

**AN ASSESSMENT OF FACTORS DETERMINING  
DEMAND FOR RAW MATERIALS IN FOOD  
PROCESSING FIRMS: A CASE OF SOYBEANS IN  
NAIROBI, KENYA.**

By

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A Project Paper submitted in partial fulfillment of the requirements  
for the award of the Degree of Master of Arts (M.A.) in Development  
Studies

Institute for Development Studies  
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November 2010

# Declaration

I declare that this Project Paper is the result of my original work and that it has not been submitted either wholly or in part to any other University for the award of a degree.

Signature . . . . . Date .....M. . . . . fe^r. . . . .SIQiV

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This Research Paper has been submitted for examination with my approval as supervisor

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# Acknowledgements

This Project Paper was prepared through tremendous support and generous contribution of many individuals and organizations. I am highly indebted to the University of Nairobi for sponsoring my studies through its scholarship and to the Socio-economics, Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT) for the research grant that provided financial support in carrying out the project.

I am profoundly grateful to my supervisor Professor Patrick Alila who dedicated his time to closely supervise and guide me. My appreciation also goes to Dr. Rosemary Atieno for her professional guidance at the initial stages of the development of this Project Paper. Dr. Jonas Chianu a Senior Research Fellow from the Socio-economics, Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT) cannot be forgotten, for without his support, guidance and professional advice this paper would not have been completed.

I wish to appreciate the support I immensely received from the entire community especially from the Director Prof. Muhamud Jama, Dr. Kamau and Dr. Joseph Onjala; fellow students (Milka Asamba, ha Wanjuki, Aggrey Barasa, Josphat Oyigo, Lokiru Matendo and shon Kariuki) and the non-teaching staff. To them all, I am grateful.

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Signature     ^ . ± . . . . 9 . / . . . ^ Date

Prof. Patrick O. Alila

Research Professor, Institute for Development Studies,  
University of Nairobi

# **Dedication**

To

My dear, loving and supportive husband Mr. Njaramba Gichuki,  
daughter Neema Muthoni and son Peter Gichuki for their  
patience during the period I was studying.  
May our almighty God bless them according to His riches in  
glory.

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Finally, I am also greatly indebted to my respondents who willfully availed themselves for the interviews and discussions that provided data and direction to this study.

## **ABSTRACT**

*This study assesses the factors determining demand for raw materials in food processing firms. The overall objective of the study was to assess the determinants of demand for soybean as a raw material in food processing firms. The city of Nairobi, Kenya was selected as a case study because it hosts a majority of these firms.*

*The study methodology and approach was based on reviewing of available documents from various sources and face to face interview. A cross-sectional survey was carried out for the soybean processing firms operating within the city. Firms were first contacted to confirm they were still in operation and to determine their sizes through the numbers of their employees. Probability sampling was employed whereby the sample was stratified into four groups according to the sizes of the firms. Firms were grouped into micro, small, medium and large enterprises.*

*The study established that the major determinants of demand for soybean are: prices of soybean; firm size; age of the firm; quality of soybean gram and the level of infrastructure within the country.*

*Correlation and regression analysis were carried out for the three variables, that is, the prices of soybean, firm size and the age of the firm since inception. The analysis revealed an inverse relationship between the prices of soybean and the quantity demanded by the firms. Another finding was that both firm size and age of the firm have a positive relationship with demand. In other words, as the firm employs more and more workers the demand for the raw materials increase and the longer a firm operates in terms of the years, its demand increases for the raw materials.*

*Moreover, it was found out that the quality of raw materials determines its demand. Firms were more interested in good quality of the soybean, which includes protein content, moisture content and the size of the bean.*

*The constraints faced by the soybean processing firms were also examined. The key finding was that farm production of soybean within the country is low and therefore processing firms are forced to*



*externally source the commodity, by importing from other countries. In addition, other constraints include notably poor physical infrastructure such as roads that impede transportation of raw material from the rural production areas, energy and telecommunication; high prices of soybean; and poor quality of soybean grain.*

*The study has highlighted some policy recommendations in order to address these constraints. Among them are: adequate budgetary allocation by the Government for improvement of the infrastructure particularly on roads and electricity; provision of adequate funds to research institutions to come up with good quality soybean varieties for processing; creating an enabling environment for doing business by giving incentives such as easing of importation procedures and reduction of import duties by the Government; and encouraging the small-scale producers to engage in farming as a business.*

# List of Acronyms and Abbreviations

<b>ASAL :</b>	<b>Arid and Semi Arid Land</b>
<b>CBS :</b>	<b>Central Bureau of Statistics</b>
<b>EPZA :</b>	<b>Export Processing Zones Authority</b>
<b>FAO :</b>	<b>Food and Agriculture Organization</b>
<b>IDS :</b>	<b>Institute for Development Studies</b>
<b>IPO :</b>	<b>Initial Public Offer</b>
<b>ITDG :</b>	<b>Intermediate Technology Development Group</b>
<b>KARI :</b>	<b>Kenya Agricultural Research Institute</b>
<b>KESA :</b>	<b>Kenya Soybean Association</b>
<b>KIRDI:</b>	<b>Kenya Industrial Research and Development Institute</b>
<b>MED :</b>	<b>Market Economies Development</b>
<b>NARIs:</b>	<b>National Research Institutes</b>
<b>SPSS :</b>	<b>Statistical Package for Social Sciences</b>
<b>USA :</b>	<b>United States of America</b>

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# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Background information

The focus of the study is to assess factors determining demand for raw materials in processing firms. To that end specifically, a case study of soybean processing firms in Nairobi has been carried out.

Improvement of agricultural products through value addition is an intervention that would sustain agriculture's contribution to betterment of the livelihood of a society (Republic of Kenya, 2003 and 2007)<sup>1</sup>. The Food and Agriculture Organization (FAO) has argued that value realized from adding value through processing of farm produce surpasses primary production as it improves the quality of the produce (FAO, 1995).

Value addition plays an Important role mainly in terms of meeting the persistent food deficits, generating incomes, poverty alleviation and employment creation. This is through production and processing activities and linkages with other sub-sectors of the economy (MED, 2004; Ferris, 1998). Moreover, value addition also provides an opportunity for the diversification of productive and export base of the

<sup>1</sup> Value addition is any activity that allows producers to capture greater value than would normally be secured through conventional commodity channels. The additional value can come from production, marketing and processing strategies that distinguish the products from standard agricultural commodities.

economy. This leads to availing products to niche markets and hence higher prices for the products which ultimately lead to increase in gross domestic product (GDP). Value addition eventually, promotes global competitiveness of the products (Jaffee and Morton, 1994).

In Kenya, processing of farm produce such as soybeans has been hampered by lack of raw materials (EPZA, 2005; MED, 2004; Jaffee and Morton, 1995). This is because per capita growth of production of major crops has not been sufficient to satisfy demand (Odhiambo et. al., 2004). Production patterns in Kenya are characterized by considerable seasonal fluctuations which results into low production and unstable levels of raw materials availability. Low crops production has led to low per capita growth of production resulting to a rise in prices of raw materials for agro processing industries (Omore et. al., 1999; Odhiambo et. al., 2004 and Navarro, 1995).

To cushion this situation it is important to enhance efficiency of crop utilization particularly by adding value through processing (Ferris, 1998). Mwega (2005) in addition, argues that Kenya's potential competitive advantage in manufacturing lies in agro-processing. To compete globally in this sub-sector, the country therefore needs to promote value addition in agro-based industries. This is because the industrial sector is considered to become more efficient if there is an increase in the share of domestic value-added in gross output (Mwega, 2005).

It is against this background that this study assesses the determinants of demand for agricultural raw materials and in particular soybeans. Soybean is an important source of protein that contains up to 40%



protein. This is relatively higher than any other source of protein including animal sources of protein such as fish, beef and chicken (Ephanto, 1994; MED, 2004). Ephanto (1994) argues that if soybeans are incorporated into traditional foods they offer a simple but effective solution to improving the nutritional status of the society. Although soybean is an important source of protein there is scanty available empirical evidence on its processing in Kenya hence the importance of this study.

