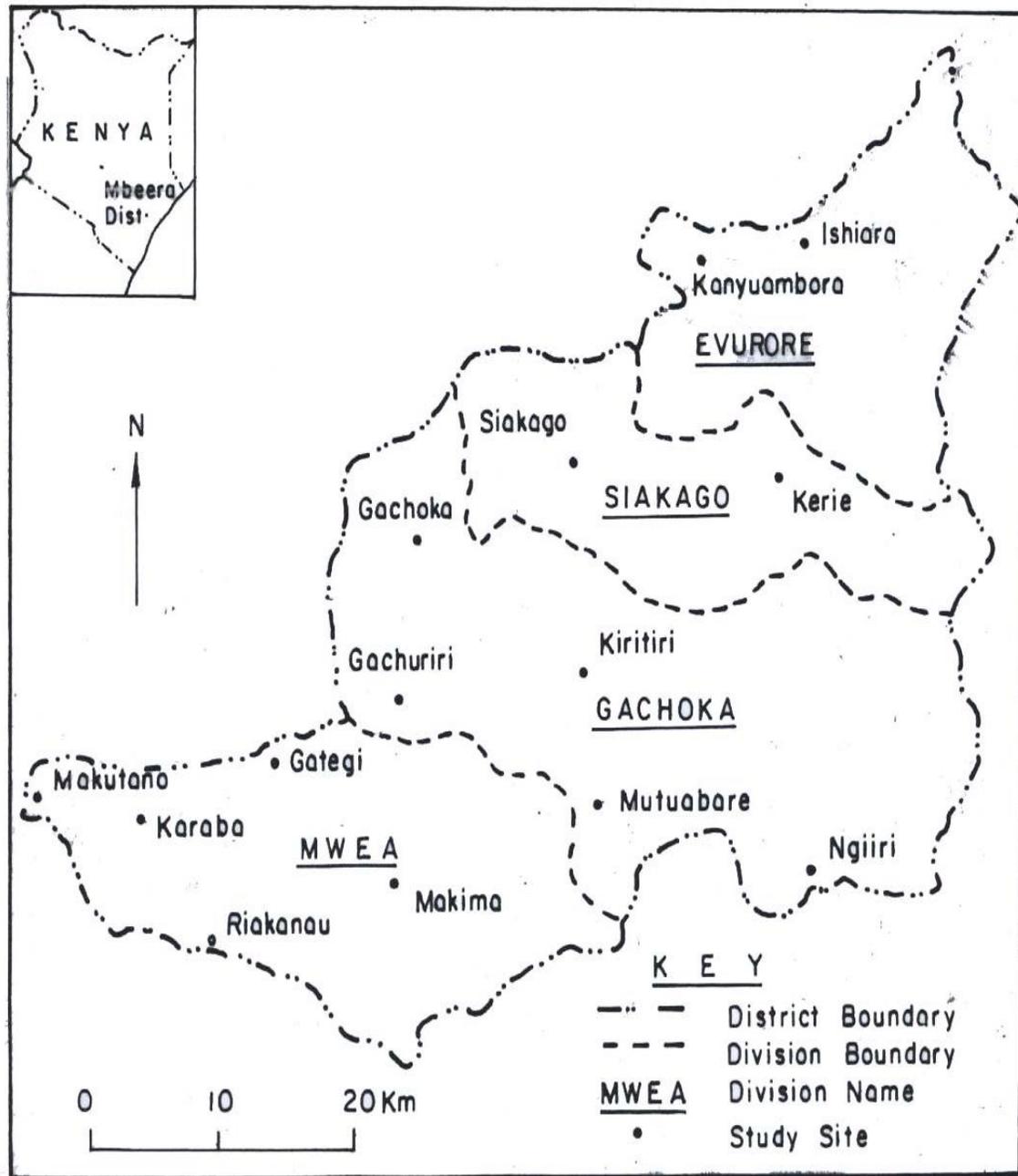


Figure 4.2: Open-air markets and their distribution within Mbeere District.
Source: Draft drawn by author 2009.

Table 4.1 Open-air markets and their respective market days

Mbeere District		Meru South District	
Market place	Market day(s)	Market place	Market day(s)
Ishiara	Tue, Thurs	Kaare	Sun, Thurs
Kanyuambora	Sun, Fri	Keria	Wed
Kerie	Thurs, Sun	Magutuni	Tue, Sat
Siakago	Fri, Tue	Chuka	Tue, Fri
Ngiri	Thurs, Sat	Itugururu	Wed
Gachoka	Fri, Tue	Kathwana	Wed
Kiritiri	Mon, Thu	Kanwa	Mon, Thurs
Gachuriri	Wed, Sat	Rubati	Fri
Makima	Sun, Thurs	Kibugua	Sat
Karaba	Tue, Fri	Cheria	Sun
Makutano	wed, sat		
Riakanau	Thu, Mon		

Source: Authors survey, 2009

Table 4.2: Results of the calculated nearest statistics for markets in Mbeere and Meru South Districts.

District	Number of open-air markets	Rn	Type of distribution	Z computed	Z Critical	Significant at P=0.05
Mbeere	12	1.62	Regular	4.13	0.00	Yes
Meru South	10	1.53	Regular	3.24	0.00	Yes

Source: Authors survey, 2009

The results show that the distribution patterns of open-air markets and their market days in both districts were evenly distributed. On average, each market had two market days distributed evenly within the week. This was interpreted to mean that open air markets in both districts were well distributed in space and time and sufficiently served all the participants. This meant that all participants had at least access to one open-air market in every day of the week. The ability of existing open air markets to sufficiently serve all participants was further affirmed by the calculated nearest neighbour statistics which revealed that distribution of open-

air markets in Mbeere and Meru South was regular. In this regard, all participants had sufficient access to open air markets at any given time. This promoted food security by ensuring that consumers had reliable markets for purchasing what they needed at any given time. The ability of farmers to access other markets may also lead increased farm income through good prices for their products. Increased farm income enhances farmers ability to purchase foods that they don't produce while enabling them to purchase quality food during deficit seasons. Therefore, the spatio-temporal distribution of open air markets in the area was concluded to have no negative influence on food security in the area.