## 1.2 Problem Statement

†

High population growth rate in developing countries Kenya being one of them, has contributed to a fast growth in urbanization that is expected to reach 47.2% by 2015 (UN, 1996). This means that more than a third of the population is expected to live in urban areas by the year 2015. This rapid trend is being accompanied by a shift in the utilization of food (Teklu, 1996). The shift has implications for the various ways in which food is produced and utilized. The growth in urbanization implies that the population will depend on value added foods such as processed food. This is essentially due to the fact that fresh agricultural produce are perishable (Alemayehu, 2000).

In Kenya, consumption of food has increased faster than production. This is attributed to the high population growth and increased urbanization which has led to the rising demand for food (Nyangito *et.al.* 2002).

Decline in food production has raised the prices of the food particularly on protein food. Nevertheless, several alternatives for alleviating

protein food have been Investigated. Soybean has been considered to be among the leading options (Osho and Dashiell, 1998). However, even though soybean has been recognized as the best among alternative sources of protein, its production and processing in Kenya has been minimal (MED, 2004). This has greatly contributed to Kenya continuously relying on importation of soybean for its agro-processing Arms (Ephanto 1994; Jaffee and Morton, 1995; MED, 2004). This can be attributed to the fact that soybean is mainly grown by small-scale farmers who can barely satisfy the growing demand (Ephanto 1994). Increased import has led to a further decline in production because imports dampen producer's domestic prices. As a result there is low production as farmers shift to more lucrative enterprises such as production of wheat, as importation of raw materials Is a disincentive to production (MED, 2004).

Importation of raw materials for industries may hinder achievement of the country's Vision 2030 goals, particularly the economic pillar.<sup>2</sup> The economic pillarof the Vision 2030 stipulates that manufacturing is among the key sectors that has been identified to deliver the targeted 10 percent economic growth rate per annum, aimed at transforming Kenya into a newly industrialized, middle income country by the year 2030.<sup>3</sup>

It is against this background that the fundamental issue of determinants of demand for soybean as raw material In agro-

Kenya's Vision 2030 is the new long-term development blueprint for the country which alms at creating "a globally competitive and prosperous country with a high quality of life by year 2030".

The economic pillar of the vision 2030 aims at achieving an average economic growth rate of 10 percent per annum and sustaining the same till year 2030.

processing firms and related questions are of concern and were investigated.

### **1.3 Research Questions**

The broad question of this study is: -

**What factors determine demand for soybeans as a raw material in soybeans processing firms?**

**Specifically, the study looks at the following questions;**

1. Are there constraints that soybean processing firms face in Kenya?
2. Do prices of soybean determine the quantity demanded of soybean?
3. Does age of the firm determine the quantity demanded of soybeans?
- 4. Does demand for soybean vary with firm size in Kenya?**
5. Does the quality of raw material determine quantity demanded of soybeans?
6. Does the quality of infrastructure to the farm gate determine quantity demanded of soybeans by processing firms?
7. What policy issues are relevant in enhancing domestic processing and production of soybeans?

## 1.4 Research Objectives

The general objective of this study is to establish and analyze factors determining demand for soybeans as a raw material in the processing firms.

Specific objectives are:

1. To identify the constraints faced by the soybean processing firms.
2. To establish how prices of soybeans affects their demand.
3. To establish how age of the firm affects demand of soybeans.
4. To establish how the size of a soybean processing firm affects demand of soybeans.
5. To establish how the quality of soybean affects demand in soybean processing firms.
6. To find out how the status of infrastructure within the country determines demand of soybean in processing firms.
7. To explore viable ways of boosting domestic soybean production and processing.

## 1.5 Justification for the study

Although several empirical studies have been documented on soybean production at farm level, studies with specific reference to Kenya on processing of soybean have been scanty. Lack of such Important

information is an impediment to rational reform policies for future development of this sub-sector.

The study is therefore among the first and provides relevant literature containing recent empirical findings for use by stakeholders including policy makers, academics, researchers, private sector and other stakeholders. The literature will also guide In designing appropriate policies to enhance the growth and development of the sub-sector.

The study is in line with the Kenya Vision 2030 which is based on three pillars, namely economic, social and political pillars. Its focus being determinants of demand for raw materials in processing firms complements the economic pillar which aims at providing prosperity for all Kenyans through an economic development programme. The study therefore not only aims at ascertaining the determinants of demand for soybean in processing firms but also explores policies which promotes production and processing to stimulate economic growth.

#### 1.6 Organization of the study

The paper is divided Into six chapters. The first chapter is an introduction to the study, where background information; problem statement; research questions, objectives, justification and organization of the study are discussed. The second chapter looks at the literature review among the literature reviewed is the Importance of food processing, demand for soybean in Kenya and constrains facing food processing in Kenya. Theoretical framework and hypothesis are also discussed in this chapter. Study methodology is looked at in

chapter six which also includes the challenges that the researcher faced during collection of the data.

Chapter four presents the characteristics of the surveyed firms and the products processed from soybean by these firms. Study findings on the determinants of demand for soybean are presented in chapter five. In addition chapter five also presents the constraints faced by the soybean processing firms and the strategies that can be used to address them. Finally, chapter six presents a summary of the findings; conclusions; policy recommendations; and areas for further research.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

### 2.1 LITERATURE REVIEW

#### 2.1.1 Introduction

The literature reviewed informs the analysis in terms of understanding investigating the problem. In other words, it enables us to find out what has been studied so far, establishes existing knowledge gap, and gives insights into the kind of additional data needed. A significant gain for the study is in terms of being more focused and avoiding duplication.

The literature reviewed is divided into several sub-topics which include: importance of soybean; importance of food processing; constraints faced by processing firms; demand for soybean In Kenya and conclusion.

#### 2.1.2 Importance of soybean

Soybean is a type of edible oil-crop of great nutritional value and has been variously described as a "miracle bean" or a "golden bean" because it is a cheap protein-rich grain (Osho and Dashiell, 1998, Sanginga, *et. al*, 1999). Its importance ranges from milk production, oil processing, livestock feeds, industrial uses and human consumption

of the bean (Addo and Oguntona, 1993). Major soybean products include; soy oil, soy meal, soy cake and the full fat soy flour (Ephanto, 1994).

Many authors have discussed the nutritional value of soybean. It is reported to be more protein-rich than any of the common vegetable or animal food sources available. It contains 40% high quality protein, 20% edible vegetable oil, and a good balance of amino acids and has, therefore tremendous potential to improve the nutritional status and welfare of the poor (Chianu and Vanlauwe, 2006; Ephanto, 1994; FAO, 1994; Sanginga, *et al*, 1999). The cost of protein, when purchased as soybean, is only about 10-40% of the cost of protein from fish, meat, eggs, or milk (<http://web.worldbank.org>). Soybean has therefore been considered to be one of the leading options for alleviating protein-energy malnutrition in Africa and is viewed as the world's biggest protein reserve (Osho and Dashiell, 1998). In Kenya therefore, soybean can make a significant contribution towards nutritional welfare and in terms of addressing food security of the rapidly expanding Kenyan population (MED, 2004). In addition, Matthews (1989) argues that flours and concentrates made from legumes other than soybean have had little commercial success than soybean.

Although industrialized nations such as USA have developed a major soybean processing industry to exploit the crop as a cheap source of protein, developing countries have failed to exploit this cheap source of protein. Indeed Chianu and Vanlauwe (2006) in their study argue that as much as the government and development partners in Kenya have carried out several initiatives to promote soybean, they have not really succeeded. Therefore, in regard to this, there is need to find out



the constraints the processing firms are facing which hinder progress, and how to address them to promote soybean processing within the country.

### **2.1.3 Importance of food processing**

Food processing is one of the most important industries with extensive multiplier effects. All the raw materials and part of energy inputs come from agriculture (Abbott, 1988; ITDG, 1999 and MED, 2004). All this in terms of employment in agriculture, industry, transport, among others, is of enormous consequence. Processing adds variety to popular diets and makes food available at all times when otherwise it would be lacking (Abbott, 1988). This means that value addition of farm produce through processing is important as it improves the food value of farm produce. Moreover, in addition to making more food available, development of the food processing industry stimulates development of other sectors and provides employment opportunities, both directly and indirectly (Alemayehu, 2000; Battcock et. al., 1998; Kibuthu, 1996).

Food processing firms provide backward linkages with agriculture and forward linkages with consumers and other industries (Abbott, 1988). For Instance, the former uses oil-bearing crops such as soybeans as raw materials from agriculture and the latter includes the further product processing and converting by-products and waste into useful products, such as animal feeds (MED, 2004 and Jaffee and Morton, 1994). In line with this, soybean processing has strong linkages especially In the areas of processing of various products for human consumption, Industrial oil and animal feeds, all of which contribute

positively to employment, income generation, and poverty alleviation (Kibuthu, 1996; Osho and Dashiell, 1998; and Sanginga, et. al., 1999).

Food processing also improves food security by increasing both the availability of and access to food throughout the year (Osho and Dashiell, 1998; Jaffee and Morton, 1995). This is due to the fact that when perishable products are processed they last longer than the normal time. This ensures accessibility of sufficient food to live a healthy and productive life. In relation to this, processing of soybean has a vital role to play In Kenya's economy. This is mainly in terms of meeting the persistent deficits in food that has continued to face the country, generating incomes and employment through production activities, processing and linkages with other sub-sectors of the economy such as animal feeds Industries (MED, 2004; Osho and Dashiell, 1998 and Sanginga, et. al, 1999). Optimizing linkages could conserve resources and bring additional benefits to the producers and consumers. For these reasons those engaged in processing should take measures to maximize linkages (Alemayehu, 2000).

Battcock *et al.* (1998) argue that food processing can contribute to improved nutrition both directly (by making foods more available by preserving them) and indirectly through generating income with which to purchase other diet sources. In addition, the value added through processing and marketing agricultural products such as soybean can be much greater than the value of the raw materials themselves (ITDG, 1999). Processing of soybeans would hence provide both the necessary nutrients and economic empowerment of the people (MED, 2004).

Improvements in food processing significantly improve self-sufficiency in food as well as minimize price fluctuations between post-harvest gluts and pre-harvest shortages (Alemayehu, 2000). Increasing the shelf-life through processing coupled with proper storage could substantially reduce losses and permit the carryover of food products between seasons.

It is anticipated that there will be an increased usage of processed products in the coming years due to growth in urbanization and change in lifestyle (ITDG, 1999 and Teklu, 1996). FAO (1993) in line with this has argued that the increased domestic processing would have important implications for food security, by reducing dependence on imported products and lessening the risk of price shocks.

Adding value to agricultural products also improves global competitiveness of domestic products, leading to an increase in a country's Gross Domestic products (GDP) (Ikiara *et al*, 2002). The above authors have generally looked at the importance of processing of farm produce but this study is specific on processing of soybean.

#### 2.1.4 Demand for Soybean in Kenya

**Table 2.1: Kenya's Soybean Imports for Agro-processing**

	US Dollars					
Soy products	2002	2003	2004	2005	2006	2007
Soybeans	188,271	301,507	1,971,970	2,742,418	2,754,713	12,312,297

Sources: Global Trade Atlas

Table 1 above indicates that importation of soybean as a raw material in Kenya has continued to increase. The problem can be attributed to

the fact that there is high industrial demand which cannot be catered for by the country's production. In connection to this, Ephanto (1994), EPZA (2005) and MED (2004) have argued that production of soybean in Kenya is low compared to its demand. MED (2004) has also pointed out that although soybean has been grown in Kenya from as far back as 1904, the crop has had little attention in terms of the overall agricultural sector policy and development agenda compared to other major cash and food crops grown in the country. This is reflected by the fact that there has never been a specific Government policy for not just soybeans but also the overall edible oil industry. Low production therefore has led to reliance on imported soybean for processing.

However, although there is an apparent high import dependency of soybean, Kenya has a considerable potential for production and processing of soybeans which has remained largely unexplored and unexploited. Soybeans can thrive in Kenya, including the country's marginal areas with low rainfall, which are unsuitable for other conventional food and cash crops (Kibuthu, 1996; Mbwika, 1996; MED, 2004 and Theora, 1995). The diversity of the country's climatic conditions makes it possible to grow a wide variety of oil crops among them soybean. The largest potential for expansion of oil crop production lies in the Arid and Semi-arid lands (ASAL), where oil crop, can do better than most other crops due to their relative drought tolerance (MED, 2004 and Theora, 1995).

Kibuthu (1996) points out that the development of oilseed In ASAL increases production of raw materials, opportunities for productive employment in the rural areas, regional equity in growth and more equitable income distribution. This would go a long way In alleviating

the current serious problems of lack of raw material for processing, unemployment, poverty and rural-urban migration.

In addition to the promotion of soybean production to cater for the high demand, there is need to upgrade efficiency of the processing firms (Kibuthu, 1996; Mbwika, 1996). This is because the cost of production compared to other major sources of protein and oil, soybean has low per unit cost of production (FAO, 1993). Livestock protein and oil sources require more capital outlay, expansive land, and higher labour inputs. The high cost of production implies low supply of raw materials for agro processing leading to low profitability which discourages small-scale producers as they are high-risk enterprises (Ephanto, 1994).

MED (2004) argues that there is high demand for soybean in major sectors utilizing soybeans such as the food aid sector, livestock industry and industries involved in the processing of human food, especially those inclined towards dietary needs and hospitals. MED (2004) continues to argue that demand for soybeans for human consumption in Kenya is mainly as food supplements (e.g. unimix) and is largely dependent on relief food requirements, which fluctuates significantly from time to time.

According to Kibuthu (1996), the end products in processing have a ready market in Kenya. High consumer prices for edible oils provides, an opportunity to produce oilseeds such as soybean in Kenya (MOALDM, 1995).

According to MED (2004), soybean is produced in Western, Rift Valley, Eastern, Central and Nyanza Provinces by small-scale farmers. Western Province stands out as the leading area accounting for nearly 50% of total national smallholder planted area and production in 2003.<sup>1</sup> In relation to this, Ephanto (1994) also points out that soybean is mainly grown by small-scale farmers and is not grown in large quantities to satisfy the demand by processing firms. This means that there is a limited supply of soybean as a raw material in processing firms compared to its domestic production (MED, 2004).

Jaffee and Morton (1995) points out that productivity of processing firms are determined by availability and accessibility of raw materials. Looking at the situation of soybean processing in Kenya, MED (2004) argues that a large proportion of soybean processing industries in Kenya rely on imported soybean.

From these studies it can be concluded that production of soybean is low compared to its demand. The authors have also argued that firms import soybean due to low production within the country, however there could be other reasons for importation of soybean that these studies have not captured. The studies in addition have not looked at processing at firm's level and have not also shown how production and processing of soybean could be boosted in order to exploit the country's potential.

The main districts where soybeans are grown in western province are Busia, Bungoma, Teso, Kakamega, Butere/Mumias, Mount Elgon, Lugarl and Vihiga.

### 2.1.5 Constraints facing processing industries in Kenya

High demand for raw materials and its availability and accessibility means higher level of production in the firms (Jaffee and Morton, 1995). This leads to improvement of producers' incomes as firms offer a stable outlet for their produce. This leads to increase in income for the producers and this trickledown effect eventually leads to high demand for processed products. However, food processors in Kenya face a number of constraints which have been highlighted by several authors among them Jaffee and Morton, 1995; EPZA 2005; Ikiara *et al.* 2002; Kimuyu, 1999 and Gicheru 2005.

One constraint facing processors is lack of reliable and adequate supply of raw materials (Jaffee and Morton, 1995; EPZA 2005; Ikiara *et al.* 2002; Gicheru 2005). Processing is based largely on imported raw materials (ITDG, 1999; Kimuyu, 1999 and MED, 2004).

Another constraint is lack of resources. Theora (1995) argues that oil-crops such as soybean receive a very small share of the country's resources, including land. Most farmers who grow such crops in Kenya work on small holdings and allocate less than one-tenth of their land. He continues to argue that although growth opportunities exist, previous development and promotional efforts in oil-crops are still accorded lower priority compared to the other crops in the allocation of public-sector investment funds.

Ministry of Agriculture, Livestock Development and Marketing (MOALDM) (1995) argues that major constraints restricting the growth of the sector have been lack of incentive prices to the producers

because of dumping of cheap processed products into the country. This has discouraged domestic processors from providing incentive prices to the producers (EPZA, 2005 and Theora, 1995).