4.3 Analyses of Maize and Beans Price Disparities.

To evaluate the price disparities across markets, the study calculated the price differences from the average retails prices for maize and beans. The results are presented in Table 4.3

Table 4.3: Price disparities for maize and beans

Markets	Beans		Maize	
	Average price difference	Degree of significance	Average price difference	Degree of significance
Chuka-Kanwa	197.72	*	168	**
Kanwa-Keria	177.6		62.5	
Chuka-Keria	375.3	***	230.5	***
Kiritiri-Ishiara	197.3	*	65	
Kiritiri-Makutano	417.5	***	140.5	*
Ishiara-Makutano	220.2	***	75.5	
Chuka-Kiritiri	459.5	***	321.8	***
Chuka-Ishiara	262.3	***	256.8	***
Chuka-Makutano	42.1		181.3	**
Kanwa-Kiritiri	261.8	**	153.8	**
Keria-Makutano	333.2	***	49.3	
Kanwa-Makutano	155.6		13.2	
Kanwa-Ishiara	64.6		88.8	
Keria-Kiritiri	84.2		91.3	
Keria-Ishiara	113		26.3	

Source: Authors survey, 2009

Key:

***	Significant at significant level of 0.001	*	Significant at significant level of 0.01
**	Significant at significant level of 0.005		Not significant

The results showed existence of high price disparities within and across markets of the two districts. However, the degree of disparity varied from product to product i.e. from maize to beans. Significant price disparities evidenced existence of poor market integration. High price of food commodities, influence both food availability and accessibility. High price disparities witnessed within the study area could have resulted from poor infrastructure serving majority of the area. Poor infrastructure generally results to high transaction costs especially during inter- markets movement of products. The high transaction costs then pushes the prices for commodities high, resulting to high price disparities among similar commodities, within same region and time period. Similar results were revealed in previous findings by Goletti and Babu (1994) that showed that poor infrastructure led to high transaction costs between markets. Therefore, the witnessed poor infrastructure negatively influences food flow hence influencing quality food access and availability.

In order to cope with the high transaction costs, traders often purchased products from producers at low prices, and sold them to costumers' at high prices. The low price offered to producers' reduces their income and saving levels, automatically eroding their ability to purchase quality food during deficits/scarcity seasons. On the other hand high prices offered to consumers during surplus seasons erode their ability to purchase sufficient food for use during deficit or scarce seasons. Therefore this study concluded that high prices disparities witnessed had profound negative influence on food availability and accessibility within the study area.

4.4 Factors Influencing Open-air Markets Operations.

The factors influencing markets operations as observed from this study included; traders' characteristics, transportation, storage facilities, market information flow, capital availability among other factors. These factors in one way or another were found to have influence on both food availability and accessibility in the area.

4.4.1 Traders characteristics

a) Gender

A total of 63 traders were interviewed in Meru South District, of whom 84% were female and 16 % male. In Mbeere District a total of 68 traders were interviewed, of whom 76 % were female and 24 % were male (Figures 4.3 a and b).

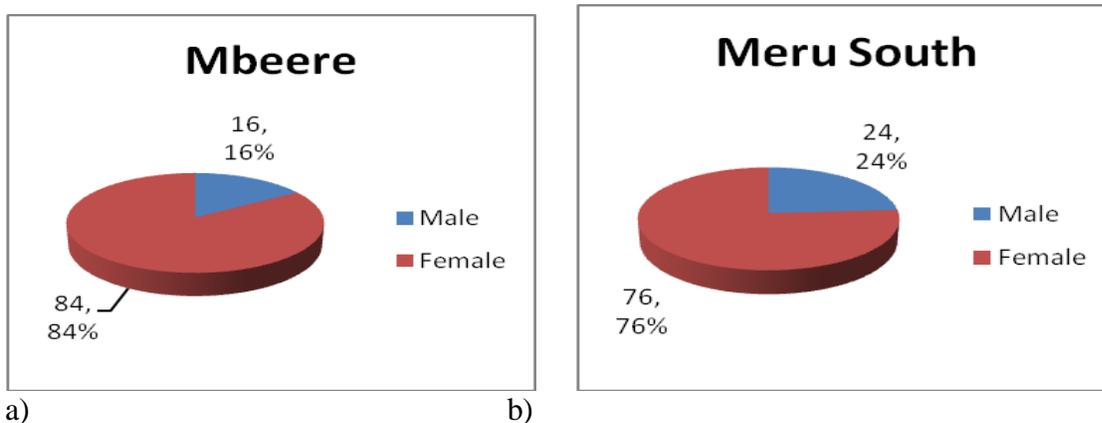


Figure 4.3: Respondents by gender

Source: Authors survey, 2009

In both Districts males were outnumbered by females. These findings were in line with Wambugu (2005), who reported that more women traded in rural markets than men. This was attributed to the fact that women especially in rural areas were the main bread winners and therefore entrusted with the responsibility of feeding the family. More so the roles assigned to women in most African societies are geared toward food production and provision of households' basic needs. Therefore to cope with these responsibilities, most women engage in small micro enterprises such as selling of maize and beans in open-air markets. There was a slight increase in number of men involved in trading of maize and beans in Meru South compared to those in Mbeere. This could have resulted from the assumption that Meru South, generally viewed as maize and beans surplus production zone compared to Mbeere, had more wholesalers (involved in assembling) than in Mbeere and majority of wholesalers were men.

The ratio of men to women involved in agricultural markets had influence on food availability and accessibility within the study area. This because most of the males traders purchased and sold their maize and beans to other markets or to traders from other markets. In contrast,

majority of women traders stored their purchased maize and beans and sold them to locals during scarcity seasons. Therefore if majority of traders in any region were men, then most of surplus food produced in the region would be sold in other markets or regions and little stored for sale to locals during deficit seasons. This would automatically result to outsourcing of food from other regions which result to higher maize and beans cost due to high transaction cost incurred. Subsequently these high food prices reduce the consumers’ ability to purchase them. However within the study area, the high ratio of women compared to men dealing with maize and beans business were sufficient to counter this challenge. Hence the traders’ gender ratio had no negative influence on food security within the study area.

b) Age of traders

The age category of 31-40 years in both districts had the highest percentage of traders, followed by the 41-50 age brackets. Age bracket <20 and 21-30 had the lowest percentages in both districts (Table 4.4).

Table 4.4: Distribution of traders’ respondents by age

Age	Mbeere		Meru South	
	Frequency	Percentage	Frequency	Percentage
<20	2	3%	1	2%
21-30	7	10%	11	18%
31-40	25	37%	33	52%
41-50	20	29%	13	20%
>50	14	21%	5	8%
Total	68	100%	63	100%

Source: Authors survey, 2009

The low percentage of traders within age bracket <20 and 21-30 was probably because the young people lacked capital, were in school or working within other economic sectors within or outside the respective districts.

In general, every sector of the economy needs to have sufficient young people operating in it. This is because the youth are more energetic and creative; they bring in new technologies and innovation necessary for improving the current systems. Therefore lack of sufficient youths in operations of open-air market in both districts negatively influence advancement of market markets which in turn influenced negatively on food availability and accessibility in the area.

c) Traders Education Levels

Up to 80 % of traders in Mbeere and 91 % of traders in Meru South had attained at least the lowest level of formal education. However majority of the traders in Meru South had attained a higher education levels than those in Mbeere (figure 4.4).