Moreover, Kibuthu (1996) and Mbwika (1996), note that the processing sector suffers from low capacity utilization. Large amounts of food, especially seasonal produce are wasted for lack of preservation and inadequate processing, thus contributing to the growing food shortage. Underutilization of capacity means that less output is generated from a unit of capital equipment than the case would have been if capital were fully utilized. In other words, the actual capital-output ratio is higher than the full capacity capital-output ratio. Underutilization of productive capacity is an unfavourable phenomenon in that it deprives society of the output of required goods as it negatively affects productivity of the firms, leading to high unit cost of production. The result has been high unit costs of production, disincentive to modernize, discriminatory duty structure, competition from cheap imports, and processing inefficiency. The sector is ultimately caught in a low investment low productivity trap leading to high inflation and balance of payment problems.

In addition, there is no organised marketing because production is small scale, scattered and also faces a grossly unequal competition from imports. Production is not able to develop because the right kind of marketing facilities do not exist and are not favourable to the producer. Furthermore, factory gate prices of imported products are much lower than the price of locally produced products (EPZA, 2005; Kibuthu, 1996; Mbwika, 1996).



EPZA (2005) also notes that the major problems constraining production include low profitability, lack of adequate processing, competition from low priced edible oil imports, and inadequate research and extension efforts.

Other constraints as stipulated by Ephanto (1994) are both current and historical factors including: ignorance at the policy level, biased programmes in support of selected commodities that serve particular objectives, lack of market, lack of awareness by producers on market outlets and utilization, introduction of soybeans in farming systems not accompanied by a package of husbandry practices, lack of adequate marketing organisation and information by the farmers.

#### **2.1.6 Conclusion**

The emphasis has mostly been placed on increasing crop production to improve food supplies with less emphasis being placed on processing. It can also be said that there are good prospects of value adding to farm produce. However, there is scanty empirical literature addressing issues related to processing of soybean and specifically determinants of demand for soybean as a raw material. The study therefore seeks to address this knowledge gap by looking at the determinants of demand for soybean in processing firms in order to increase the level of processing.

The methodologies used by authors in the reviewed literature relied heavily on secondary data whereas this study has used both primary and secondary data collection.<sup>5</sup>

## 2.2 THEORETICAL FRAMEWORK

### 2.2.1 The theory of supply and demand

This study is informed by the theory of supply and demand. This theory describes how prices vary as a result of a balance between product availability at each price (supply) and the desires of those with purchasing power at each price (demand) (Begg, *et al*, 2005; Mankiw 1998). The law of demand states that, 'if all other factors remain constant (*ceteris paribus*), the higher the price of a good, the less the demand for that good. In other words, the higher the price, the lower the quantity demanded, otherwise more goods will be demanded at lower prices. Therefore, there is an inverse relationship between price of a product and quantity demanded. The law of supply states that 'as the price of a good rises, the quantity supplied of the good rises, and as the price of a good falls, the quantity supplied of the good falls', meaning a positive relationship between quantity supplied and the price of a good.

The quantity of a good that buyers purchase at a higher price is less because as the price of a good goes up, so does the opportunity cost of buying that good. As a result, people will naturally avoid buying a product that will force them to forego the consumption of something

<sup>5</sup> Primary survey is whereby face to face interview has been carried out using an open and close ended questionnaire.

else they value more (Begg, *et al*, 2005; Mankiw 1998). The demand for a good can increase or decrease. It Increases if people are willing and able to buy more of the good at all prices. When more people effectively demand something (i.e. demand backed up with the ability to pay and the willingness to pay), the quantity demanded at all prices will tend to Increase. This is usually referred to as an 'increase in demand'. Increased demand can be represented on the graph as the curve being shifted to the right. This is because at each price point, a greater quantity is demanded. It is the shifts in demand and supply curves that cause the market price to change, not changes in the price that cause demand and supply curves to shift.

In theory, a number of other factors influence demand. These Include; change in tastes and preferences (where the same consumers may desire more of the same good than they previously did), price of related goods (i.e. substitutes and complements), income, size of the firm, age of the firm, expectation of future prices, quality of a product, season, weather, availability, advertisement, among others (Begg, *et al*; 2005; Lundvall and Battese, 1997; Mankiw, 1998; McCormick, 1993 and Muchiri, 2006). An increase in consumer income will increase demand for the good (Begg, *et al*, 2005).

Insofar as one good can be substituted for another, the demand for the two kinds of goods will be bound together by the fact that customers can trade off one good for the other if It becomes advantageous to do so. Thus, an increase in price for one kind of good (*ceteris paribus*) will result in an increase in demand for its substitute goods and a decrease in price (*ceteris paribus*) will result in a decrease In demand for its substitutes. Therefore, there is a positive

relationship. A decrease in the price of a complement good will raise the quantity demanded, meaning there is a negative relationship.

The size of the firm also determines quantity demanded. As the firm grows in size, quantity demanded of its raw materials increases (McCormick, 1993; Lundvall and Battese, 1997). Lundvall and Battese (1997) point out that the larger the enterprise in terms of the number of employees, the higher the quantity demanded for its raw materials. Ikiara *et al.* (2002) have also found a strong positive relationship between size and efficiency of a firm. McCormick (1993) argues that growth of enterprises depends on its size and the number of years in existence since its inception. Kimuyu (1999) argues that the age and size of an enterprise are important determinants of the progression toward its efficiency, implying that efficiency is the outcome of a learning process that also permits enterprise growth. In other words, firms' age determines quantity demanded, whereby older firms are expected to demand more compared to younger firms. On the other hand, large enterprises (in terms of the number of employees) are expected to demand more for processing compared to medium enterprises. Medium enterprises are expected to process larger quantities of products compared to small, and small enterprises are expected to process more than micro enterprises.

Demand is also determined by quality of a product (Kaneko and Chern, 2003 and MED, 2004). Kaneko and Chern (2003) point out that though demand analysis has traditionally dealt with demand for homogeneous goods that is determined by a set of relevant prices and demographic variables, demand for quality need not be determined by the same set of variables. Even if there is an objective measure of

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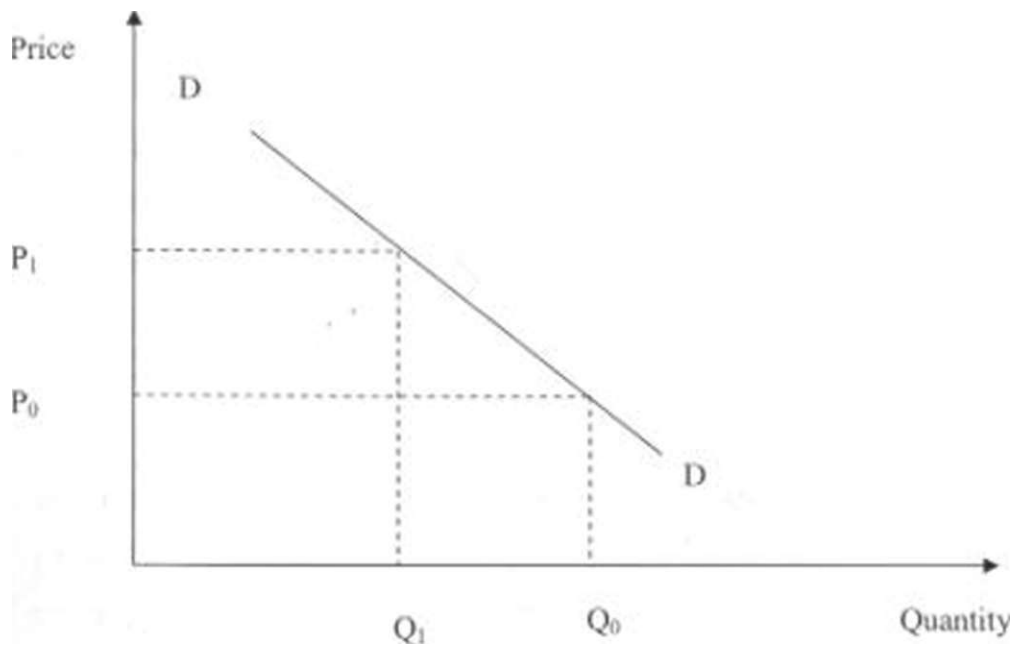
particular quality, it does not follow that all consumers perceive quality in the same way. It is possible that some quality yields a positive utility for some people but negative utility for others.

According to MED (2004), there are different qualities of soybean. MED (2004) defined quality as the composition of protein of a given sample of soybeans. The levels of these components help determine the processed value of soybeans products. Hence, the level of protein has a direct impact on the quantity of soybeans demanded. For the purpose of the study, quality is defined as the composition in terms of protein content of a given sample of soybeans, size of the bean and the cleanliness of the produce. The study will establish how the quality of soybean affects its demand, by finding out whether the processors look at the protein content of soybean before buying them.

As applied in the study, it is hypothesized that quantity demanded by the processing firms is a function of the prices of soybean, size of the firm, age of the firm and quality of soybean. Deriving from the above theory it is expected that, other things being constant, quantity demanded of soybeans by a processing firm will go up as a firm grows in size i.e. the number of employees. Quantity demanded is also expected to increase depending on the number of years a firm has been in operation i.e. the years it has been in operation since its inception. Prices are expected to determine demand of soybean in such a manner that as they go down quantity demanded of soybean increases and vice versa. Figure 1 below shows how prices of soybeans, *ceteris paribus*, are expected to determine quantity demanded of soybean by processing firms. As prices increase from  $P_0$  to  $P_i$ , quantity demanded decreases from  $Q_0$  to  $Q_i$ , meaning the

relationship is expected to be negative.

**Figure 1: Expected relationship between prices of soybeans and quantity demanded**



Source: Author's conceptualization

There has been a great deal of empirical application of the demand theory to assess determinants of demand. These efforts have mainly been in the analysis of the determinants of demand on several commodities carried out in different countries. Through application of the theory several factors have been identified as determinants of demand. These include level of processing, price, quality of raw materials, level of infrastructure, level of income, advertisement, prices of related products, accessibility of raw materials among others. These include Muchiri (2006) who carried out a study with the main objective of establishing the factors determining demand for non seasonal produce; Goddard and Glance (1989) whose study aimed at

understanding demand for fats and oils in Canada; Eales and Unnevehr (1988) whose main objective was to understand demand for beef and chicken products; Schmitz and Seale (2002) with the aim of understanding import demand for fresh fruits in Japan; and a study by Bansback (1995) whose aim was to establish determinants of meat demand.

Study hypotheses are as follows:-

1. Constraints faced by soybean processing firms are not significant in determining the quantity demanded of soybean by the soybean processing firms.
2. The age of the firm since inception is not significant in determining the quantity demanded for soybean by the soybean processing firms.
3. The size of the firm is not significant in determining the quantity demanded for soybean by the soybean processing firms.
4. Prices of soybean are not significant in determining quantity demanded for soybean by the soybean processing firms.
5. Quality of soybean Is not significant In determining quantity demanded for soybean by the soybean processing firms.
6. The quality of infrastructure is not significant in determining quantity demanded for soybean by the soybean processing firms.

I



# CHAPTER THREE

## 3.0 STUDY METHODOLOGY

### Introduction

This chapter discusses methods and principles used to carry out the survey. Specifically, it presents the study site, sampling procedure, data collection, data analysis and presentation. Discussed also are challenges encountered in the process of data collection and how they were addressed and finally operationalisation of variables.

### 3.1 Study Site

The study site is the City of Nairobi. It is characterized by an agglomeration of economic activities and high concentration of international, regional and national institutions. Nairobi is the principal industrial centre of Kenya. According to the 1999 population census, Nairobi is home to 2.2 million people with a population density of 3079 people per Km<sup>2</sup> (KNBS, 2007). There is no current data on the exact population size. However, due to the rapid rate of population growth and rural-urban migration, there is a possibility that the population is far much higher than the above statistics. This population poses new and different challenges of food, meaning that food consumption have increased tremendously calling for increased levels of supplies.

The general characteristic of urban areas such as Nairobi is that the cost of traditional staple foods is often higher; while the cost of

processed food is lower. Therefore, diets in urban areas are based more heavily on processed foods (<http://foodafrica.nri.org>). This is the case with Nairobi being the capital city with high demand for processed products. According to EPZA (2005) most of the soybean processing firms In Kenya are located and/or headquartered in Nairobi. In relation to this, the recent list of soybean processing firms from Kenya Soybean Association (KESA) dated 1998 indicates that more than eighty per cent of these firms are located in Nairobi. Therefore, this is the more reason why Nairobi city was chosen as a study site. Another reason for the choice of Nairobi is that it was easily accessible for the researcher.

### **3.2 Sampling Procedure**

Sampling procedure is defined as the selection of some part of an aggregate or totality on the basis of which a judgement or inference about the aggregate or totality is made. In other words, it is the process of obtaining information about an entire population by examining only a part of it (Kothari, 2004).

Cross-section survey was carried out and the basic sampling unit or unit of analysis was the soybean processing firms.<sup>6</sup> Probability sampling was employed to give an equal chance to every firm of being incorporated into the sample. Soybean processing firms currently in operation in Nairobi city were compiled from the most recent Kenya Soybean Association's (KESA) list dated 1998 of soybean processing firms and Kenya Directory of Manufacturing Industries obtained from

\* Babble (1998) defines the unit of analysis as the specific objects or elements whose characteristics are wished to be described or explained and about which data is collected.

Kenya Industrial Research and Development Institute (KIRDI) (1997). KESA has listed 103 such firms within the country and KIRDI has listed the firms as food processors but not specifically soybean processors. Kenya telephone directories were used to obtain the addresses of these firms. All the firms in Nairobi were contacted to confirm that they are still in operation and actually process soybeans. They were also asked to give the actual figure on the number of employees in order to determine the size of the firm. This exercise led to an effective sampling frame of 57 soybean processing firms.

The Information obtained was used to carry out stratified random sampling whereby firms were stratified according to their sizes (using the number of permanent employees as a measure of size). The usefulness of the stratification was to ensure representativeness of the sample.

In using size to stratify the firms, the definition of Parker and Torres (1993) on sizes of firms was adopted. According to them, the sizes of firms are classified into four criteria as follows:

- (1) Micro enterprises: These are enterprises employing a maximum of 10 workers (including the working owner),
- (2) Small enterprises: These are enterprises employing more than 10 and up to a maximum of 50 employees
- (3) Medium enterprises: These are enterprises employing more than 50 and up to a maximum of 100 employees
- (4) Large enterprises: These are enterprises employing over 100 employees.

Following Parker and Torres (1993), soybean processing firms were classified into four groups: Micro, Small, Medium, and Large

enterprises. The compiled list indicates that there were 16 micro enterprises, 19 small enterprises, 7 medium enterprises, and 15 large enterprises making a total of 57 soybean processing firms (see appendix I). Out of these, 32 firms (9 micro enterprises, 11 small enterprises, 4 medium enterprises, and 8 large enterprises) were sampled for survey. It could not have been possible to interview the entire population due to time and resources constraint. Nevertheless, the sample size was considered to be representative of the population frame. The sampling was done using proportionate sampling technique (whereby the population was stratified into relevant subgroups and random sampling carried out within each subgroup). For the sampling to be proportionate, stratified random sampling was carried out whereby the sampling Intervals were identical in each stratum. Firms from each group were assigned a number, written on small pieces of papers that were of the same size, quality and colour. These papers were folded, put in a container, mixed, and picked one piece of paper at a time without replacement until the numbers picked corresponded to the sample number required for that group. This procedure was repeated for all the four groups.

### 3.3 Data Collection

In this study both secondary and primary data were used. Primary data came in handy to complement and add new dimensions to secondary data. In other words, the data was gathered through desk top research and through survey research. The study used a semi structured questionnaire containing both open and closed ended questions as a tool for collecting primary data Information (see appendix II). Unlike self-administered questionnaires, face to face

interviews were preferred as they allowed the researcher to probe for more information from the respondent. Before embarking on the cross section survey, questionnaires a pilot test was carried out whereby the tool was pre-tested to establish its reliability. This helped the researcher to establish the questions which seemed not to be clear to the respondent and revise them for clarity.

The questions were grouped into the following broad themes: (a) general Information (b) availability of soybean (c) constraints (d) quality of soybean (e) prices of soybean (f) prices of substitutes (f) ways of increasing domestic production and processing of soybeans. The survey targeted top management who were conversant with procurement in their firms such as directors, managers and accountants. To save on time and financial resources, the researcher booked appointments prior to the visits.