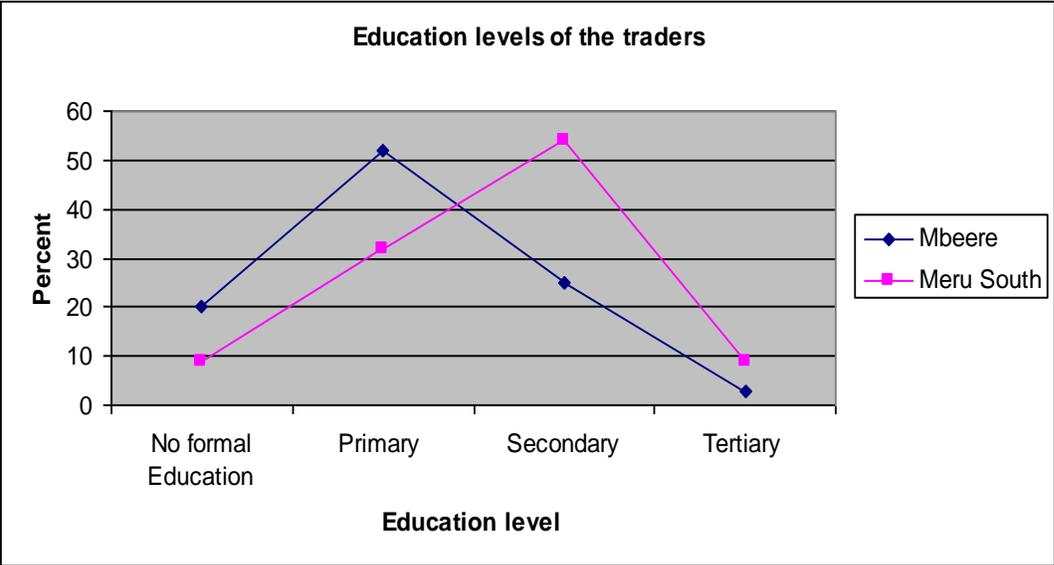


Figure 4.4: Education level of the various traders’ respondents:
Source: Authors survey, 2009

The differences in education levels among traders in Meru South and those in Mbeere were attributed to the high disparities in infrastructure development and climatic conditions between the two districts.

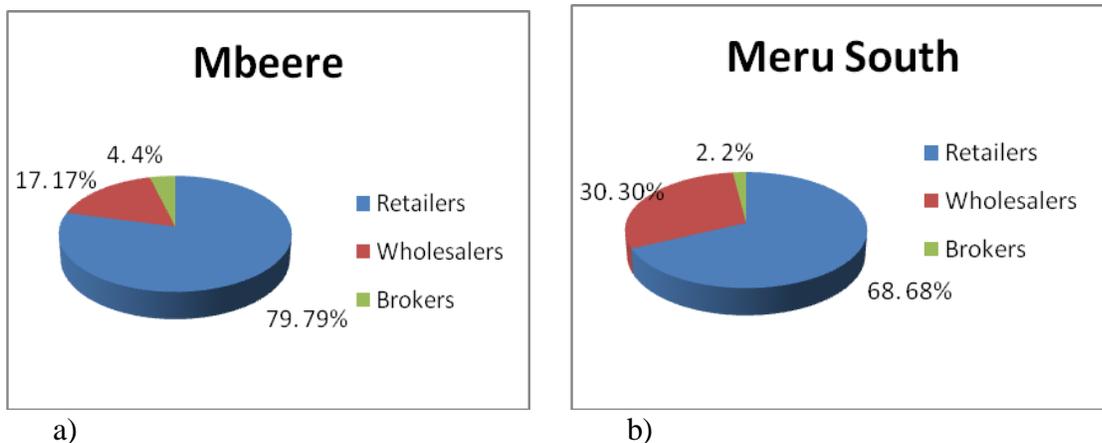
The study concluded that the education level played an important role in the determination of the business growth. This was based from the study results that showed that 65% of the wholesalers within the study area had completed their secondary education. This meant that

traders with higher education had acquired formal knowledge that equipped them with extra skills for managing and expanding their business more compared to those who had only minimal or no formal education at all.

The volume of a commodity available for buying and selling in any market influences the prices, supply and quality of the commodity. All these aspects are important for ensuring reliable food security. Therefore since majority of traders operating within the open-air markets in Mbeere and Meru South had basic formal education, their operation status guarantee stable food availability and accessibility. Therefore, the study concluded that, education level of traders in the area had no, if any little negative influence on food availability and accessibility in the area.

d) Traders Composition

There were 68%, 30%, 2% and 79%, 17% , 4% retails, wholesalers and brokers respectively in Meru South and Mbeere distric (figures 4.5 and b).



Figures 4.5 a and b: Ratio of different traders in Meru South and Mbeere

Source: Authors survey, 2009

In addition 56% of the traders in Mbeere and 51 % in Meru South were fulltime traders

In both districts, majority of traders were retailers. These results were similar to those reported by Wambugu (2005). The result represents a perfect market structure that provides for few wholesalers than retailers. The high percentages of full time traders available within these open

air markets indicated that there were sufficient traders to serve consumers efficiently at any time, either on market day or not.

It was also established that most of the wholesalers in both districts were not solely wholesalers but were also involved in retail transactions. This had both beneficial and destructive impacts. The benefits resulted from reduced food prices due to reduced trade chain. The destruction resulted from creation of monopoly that compromises the quality and promoted exploitation of both consumers and producers.

4.4.2 Standardization Unit of Measurement and Pricing per Unit

The study established that in both districts, the main units of measurement used were tins and weighing machines. Majority of the respondents 76% and 77% in Mbeere and Meru South respectively used tins (*gorogoros*) as a unit of quantity measurement when purchasing or selling, 20% and 16 % respectively preferred using weighing machines while only 4% and 7% in Mbeere and Meru South respectively combined both tins and weighing machines.

It was reported that 55% of the traders using tins as unit of measurements had at one point used sub standard tin i.e. either a bigger tin when purchasing from farmers/producers or smaller size tins when selling to consumers.

Findings of this study revealed that lack of standardized unit of measurement led to exploitation of both producers and consumers. To cope with this challenge, traders reported that most small scale farmers favoured selling their surplus yields to foreign traders (mostly traders from the city) whom they believed had genuine unit of measurement. This later contributed to acute food shortage since most of the surplus yields sold to foreign traders were generally transported and sold to other regions, hence, little stock available for sale to the locals during deficit seasons. In addition, the low prices offered to farmers during the purchase time compromised their ability to purchase quality food during deficit seasons. Based on this the study concludes that lack of standardized unit of measurement adversely influenced food security within the study area.

4.4.3 Transportation

Results from this study showed that 95 % of the traders in both districts accessed major buying areas through poorly maintained dry weather roads which were impassable during the wet season. Only 5% of traders accessed their main buying area through tarmaced road. In addition, 75 % and 90% of the open-air markets in Meru South and Mbeere Districts respectively were connected by poorly maintained dry weather roads. Only 25% and 10% in Meru South and Mbeere Districts were connected by tarmaced road

The poor state of rural roads was viewed as one of the key challenges facing inter-market movement of maize and beans across open-air markets of the two districts. This also contributed to high price disparities witnessed for maize and beans traded within neighboring markets and at same timeframe. Investment in rural roads can lead to a remarkable reduction of marketing costs and margins and an increased farm gate output prices. High transport costs make it difficult for traders to supply goods in areas that are beyond good market roads, which inevitably are the poorer areas. As a result, moving products from an area of surplus to deficit regions is often a major challenge. Poor infrastructure therefore limits opportunities for intra-regional/inter market trading resulting to low competitiveness. Therefore good and well maintained road network is important in ensuring easy movement of products between markets at all time and at reasonable cost.