To obtain secondary data, a wide scope of literature was reviewed in relation to the study. The main aim of reviewing the secondary sources of data was to Identify existing knowledge gaps, problem to be addressed by the study and inform areas to lay emphasis on. Secondary data therefore helped to establish what is already in existence in relation to the current study and explanations that have been offered concerning relationships among variables. Secondary data was collected through review of existing literature from books, Journals, dissertations, internet and reports.

### **3.4 Challenges faced during data collection and how they were addressed**

The researcher experienced some challenges during data collection. First, getting the list of soybean processing firms was very difficult. It had earlier been anticipated that the list could easily be obtained from the Kenya National Bureau of Statistics (KNBS) but unfortunately, this was not the case. It turned out that KNBS did not have a specific list for soybeans processing firms. Nevertheless, the researcher visited other institutions such as Kenya Industrial Research Development Institute (KIRDI) and Kenya Soybean Association (KESA). The list obtained from KESA was specific though not comprehensive. The list obtained from KIRDI was not specific and therefore firms from the two lists were contacted to verify their existence and whether they were currently processing soybean.

Secondly, before embarking on the field interviews, a letter of recommendation had to be obtained from the Registrar of the Institute for Development Studies (IDS) of the University of Nairobi. The letter of recommendation was intended to allay any apprehensions and to ensure co-operation from firms. Unfortunately, even after presenting the letter, security personnel were still apprehensive and denied the researcher entry to the premises until a confirmation from their bosses that the researcher had booked an appointment prior to the visit. This meant that a lot of time was wasted before getting access to the firms.

It was also a challenge that some firms were reluctant to be interviewed. These firms had to be contacted several times before consent was granted for an interview. Some of those that gave

consent and appointment date and time it turned out were not available when the researcher went to carry out the planned interview. The researcher was therefore forced to cancel the appointment and call later to book an appointment afresh. She had to confirm new appointment before embarking on the journey to the firm to save on scarce resources. Due to such delays and postponement of appointments, the researcher was faced with another challenge of time and financial resources constraints.

### **3.5 Data analysis and Presentation**

Both descriptive and statistical analytical methods were used in the study. Data collected was analyzed both quantitatively and qualitatively. All completed questionnaires were cross-checked for data integrity, completeness and consistency. It was then coded and entered into the computer, weighted and finally analysed. The data was analysed using Statistical Package for Social Sciences (SPSS) and Microsoft excel. SPSS helped in coming up with frequency distributions which were presented as brief summaries of the data collected. SPSS was also used to carry out cross tabulations such as test of significance, correlation analysis and regression analysis. It aided in the testing of the hypotheses.

Correlation analysis was used to establish the relationship between (a) quantity demanded of soybeans by the processing firms and the size of the firm, (b) quantity demanded of soybeans by the processing firms and the age of the firm, (c) quantity demanded of soybean by the processing firms and the prices of soybean. Regression analysis was carried out to determine the causal relationship between the

variables. Specifically it was carried out in respect to explanatory variables (age of the firm since inception, firm size and the price of soybean) to find out the elasticity of demand for soybean by the processing firms.

Frequency distributions in form of percentage values were used to analyse quality of soybean, availability of soybean and also the products being processed from soybean by the firms. The findings were then presented with the aid of frequency tables and bar graphs which were accompanied by explanations depending on the specific objective.

Qualitative data analysis entailed coding and organizing it into themes and concepts. From these the emerging patterns were noted and interpreted in view of the study objectives. Where necessary, these were used to expound on some of the quantitative aspects in the study. Constraints faced by the soybean processing firms were analysed qualitatively and no statistical tests were conducted on these qualitative variables. Descriptive analysis of all independent and dependent variables in the study was also conducted. The inferences made from the analysis are therefore representative of the status of the industry in Kenya.

### **3.6 Operationalisation of the variables**

Operationalisation of the variables was carried out as follows in order to test the hypotheses stated in the study.



### **3.6.1 Dependent / explained variable**

#### *Quantity demanded of soybeans*

In this study quantity demanded of soybean is the dependent or explained variable. It is defined as the quantities in tonnes that the food processing firms are not only willing to purchase but are also able to buy at a given price within a given period of time. This variable is measured by establishing how many tonnes of soybeans were bought by the soybean processing firms in the past one year. This data was collected from the records kept by the processing firms.

### **3.6.2 Independent / explanatory variables**

#### *Price*

The study defined price as the amount of money in Kenya shillings used to purchase a ton of soybeans within a given period of time. Price for soybean was measured by establishing on average the amount of money (in Kenya shillings) paid per ton by soybean processing firms in the past one year. It was therefore expected that from the theory of demand the higher the price for soybeans, other things held constant, the lower the quantity demanded and vice versa. Therefore, an inverse relationship was expected, thus a negative sign.

#### *Size of a firm*

Firm size was determined by the number of employees, meaning the total number of people working in an enterprise and who may or may

not be paid salaries or wages. They may include any owner/operator, family members working in the business, and fully paid workers who are permanently employed. From the literature a positive relationship is expected between this variable and quantity demanded of soybean by the processing firms.

#### *Age of the firm*

In order to establish the age of an enterprise, the year an enterprise started its operation was established. Then the actual year of study (2007) was used to determine the age of the enterprise by deducting the year an enterprise started its operation from the current year. A positive relationship is expected between the number of years the firm has been in operation and the quantity demanded.

#### *Quality of soybean*

Quality of soybean in this study was defined in terms of the percentage composition of protein content of a given sample of soybeans. It was also defined in terms of the sizes of the bean and moisture content. '

' Bigger sized soybean is considered to be of higher quality

## CHAPTER FOUR

### 4.0 FIRM'S CHARACTERISTICS AND MAIN PRODUCTS PROCESSED FROM SOYBEAN

#### Introduction

In this section an introductory description of the firms interviewed is undertaken. The main aim is to provide a general overview and outline key features of the firms that were visited and interviewed. This section also looks at the main products being processed from soybean by the firms that were interviewed.

#### 4.1 FIRM'S CHARACTERISTICS

##### *Ownership and shareholding of the processing firms*

The following definition by Stokes (1998) was used to describe ownership of the firms during the interviews. A public limited company is defined as a legal body, which has a separate identity to that of its owners. It can be bought and sold as a whole, or in part, go bankrupt without its owners suffering the same fate. It may issue securities to the public through among others, an initial public offer (IPO) and may be traded on a stock exchange. In contrast, private companies, may issue stock and have shareholders. However, their shares do not trade on public exchanges and are not issued through an IPO. A sole proprietorship is defined as a business where the owner(s) are inextricably linked to the business and not separate from it. A sole proprietorship is unlike a public limited company, in that the owner is

the business, that is, there is no legal separation between the assets and liabilities of the business and the assets and liabilities of the individual who owns it. A family business is a business owned, controlled, and operated by one or more member(s) of one or different families.

From the analysis it was found out that 34.4% of the firms interviewed were private companies, both sole proprietorship and family owned were 25% respectively and 15.6% were public limited companies. This indicates that majority of the firms interviewed were private companies (see Table 4.1).

**Table 4.1: Type of ownership of survey firms**

Type of Ownership	Frequency	Percentage
Private company	11	34.4
Sole proprietorship	8	25.0
Family	8	25.0
Public limited company	5	15.6
Total	32	100.0

Source: Field data 2007

Going beyond a mere classification of the processing Firms into ownership structures, the study looked at the shareholding of the processing firms sampled. The four classes of shareholding evaluated were: (a) where there is complete domestic control of shares; (b) where indigenous Kenyans controlled majority of the shares; (c) where foreigners (non-Kenyans) controlled majority of the shares; (d) where the shares are equally distributed between indigenous (Kenyans) and foreigners (non-Kenyans). Result shows that most (about 78%) of the

processing firm's shares were completely controlled by Kenyans. This is followed by processing firms where indigenous controlled majority of the shares (about 13%). Processing firms where majority of the shares were controlled by foreigners and where shares were equally distributed among indigenous and foreigners are 6% and 3% respectively (see Table 4.2). This result shows that it was only in just 22% of the processing firms that both Kenyans and foreigners joined hands in raising the necessary capital for running the business. In other words, majority (89.6%) of the survey firms are controlled by Kenyans.

**Table 4. 2: Shareholding of the firms**

Shareholding	Frequency	Percentage
Wholly domestic (Complete ownership by Kenyans)	25	78.1
Majority share domestic (Kenyans controlled majority of the shares)	4	12.5
Majority share foreign (foreigners controlled majority of the shares)	2	6.3
50% domestic 50% foreign (shares were equally)	1	3.1
Total	32	100.0

Source: Field data 2007

In addition, the study classified the surveyed firms into two main categories. This was with respect to how they operated (whether locally or multi-nationally). The result indicates that while about 81% of the surveyed processing firms could be classified as local (operating just within Kenya), the remaining ones (about 19%) could be classified as multinational corporations (operating in Kenya and at least one other country).

## 4.2 MAIN PRODUCTS PROCESSED FROM SOYBEANS

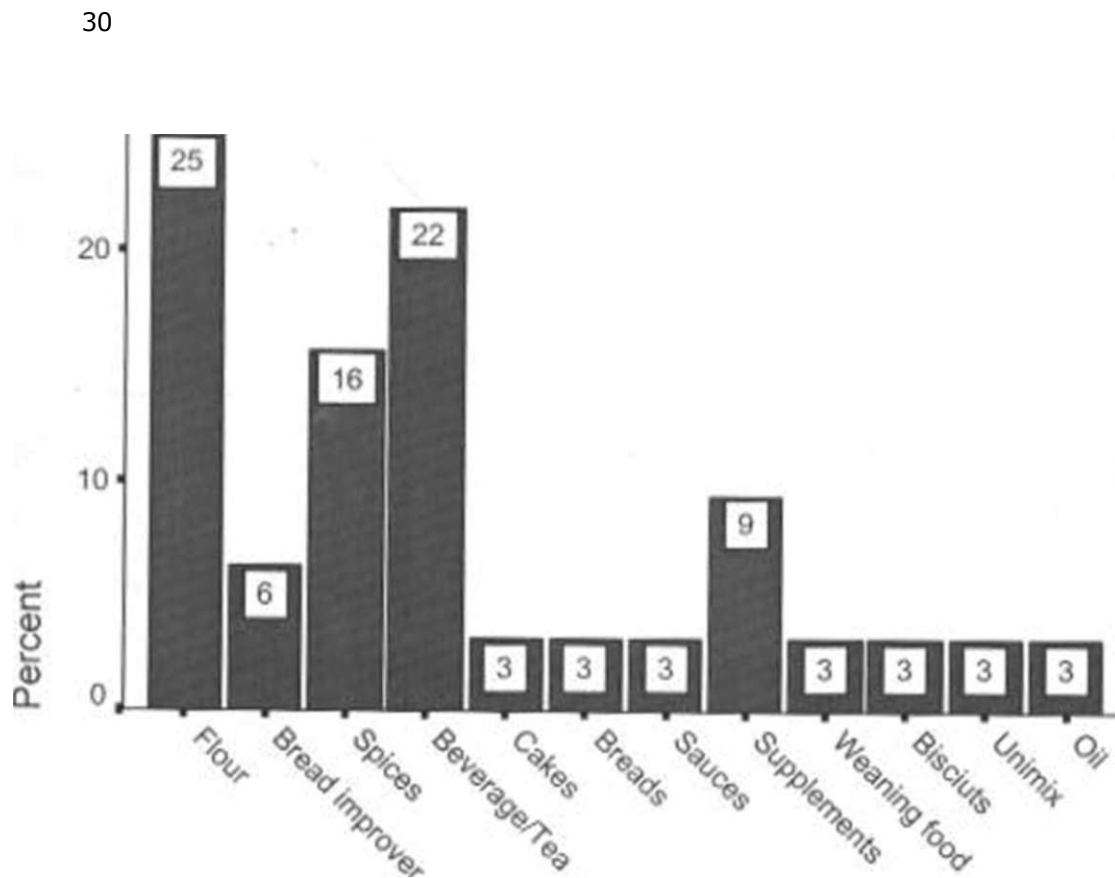
Ephanto (1994) and MED (2004) point out that the major products processed from soybean for human consumption include; soy oil, soy cakes, roasted grain snacks, soy drink/beverage, soymilk, soups, soybean weaning food, soybean bread, sauces, unimix and soy flour.

The findings reveal that several products are processed out of soybeans by the food processing firms In Nairobi. These Include soy flour, soy beverages/tea, soy spices, bread improver, soy bread, soy sauces, and soy supplements. Others are weaning foods, soy cakes, soy biscuits, unimix, and soy oil. Unfortunately, it was rather surprising to note that none of the soybean processing firms in Nairobi process soy milk. This is because they lack equipments or machines for processing soy milk. The imported version of soy milk (mostly from Thailand), which is commonly found in the shelves of supermarkets in Nairobi, is selling for as high as Kenya Shillings one hundred and six (KSh. 106) per litre about twice the price of dairy milk that sells at about Ksh. 60 per litre in Kenya. This indicates that in as much as there is a market niche for soybean milk in Kenya, processing firms have not yet taken an initiative to process it. It is also possible that they are not aware of the existing demand for soymilk in Nairobi.

Of all these processed products from soybean, soy flour (25%), soy beverage/tea (22%) and spices (16%) are by far the most commonly made products among the processing firms Interviewed. They are followed in frequency by the soy supplements (9%) and bread improver (6%). All the other products (soy bread, soy sauces, soy

cakes, weaning foods, soy biscuits, unimix, and soy oil) were not as commonly found to be made (3% each) among the firms interviewed. This is illustrated in figure 2 below.

**Figure 2: Main Products Processed from soybean by the Kenyan Firms**



main products from soybeans

Source: Field data 2007

#### **4.2.1 Classification of processed products under different firm sizes**

Looking at the processed soybean products in relation to the firm sizes, the study reveals that of the 12 processed products (soy flour, soy beverages/tea, soy spices, bread improver, soy bread, soy sauces, soy supplements, weaning foods, soy cakes, soy biscuits, unimix, and soy oil), the micro-enterprises were only involved in processing three products. These are beverage/tea (44%) followed by flour (33%) and spices (22%) (See Table 4.3 below).

The small enterprises processed more products than the micro-enterprises. Of the 12 processed products the small enterprises were involved in processing six products. These are soy spices (27%), soy beverages/tea (18%), soy flour (18%), bread improver (18%), soy bread (9%), and soy sauces (9%) (See Table 4.3 below).

The study reveals that fewer products are being processed by medium enterprises. Of the 12 processed products, the medium enterprises were involved in processing only three products namely soy beverages/tea at 50%, soy flour at 25% and soy cakes at 25% as shown on table 4.3 below. This could be attributed to the fact that the medium enterprises within the study area are few, thus only four firms were interviewed by survey compared to the other sub-groups.

The large enterprises processed a higher number of different soybean products compared to the micro, small and medium enterprises. They were involved in processing seven products which includes flour at 25% being the most popular product. The rest were beverage/tea,



supplements, weaning foods, biscuits, unimix and oil each at 12.5% (see Table 4.3 below).

**Table 4. 3: Classification of Processed Products according to the size of processing firm (in %)**

	Micro- enterprises	Small- enterprises	Medium- enterprises	Large- enterprises
Flour	33.3	18.2	25.0	25.0
Bread Improver	0	18.2	0	0
Spices	22.2	27.3	0	0
Beverage/tea	44.4	18.2	0	12.5
Cakes	0	0	25.0	0
Breads	0	9.1	0	0
Sauces	0	9.1	0	0
Supplements	0	0	50.0	12.5
Weaning foods	0	0	0	12.5
Biscuits	0	0	0	12.5
Unimix	0	0	0	12.5
Oil	0	0	0	12.5
Total	100	100	100	100

Values are the percentages of the various processed product by sub-groups of processing firm

Source: Field data 2007

Combining micro and small enterprises we find that the two categories of firms are involved in processing six products, whereas medium and large enterprises combined are involved in processing eight products. This is in line with the findings by Muhu, (2005) who found out that as

the firms grow in size the level of productivity improves which leads to diversification In production. This therefore means that as the firms grow in size they are able to process more varieties of products due to Improvement In efficiency and economies of scale.