To cope with the transport challenges, different traders within the study area have opted for different modes of transport. Figures 4.6 and 4.7 show a wide range of the transport means used by different traders as identified during the study. The choice of means of transportation largely depended on: cost to be incurred, the distance to be covered, condition of the road and volume of products to be transported. Wheelbarrows, head loads and *Mikokoteni* (hand carts) were the mainly used to transport of small volume of products or for movement of products within the same market.

Due to the challenges resulting from the existence of poor transportation within the study area, the study concluded that transportation had negative influence on food security. This came as a result of increased transaction cost which led to high food prices hence limiting basic food accessibility and availability to many consumers.

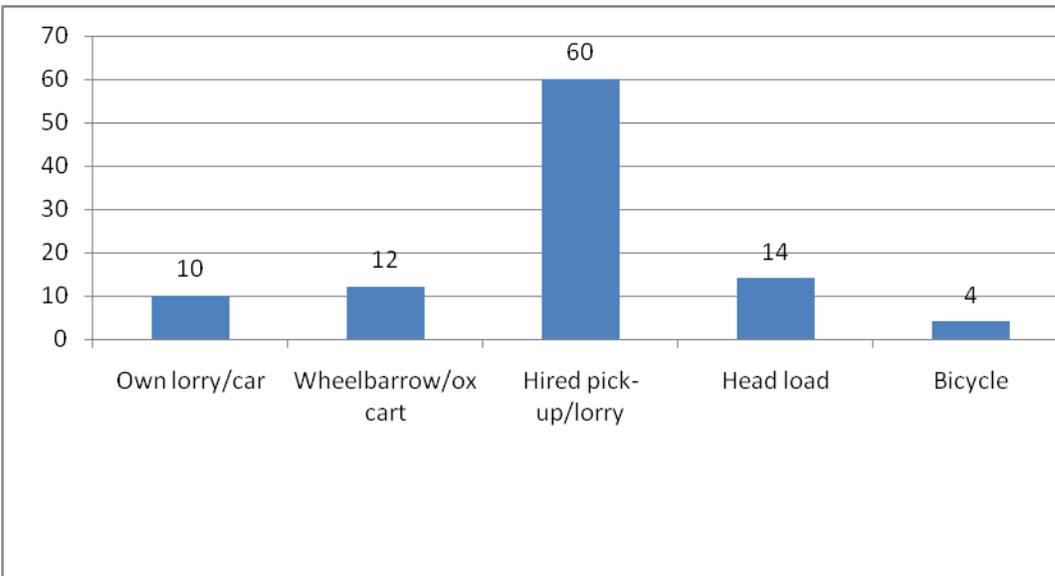


Figure 4.6: Transport means used by maize and beans traders within open-air markets in Meru South District

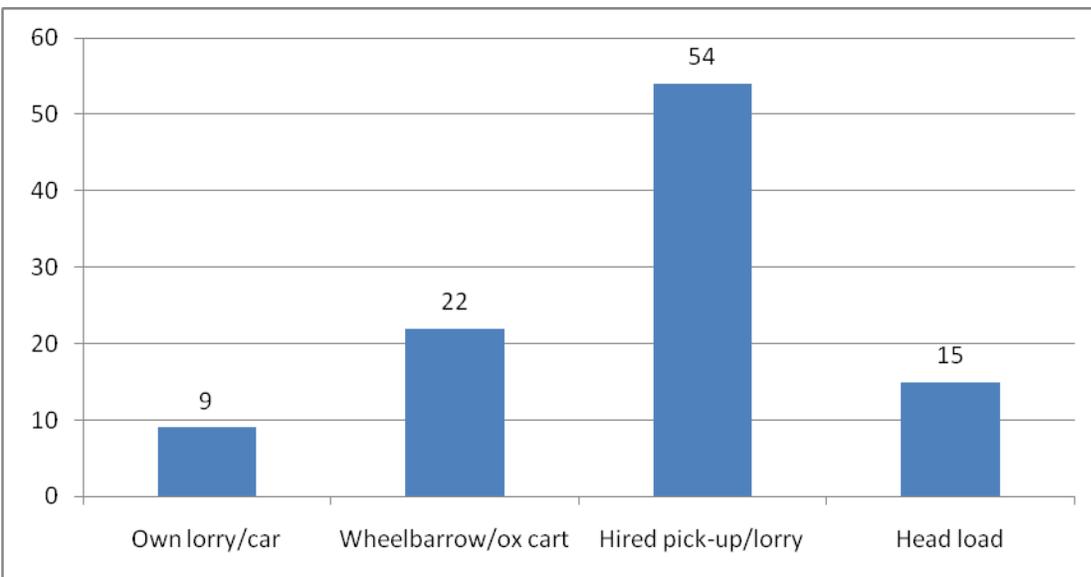


Figure 4.7: Transport means used by maize and beans traders within open-air markets in Mbeere District

Source: Authors survey, 2009

The study further established that the main transportation problems faced by traders included; poor road network, insufficient means of transport, high charges or levies, high transport cost, corruption on roads, damage of grains and insecurity (theft and carjacking) (Table 4.5).

Table 4.5: Transport constraints analysis

Transport Constrains Analyses							
Problem	Frequency	%	Frequency	%	Cause	Effects	Possible solution
Poor roads	25	38	34	54	-Poor road maintenance	High transport cost	Good maintenance of the road
Lack of transport means	11	16	3	5	-Poor roads conditions -Lack of capital	-Poor supply of good -High prices of goods	-Improved roads -Low interest loans
High fuel prices	18	26	9	15	-Poor policies regulating fuel price	-High transport cost	-Good policies governing fuel prices
Corruption	2	3	2	3	-Poor moral ethics	-demoralize new and upcoming investors	-Good anti-corruption system
Lack of security	2	3	2	3	-Presence of illegal fire arms and few security officers	-loss of life and property	-Increase and improve security officers
Damage of grains	1	1	0	0	-Rainy weather and negligence	- Poor quality of goods supplied and losses	-Create and enforce new policies governing transport -Quality control
High charges/ Levies	9	13	13	20	-Multiple payment of levy	-Few inter-regional movement of goods	-Lower and harmonize levy charging systems
Total	68	100	63	100			

Source: Authors survey, 2009

However, 70% and 74% of traders in Mbeere and Meru South respectively agreed that the road network in their respective areas of operational were adequate to serve the areas effectively but these roads were poorly maintained. Traders strongly agreed that good transportation system was important in ensuring steady supplies and fair prices for maize and beans in the area.

4.4.4 Storage Facilities

Storage places

This study established that 95% and 90% of traders in Mbeere and Meru South respectively stored maize and beans they traded but in different volumes. In Meru South, the most common storage places used included; hired stores (42%), market stalls (20%), own houses within homesteads (18%), own store within the market (15%), and other traders' store (5%). In Mbeere, most common storage places used included; hired stores (55%), market stalls (7%), own houses within homesteads (28%), own store within the market (6%), and other traders' store (4%). These are demonstrated in figures 4.9 and 4.10

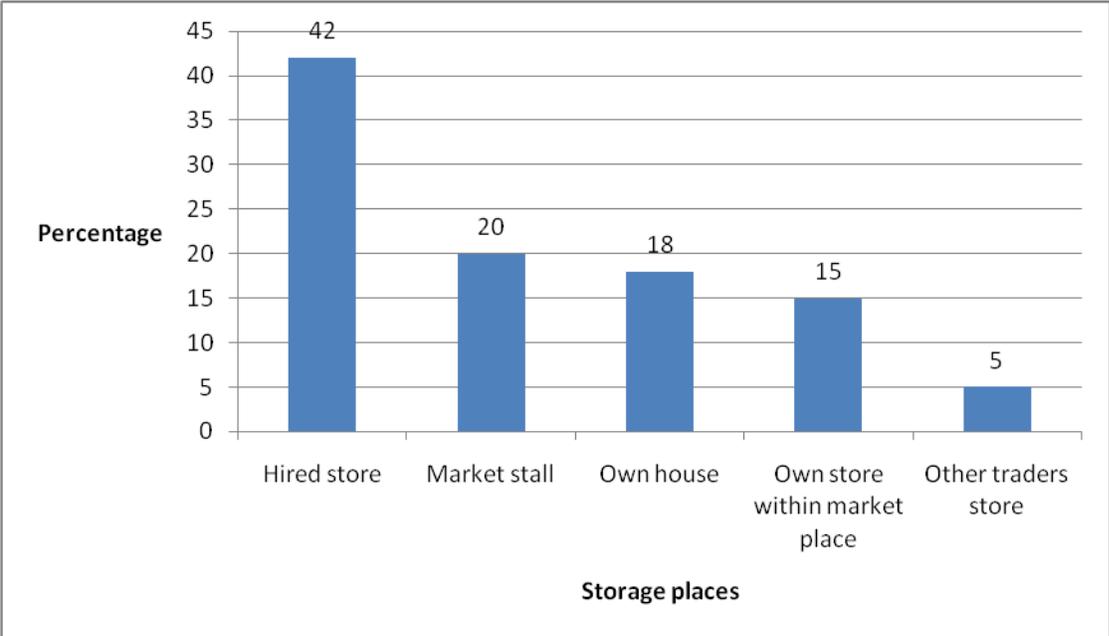


Figure 4.8: Main storage places in Meru South District
Source: Authors survey 2009



Figure 4.9: Main storage places in Mbeere District

Source: Authors survey 2009

Reasons for Storage

The study established that various traders stored maize and beans for various reasons. Sixty one percent of traders in Meru South and 40 % in Mbeere stored their grains to await higher prices. The least reason why traders stored maize was to dis-assemble, as cited by 17% and 7% of traders in the Mbeere (the deficit zone) and Meru South respectively (Table 4.6).

Table 4.6: Main reasons for storing maize and beans

Reason for storage	Meru South		Mbeere	
	Frequency	Percent	Frequency	Percent
To assemble into large quantities	13	21%	12	18%
To disassemble into smaller quantities	4	7%	12	17%
To wait higher prices	37	61%	27	40%
Lack of transport	7	11%	17	25%
Total	61	100%	68	100%

Source: Authors survey, 2009

Limitations to Storage

Traders within the study area faced a number of storage problems. The main problem was lack of sufficient storage structures in Meru South District and lack of adequate capital in Mbeere District (Table 4.7).

Table 4.7: Traders limitations to storage of maize and beans

Constrains to storage	Meru South		Mbeere	
	Frequency	Percent	Frequency	Percent
Lack enough of storage facilities	24	38%	9	13%
Theft/ insecurity	3	5%	0	0%
High storage cost	10	16%	6	9%
Rodent and pest infestation	16	25%	22	32%
Erratic price changes	4	6%	8	12%
Lack of enough capital	6	10%	23	34%
Total	63	100%	68	100%

Source: Authors survey, 2009.

The influence of NCPB, which manages national cereal storage facilities while regulating prices, had minimal impacts in the area. Only 3% of traders reported making any transactions with the board. There were also no other indicators showing that the board had influence on maize and beans marketing in the area.

Storage is a key component in ensuring steady and constant supply of any commodity. Food availability and food accessibility are important components of food security that are largely influenced by storage. From the results, it's clear that the study area was faced with major storage constrains which influenced the volume, price and quality of maize and beans traded in the open air markets. Majority of traders stored their grains in hired stores or in their home. In most cases two or three traders' hired one store within the open-air market. This helped traders to cope with high cost of storage. This strategy however reduced the volume of maize and beans stored by a individual trader.

To cope with increasing scarcity of storage facilities and high cost of storage, most local traders assembled their purchases to a threshold of their storage facilities and sold them out to rest to external traders at a little profit. This influenced the volume of food available during deficit seasons/periods and the prices.

In most open air markets, storage within market stalls was hampered by poor state of stalls which subjected the grains to theft and damage by rainfall. In open-air markets where the stalls were modernized and well developed like the case of Chuka open-air market, traders used stalls as buying, selling and storage venues. Traders interviewed said that, storage within stalls enabled them to cut down costs such as transport and rent which led to reduced prices for products traded.

Inactiveness of NCPB in the area have made most maize and beans traders in the area to depend on external traders and markets for the supply of grains during deficit period and also for selling of surplus purchases. In addition, NCPB has a role of regulating prices and quality of maize and beans among other cereals. However these significant roles are generally neglected within the study area due to NCPB inactiveness. The consequences are escalated prices for maize and beans, unreliable supply and sometimes supplies and poor quality grains which negatively impact on food security.

Effects of Poor Storage Facilities

From the study, 25% of traders in Mbeere and 10% in Meru South had either directly or indirectly suffered losses due to poor storage facilities or mechanisms. Poor storage not only influenced the supply and prices of products but also influences the quality. For example poor storage of maize was mentioned by 65% of traders as the main cause of maize poisonous chemical known as aflatoxin which is harmful on both human and livestock health. To describe the magnitude of the effects of poor quality of products resulting from poor storage, one of the traders said “If the food stuffs sold to consumers is not of good quality, then no one will be willing to buy from you even if you offer the lowest price”. These finding corresponded with statement recorded by the qualitative and quantitative information presented by a number of studies done in Africa (Karugia et al., 2006; Kaari, 2004; Amha, 2002).

Based on the above discussions, poor storage facilities within the study were viewed to have negative influence on food security. The inadequate storage facilities generally limited the quantity of maize and beans supplied, leading to increased prices for maize and beans and sometimes to low quality supplies. All these impact negatively on food security.

4.4.5 Market Information

With increased access to Information Communication Technology (I.C.T) in Kenya especially in rural and remote areas, it was established that 54% of traders in Meru South and 61% in Mbeere used mobile phone (Calling their colleagues in other markets) to gather market information. In general, 60% of traders in Meru South and 71% in Mbeere relied more on other traders as sources of market information. On average 37% and 24% in Meru South and Mbeere respectively depended on market information gathered through individual visits to markets. Other identified sources of market information included printed media, electronic media and price information blackboards located at various Ministry of Agriculture offices (Table 4.8).

Table 4.8: Sources of market information

Source of information	Meru South		Mbeere	
	Frequency	Percent	Frequency	Percent
Trader visit to markets	23	37%	16	24%
Other traders	38	60%	48	71%
Printed media	2	3%	4	5%
Total	63	100%	68	100%

Source: Authors survey, 2009

However 43% percent and 49 % of the traders in Meru South and Mbeere, agreed that the market information they received was reliable and adequate for their operations.

Market information flow within the study area was found to be poor as most traders had only access to information from the markets they recently traded with or were currently trading. Fifty five percent of traders were willing to gather more market information but were

constrained by lack of reliable source of information or high cost of accessing such information. Ninety percent of the traders agreed that majority of consumers and producers depended largely on the limited market information offered to them by traders or brokers.

Flow of information is a key component in determining movement of goods and the pricing effects. Price of food products is a key component that is influenced supply and demand. However supply and demand greatly depends on information flow. The poor flow of market information witnessed within the study area generally hampered the consumers and producer decision making in regard to what, when and where to buy and sell. Good flow of market information ensures that pricing shocks within markets are evenly transmitted. This reduces over pricing and controls food scarcity. It also ensures that consumers purchase sufficient food in case of anticipated price increase or deficits in supply of certain commodity. In addition, if producers have access to reliable information, they could be able to indentify markets with good prices for their products or even predict when prices are product would increase. Good information flow also encourages movement of products across neighbouring markets which increases competitiveness and improves quality of products sold. In conclusion, poor information flow witnessed within the study area compromises the supply and demand law, hence negatively influenced food security within the area., .

4.4.6 Sources of Capital

Forty four percent and 48% of traders in Meru South and Mbeere Districts respectively had their initial capital generated from their personal savings (Table 4.9). Only 6% and 7% from Meru South and Mbeere districts respectively had their capital sourced from loans either from a friends or relatives. Only 4% and 1% of traders in Meru South and Mbeere sourced for capital from bank loan. This probably due to high interest rates or lack of collateral

Table 4.9: Sources of capital for various traders

Sources of Capital	Meru South District		Mbeere District	
	Frequency	Percent	Frequency	Percent
Parents	11	18%	1	2%
Husband/wife	6	10%	9	13%
Loan from relative/friend	4	6%	5	7%
loan from Bansk	4	6%	1	2%
Personal savings	28	44%	33	48%
Sold assets	10	16%	19	28%
Total	63	100%	68	100%

Source: Authors survey, 2009

The source of capital has been one of the main barriers to entry in any trading activities in most developing and developed countries. Availability of capital determines the number of traders involved in any business, the magnitude of transaction made and level of business operations. In general, few traders create a market monopoly by controlling the prices and supply of products. Presence of many participants (traders) in the market creates room for a healthy competition which results to lower prices and better products.

Like in many other parts of the world, lack of capital is one of the challenges hindering entry of new participants in any business activities. This, not exception for maize and beans open-air markets business activities in Mbeere and Meru South Districts. This has resulted to low competition, high prices and lows quality of maize and beans sold in these markets. It has also contributed to low price offered to small scale farmers, whom in most cases have small quantities hence low negotiation power. The low prices offered to farmers, the lower their income and savings consequently deterring their ability to purchase food during deficit seasons. Based on this, the study concluded that lack of capital negatively influenced food security within the study area.

4.7 General Market Operations

a) Inter-Market Movement of Goods and Services

The study established that 70% of the traders in Meru South and 35% in Mbeere did not participate in inter open-air market trading. Up to 49% of the traders in Mbeere and 69% in

Meru South purchased their maize and beans directly from the farmers either through farmer’s deliveries to the market or farm gate purchases. It was also noted that 95% and 92% of traders in Meru South and Mbeere respectively transacted most purchases during the harvesting period and most sales during deficit periods. Similar results were also observed by Wambugu (2005).

There were more inter-market transactions for maize and beans in Mbeere as compared to Meru-South. This was probably because Mbeere was viewed as maize and beans deficit producing area compared to Meru South District. Therefore, high inter movement of maize and beans was seen as a strategy for meeting the food demand in deficit area. In Meru South District there were few inter-market transactions. However in both districts, majority of traders (70%) traded only in one open-air market. This was probably because most traders specialized in buying from farmers during the harvesting time (surplus period), assembling the purchases into bulk volumes for either storing for sale when prices increase, or for selling to traders from other markets or institutions within and outside the districts.

b) Major Purchasing Areas

In Mbeere only 27% of traders specialized in purchasing and assembling of the maize and beans from farmers during harvest period either for sale to the same farmers during deficit periods or to external traders. Main buying and selling areas for traders in both districts are shown in table 4.10

Table 4.10: Major buying areas for Mbeere and Meru South traders

	Mbeere	Meru South
Buying area	Percent	Percent
In the villages	12	24
Farmers delivery in the market	15	62
Other markets	54	10
Other traders (wholesalers and lorries)	19	4
Total	100	100

Source: Authors survey, 2009

The study also established that 80% of traders in Meru South and 94 % in Mbeere districts were involved directly in farming of maize, beans or both. However majority of these traders did not sell their surplus yields immediately after harvest unlike other farmers. Instead, these traders (who also do farming) capitalized in buying surplus yields from other farmers, assembling them into bulk quantities either for sale to other markets (plate1) or for storing to await higher prices or to sell to traders from deficit areas, institutions or same farmers during scarcity. This may led to high food prices for consumers during deficit periods.

The study also established that all the traders in both districts traded in different varieties of cereals. The main being green grams, sorghum, millets, peas and cowpeas. The main reason, according to traders was to attract more customers by offering variety of products and to increase general business profits margins. This also improves food security by offering diverse products with different nutrition values hence serving as substitutes to main food.

a) Traders' Opinion on Markets Operations and Influence on Quality Food Accessibility and Availability

Eighty seven percent of traders agreed that open-air market played an important role in ensuring quality food supply and fair prices. This was supported by the fact that many customers and producers purchased and sold their products during market days. This was probably due to fair prices offered, presence of many buyers and sellers and diversity of products available during market days compared to non market days.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study aimed at understanding the degree of integration of open air markets and the influence on food security in Meru South and Mbeere. Data was mainly collected using semi structured interview schedules administered to maize and beans traders and from markets records within MoA and local government offices. From the analyses, the nearest neighbour indices results revealed that open-air markets in both districts were uniformly distributed. This meant that spatio-temporal distribution of open-air markets within the study area had no negative influence on the food security as the markets were adequately to serve all the participants. The analyses of price disparities revealed existence of high price differences in some markets either within the same district or across the two districts. This was evidence of poor market integration. Poor market integration generally has negatively influenced food availability and accessibility, the two main aspects of food security. In summary, open air markets in the area were poorly integrated and negatively influenced food security. The study further examined a number of factors that influenced the operations of open air markets within the study area. Most of these factors had contributed to the poor market integration experienced in the area. These include:

Transportation: Transportation played a key role in the trading of maize and beans. Poor and inaccessible road network especially during rainy season was identified as main challenge to inter-markets trading. High transport costs contributed to high price disparities witnessed within the study area. It was established that most open-air markets were connected by dry weather roads which in most cases were poorly maintained.

Storage facilities: the study showed that the majority of traders stored the maize and beans that they traded in. Hired stores, own houses and market stalls were the main storage venues used by traders within the study. Traders stored maize and beans for various reasons including; to

await higher prices, to assemble into big volumes for transportation to other area/ sell to other traders or to disassemble into small volume to sell to consumers. Inadequate of enough storage facilities was the main challenge

Market Information flow: The study established that market information available to traders was neither adequate nor reliable. This scenario hindered many traders from participating in inter open-air trading. This also limited many consumers and producers decision making regarding when to buy or sell maize and beans.

Capital sources: The result showed that most traders had problems in accessing capital. The main sources of initial capital identified by most traders were personal savings, selling of assets and parents donation. The main obstacles in accessing loans from bank include; high interest rates and lack of loan security especially for youths and women who had no/limited access to assets such as land. The study also established that low capital limited the volume of grains the traders purchased, transported and stored. The ability to participate in inter open-air markets trading was also determined by amount of capital one had. Since few traders had access to adequate capital, it lead to cartels leading which exploit both farmers and consumers.

Standardization of unit of measurement: It was established that tins and weighing machines were the widely used units of quantity measurement in both districts. Most traders had problems with use of different unit of measurement within markets. Lack of one standardized unit of quantity measurement during buying or selling of maize and beans or other cereals resulted to exploitation of producers and consumers.

5.2 Conclusions

Despite the even distribution of open-air markets in Mbeere and Meru South Districts, the existence of high price disparities revealed that these open air markets were poorly integrated and negatively influenced food security within the study area. However the study established that the high price disparities reported resulted largely from witnessed aspects such as transportation challenges, poor market information flow, capital access challenges, storage constraints and lack of standardized unit of measurement. Improvement of these aspects would result to a well integrated open air markets with improved food access and availability. In addition, price stabilization between markets located within high production regions and those in low production regions will be improved. In this regard markets from one region could be serving as special “reserves” for markets in another region. That is, the surplus grains are sold to deficit markets during good harvests and additional supply is bought during bad harvests.

In conclusion;

Open-air markets within the study area influenced food security by determining the accessibility and availability of maize and beans to consumers. In addition, the markets determined the price farmers and consumers got for maize and beans.

Existing poor integration of the open-air markets in Mbeere and Meru South districts limited the potential of these markets in improving the state of food insecurity in the area.

Improving the poor state of market integration will enhance easy flow of maize and beans at all time from surplus production zone to deficit production zone and lower the transaction cost. This will result to better maize and beans prices for consumers, better pay for producers and guaranteed supply and demand. These will enhance food accessibility and availability, key components of food security

5.3 Recommendations

This study revealed that open air markets in the study area are poorly integrated and negatively influence food security. However the poor integration of these markets resulted not from their spatio-temporal distribution but from a number infrastructural and institutional aspect. Unlike previous years, these aspects need to be put into consideration when drawing policies affecting food security and agricultural development within the study areas. To enhance the contributions of open-air markets in reducing cases of food insecurity, there is need to enhance their degree of integration. To achieve this, the study recommends the following:

- There is urgent need to improve the rural transport network to ensure efficient flow of commodities from one region to another. This will lead to improve the flow of maize and beans from surplus production area to deficit areas at lower costs.
- There is need to strengthen the policy regulating the unit of quantity measurement and pricing of maize and beans. This will protect both the consumers and farmers from exploitation by traders.
- There is need to put in place effective mechanism for enhancing market information flow within markets to producer, traders and consumers. This can be achieved by creating market information centre at each operating open-air market. With the current IT technologies, the proposed information centres need to be networked and connected with internet to ensure information is shared between markets. In addition, the cost of accessing this information should be minimal or free. There is also need to ensure that similar information is accessible by use of mobile phones. Good information flow will also serve as early warning signals for all participants. This will results in early preparedness and sourcing of alternative supplies to ensure availability of food at reasonable prices.

- Challenges related to maize and beans storage within open air markets need to be addressed urgently. Scarcity and high cost of storage premises could be overcome by building standard and affordable stores within each open-air market. This can be done by county council, government and NGOs. This will increase grain storage capacity in the area, reduce cost of transport and ensure reliable supply, fair prices both to consumer and farmers and increased profits to traders. In addition there is immediate need to train traders on good grain storage practices. This will reduce poor quality grain supply resulting from poor storage practices. Poor quality grains results to traders' losses and health problems to consumers.
- There is need to ensure that NCPB operations within the area are improved to promote maize and beans price stabilization. NCPB can promote maize and beans availability and accessibility through buying from producers at reasonable price and making it available during deficit period at affordable price.
- There is urgent need to encourage contractual arrangement between farmers and traders. This will encourage production, stabilize prices and increase farm income. This will inevitably result to availability and accessibility through increased production, income and savings by farmers.

This study has observed that open-air markets integration play a very crucial role in influencing food security within a region. More attention should be given towards improving conditions of these markets not only for improving food security but also for stimulating rural economic growth. For further research, this study recommends;

- Analysis of the influence of open-air markets on food security in other regions not covered by this study.
- Detailed analyses on the magnitude each factor identified in this study on influence on food security.
- Trend assessment of the development of open air markets and how their existence over time has impacted on agricultural development in respective areas
- Comparative study on farmers', consumers and traders opinions on status of open-air markets and influences on food production, cost, quality, diversity and income.

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7. APPENDIX 1 Traders Interview Schedule for Assessing the Influence of markets on Food Security.

Traders Interview Schedule for Assessing the Influence of markets on Food Security. The Case of Open-Air Markets in Mbeere and Meru South Districts.

Declaration:

We will greatly appreciate your assistance in this study. Your answers are of importance since you have been selected as an interviewee. Under no circumstances will individual answers be divulged. They will be used in combination with answers of other people responding to the study.

THANK YOU.

Background Information

Interviewers name..... Code No.....

R001) Traders name..... R002) Gender..... 1) Male 2) Female

R003) Age of trader in years 1) <20 2)21-30 3)31-40 4)41-50 5) >51

R004) Division.....

R005) Location.....

R006) Education level: 1) No formal education
2) Primary (specify class).....
3) Secondary (Specify form).....
4) Others (specify).....

R007i) Nearest market centre/ Town of operation

R007ii) Approximate distance from residential
1) < 1km 2) 2-5 km 3) 6-10 4) >11km

R008) Type of trader
1) Wholesaler 2) Retailer 4) Both retailer and wholesaler
5) Transporter 6) Others (specify)

R009) For how long have you been in business of maize and beans?
1) <1 yr 2) 1-2 yrs 3) 3-4 yrs 4) 5-6yrs 5) >7yrs

R010) What other crops do you trade in? List in order of importance.
1) 2).....
3)..... 4).....
5) 6).....

R011) Traders status
1) Full time 2) part time (with other jobs)

R012) Who owns the business?
1) The trader 2) Family business 3) A relative
4) Employed 5) Others Specify

R013) Where is your major buying area?
1) In the villages (mention) 2) Farmers deliveries within that market
3) Traders within the market 4) Traders from outside the market
5) KCPB 6) Other (specify)

R014) Where is your major Selling area?

- 1) In the villages (mention)
- 2) Buyers within the market
- 3) To institutions
- 4) Buyers from outside the market (Specify)
- 5) KCPB
- 6) Other regions (specify)

R015) Approximately how many bags of maize and beans did you buy and sell in the year 2007?

<u>Buy</u>	<u>Sell</u>
Maize.....bags	Maize.....bags
Beans.....bags	Beans.....bags

R016) Do you farm maize and beans? 1) Yes 2) No

R017) If yes when do you sell your product?

- 1) Immediately after
- 2) One month after harvest
- 3) During planting
- 4) 2-3 months after harvest
- 5) Others (specify)

Section II Commodity flow

A) Buying

R018a) Who does the purchasing of maize and beans for you?

- 1) Self
- 2) Agent
- 3) Family member
- 4) Others (Specify)

R018b) From whom did you buy maize and beans grains in the 2007 year?

- 1) Farmers
- 2) agent
- 3) family member
- 4) others (specify)

R019) What was the buying and selling price for the current maize and beans?

<u>Buying</u>	<u>Selling</u>
Maize	
Beans	

R020) Where did you buy most of your beans from in the year 2007?

- 1) Within the market
- 2) Other markets within the district (specify)
- 3) Markets outside the district (Specify)
- 4) Other markets within and outside district
- 5) Others (Specify)

R021) Where did you buy most of your maize in the year 2007?

- 1) Within the market
- 2) Other markets within the district (specify)
- 3) Markets outside the district (Specify)
- 4) Other markets within and outside district
- 5) Others (Specify)

R022) What is the average distance from your main maize buying place to your selling place?

- 1) <1km
- 2) 1-5 km
- 3) 6-10km
- 4) >11km

R023) What is the average distance from your main beans buying place to your selling place?

- 1) <1km
- 2) 1-5 km
- 3) 5-10km
- 4) >10km

R024) What means do you prefer to use to measure quantity when buying?

- 1) Tins 2) Weighing machine 3) Bags 4) Others (specify)
- R025) In most cases who incurs transport cost?
 1) Trader 2) seller 3) both
- R026) What is the maximum quantity (bags) can you purchase per transaction?
 i) Maize 1) 1-5 2) 5-10 3)10-15 4)15-20 5)>20
 ii) Beans 1) 1-5 2) 5-10 3)10-15 4)15-20 5)>20
- R027) On average what quantity (bags) did you purchase in the year 2007?
 i) Maize 1) < 10 2)10-20 3)20-30 4) 30-40 5)40-50 6)>50 (Specify)
 ii) Beans 1) < 10 2)10-20 3)20-30 4) 30-40 5)40-50 6)>50 (Specify)
- R028) In which months do you buy most of your maize and beans?
 1) Jan 2) Feb 3) Mar 4) Apr 5) May 6) Jun 7) Jul 8) Aug
 9) Sep 10) Oct 11) Nov 12) Dec

B) Selling

- R029) Who buys most of your maize?
 1) Locals people 2) Other traders 3) institutions (specify))
 4) KCPB 5) Others (Specify)
- R030) Who buys most of your beans?
 1) Locals people 2) Other traders 3) institutions (specify))
 4) KCPB 5) Others (Specify)
- R031) Where do you sell most of your maize?
 1) Within the market 2) Other markets within the district (specify)
 3) Markets outside the district (Specify)
 4) Other markets within and outside district 5) Others (Specify)
- R032) Where do you sell most of your beans?
 1) Within the market 2) Other markets within the district (specify)
 3) Markets outside the district (Specify)
 4) Other markets within and outside district 5) Others (Specify)
- R033) What measure do you prefer to use when selling your maize and beans?
 1) Tins 2) Weighing machine 3) Bags 4) Others (specify)
- R034) How many other open-air markets do you know around that you can sell your grains?
 1) None 2) One 3) Two 4) Three 5) Four 6) >Five
- R035) Do the markets have necessary facilities (roads, stores, space etc) for marketing maize and beans? 1) Yes 2) No
- R036)i) What fees do you pay before you can sell your grains in the market centre(s)?
 1) License fees 2) stall fees 3) per bag charges 4) Others (Specify)
 ii) In case of licenses fees are you allowed to use the same trading license within other markets in the district? 1) Yes 2) No
 iii) In case of stall charges, do you pay 1) daily 2) weekly 3) monthly 4) Others (Specify)
 How much? KShs.....
- R037) What is the average distance to your furthest selling place? In km
 1) <1km 2) 1-5 km 3) 5-10km 4) >10km
- R038) Do you sell in other markets?

7) Others (specify)

Section v: Market Information

R061) How do you get market information?

- 1) By visiting market places 2) From NCPB 3) From other traders
4) From government officials 5) From printed media 7) From electronic media
8) From agricultural extension officials 9) Others (specify)

R062) Do you have a mobile phone?

- 1) Yes 2) No

R063) If yes, do you use the phone for business activities?

- 1) Yes 2) No

R064) i) Do you think that the flow of market information is okay and reliable?

- 1) Yes 2) No

R065) ii) If no why?

- 1) Lack of reliable sources 2) unpredictability of market
3) Lack of trust between traders 4) Lack of communication facilities
5) Many brokes/middle men 6) Others (specify)

Section vi: Policy

R066) Do you require a trading license to engage in maize and beans trade?

- 1) Yes 2) No

R067) If yes how much do you pay per year? In Kshs

- 1) <500 2) 500-1000 3) 1000-1500 4) 1500-2000 5) 2000-2500 6) >2500

R068) Do you use the same licenses for maize, beans and other grains you sell?

- 1) Yes 2) No

R069) What are the main constrains facing market of maize and beans

- 1) Low prices 2) Lack of capital 3) Unstable prices
4) Lack of credit services 5) High interest rates 6) Poor roads
7) Lack of storage lack of market information
8) Poor government policies
9) Fluctuating maize and beans demand and supply 10) Others (specify)

R070) Are you required to pay permit to move maize and beans from one district to another?

- 1) Yes 2) No

R071) What do you think should be done to improve trade between two markets/districts?

- 1) Improve roads 2) Good market information 3) Low transport cost
4) Price stability 5) improved security 6) Availability of storage
8) Reduce charges and levies 9) Others

Section vii: Roads

R072) What type of roads do you frequently use to transport your grains from:

- i) Seller/farm gate? 1) All weather 2) Dry weather
ii) The market to the nearest other market? 1) All weather 2) Dry weather

R073) In your own view is the road network well developed to enable easy transportation of maize and beans grains?

- 1) Yes 2) No

R074) What problem(s) do you face during transportation maize and beans?

- 1) Poor roads
- 2) Lack of transport means
- 3) Hire charges and levies
- 4) Corruption in roads
- 5) Lack of security
- 6) Damage of grains
- 7) Others (Specify)

R075) In your opinion what should be done to improve the situation?

- 1) Good roads
- 2) Waived road levies
- 3) Regulated oil prices
- 4) Improved security
- 5) Fighting corruption
- 6) Others (Specify)

R076) Why did you opt to involve in trade of maize and beans?

- 1) High returns
- 2) High demand
- 3) promising supplies
- 4) Locally available
- 5) Easy business to start
- 6) Low capital needed