Soy flour was the only product that was processed by all the four categories of soybean processing firms. Soy beverages/tea was produced by three out of the four categories, that is, micro, small and large firms. Spices and supplements were produced by two out of the four categories each (micro and small enterprises for spices; medium and large firms for supplements). The remaining products were basically produced by only one of the four classes of firms and as follows: breads, bread improver, and sauces by small enterprises; cakes by medium enterprises; and weaning foods, biscuits, unimix, and oil by large enterprises. It Is important to note that micro processing firms do not process products that require high level of technology. Similarly, the relatively more sophisticated products (oil, unimix, biscuits, weaning) were only produced by the highest class of processing firms, the large enterprises (see Table 4.3). This shows that while the micro-enterprises class is a learning phase, the large-enterprise class is a phase for processing firms with the necessary resources and equipment to diversify and also venture into new products in order to carve out market niches for themselves.

# CHAPTER FIVE

## 5.0 DETERMINANTS OF DEMAND FOR SOYBEANS

### Introduction

In this section, factors determining demand for soybean in the processing firms are discussed. The discussion is based on study findings from the 32 firms that were interviewed. Although not all firms were surveyed, this sample size was considered to be representative of the population frame. Correlation and regression analysis are carried out to establish the relationship among dependent and Independent variables. In addition, the constraints facing these firms together with the strategies to address them are also discussed.

### 5.1 FACTORS DETERMINING DEMAND FOR SOYBEANS

#### 5.1.1 Age and Size of the firm

A significant (at 1% probability level) positive correlation was observed between the size of the firm and the quantity demanded for soybean. The Pearson correlation coefficient between the quantity demanded and the size of the firm was 0.801 (see Table 5.1). This means that as a firm grows in size (increase in the number of employees), that is, moving from a micro to a small or from a small to a medium or from a medium to a large so does the quantity demanded increases. The study therefore reveals that employment of more people will lead an increase in the quantity demanded of soybean by the firms.

The Pearson correlation between the age of a firm and the quantity demanded of soybean was also positive and strong (0.535) (see Table 5.1). This implies that as firm stays in operation from one year to another, its demand for soybean will increase hence, older firms will demand more quantities than the younger ones.

The above findings are consistent with those of Battese (1997); Ikiara *et al.* (2000); Lundvall and Kimuyu (1999); and McCormick (1993). They pointed out that age and firm size of an enterprise are Important determinants of the progression towards the threshold of the best practice and efficiency. They noted that efficiency Is the outcome of a learning process which takes some time and it permits an enterprise to grow. Together with Kimuyu (1999); McCormick (1993) and Muhu (2005), argue that large firms with their greater capacity are less constrained than smaller ones, a situation that enables them to increase their demand for raw materials.

In addition, regression analysis on the size of the firm proves further that there is a significant positive relationship between firm size and the quantity demanded (regression coefficient was 155.7) as shown in table 5.2 below. This means that holding other independent variables constant, *ceteris paribus*, quantity demanded will Increase by 155.7 tonnes if a firm moves from one level to another i.e. from a micro to a small or from a small to a medium or from a medium to a large enterprise.

Regression analysis also established that there is a positive correlation (regression coefficient was 144.3) between the age of a processing

firm and its demand for soybean significant (see Table 5.2). This implies that an older and more experienced firm will demand more than a relatively younger firm in this case. If all other things are held constant, the quantity demanded by a processing firm will increase by 144.3 tonnes year after another.

#### 5.1.2 Price of soybean

As postulated theoretically, the result of the current study is in conformity with the previous findings from other studies that there is an inverse relationship between the quantity demanded and the prices. The result of the study indicates that the Pearson correlation coefficient is -0.637 and significant at a 1% level (see Table 5.1). This means that if prices of soybean go up, the quantity demanded of soybean by processing firms will go down and vice versa.

A regression analysis indicates a negative coefficient between price and quantity demanded of soybean of -0.7 (see Table 5.2). The result means that if other independent variables are held constant, *ceteris paribus*, a unit increase in price will result to a decline in quantity demanded by 0.7 tons of soybean. This means that as the prices of soybean go up by a unit price, the quantity demanded by a processing firm will go down by 0.7 tons. This result is consistent with the law of demand which stipulates an inverse relationship between the prices and the quantity demanded of goods.

**Table 5. 1: Correlation between quantities demanded of soybean and dependent variables**

	Actual age since inception	Firm size	Price per ton
Quantity of soybean demanded	0.535** 0.002	0.801** 0.000	- 0.637** 0.000

Pearson correlation Sig. (2-tailed); \*\* Correlation is significant at the 0.01 level (2-tailed);

Source: Field data 2007

In order to determine the elasticity of demand for soybean by the processing firms, regression analysis was carried out in respect to the explanatory variables. The results are presented in Table 5.2 below.

**Table 5. 2: Regression analysis between quantities demanded for soybean and dependent variables**

	Coefficients	Significance
Constant	22172.0	0.10
Age since inception	144.3	0.06
Price per ton	-0.700	0.09
Firm size	155.7	0.00

Source: Field data 2007

From these findings a demand equation can be derived as follows:

$$Q = 22172 + 144.3X - 0.7Y + 155.7Z$$

Where Q is the quantity of soybean demanded.

X is the age of the soybean processing firm

Y is the price of soybean and

Z is the firm size

The signs of the above equation are as advanced theoretically. The null hypotheses stated in this study are therefore rejected; hence the alternative hypotheses accepted are stated as follows:

1. The age of the firm since inception determines the quantity demanded for soybean by the soybean processing firms.
2. The size of the firm is significant in determining the quantity demanded for soybean by the soybean processing firms.
3. Prices of soybean are significant in determining quantity demanded for soybean by the soybean processing firms.

### **5.1.3 Quality of soybeans**

The findings reveal that quality of soybean is a major determinant of the quantity demanded by the firms. All the respondents indicated that the quality of soybean is an important factor determining demand of soybean in their firms.

Respondents were also asked whether they were interested in organically produced soybean. Fifty percent of the respondents said that they were interested in organically produced soybean as they felt that such soybeans are of high quality. The remaining fifty percent were not keen on the way soybean was grown.

Other major considerations that were reported to determine whether soybean is of high quality are: the protein content, size of the bean,

and moisture content. In relation to these, out of the 32 respondents interviewed, more than fifty nine percent of the respondents said that they are interested in higher protein content of soybean for higher nutritional levels. More than fifty six percent prefer low moisture content in soybean, reason being that the processor will not waste a lot of time waiting for the soybean to dry up to be processed and at the same time the processor will save on costs since low moisture content means lower weight. One half of the respondents prefer the bigger sizes of the soybean than the smaller ones as they felt the bigger sizes are of higher quality than the smaller sizes in terms of protein content (see Table 5.3). It is important to note that the question was open and therefore allowed for multiple responses.

**Table 5. 3: Proportion of the surveyed firms that expressed their desire on quality of soybean**

Parameter	No of firms that said yes	Percentage
High protein content	19	59.4
Preferred soybeans with low moisture content	18	56.3
Preferred large-sized soybean grains	^16	50.0

Source: Field data, 2007

The findings therefore confirm that there is a positive correlation between the quality of soybean and the quantity demanded by processing firms. These findings concurs with Jaffee and Morton, 1994; Kaneko and Chern, 2003; MED, 2004; Nyangito *et,al.*, 2002; and Gicheru, 2005 who pointed out that quality of raw materials



determines its demand. The higher the quality of the raw material used in processing, the higher the value of the processed product. It can therefore be argued from the findings that there is a positive relationship between the quality of soybean and the quantity demanded.

It can be concluded that the higher the quality of soybean the higher the quantity demanded by a processing firm. The study findings therefore reveal that quality of soybean is significant in determining the quantity demanded for soybean by the soybean processing firms.

#### **5.1.4 Level of infrastructure**

Poor physical infrastructure such as roads, energy and telecommunication, was mentioned by more than thirty seven percent of the respondents to affect the level of demand of soybean by processing firms. The respondents indicated that Western Province is the leading area where soybean is grown in Kenya, however, the Province is marginalized in terms of infrastructure development such as roads. Due to poor roads from Western Province the processors said that they are not able to access soybean from this area as transportation cost is exorbitant given that the quantities are small from small scale farmers and therefore they cannot enjoy economies of scale. They argued that it is much cheaper to import in bulk from other countries compared to sourcing them from within the country. This means that the poor state of Kenyan roads has inhibited transportation of soybean from rural areas to processing firms in Nairobi city as well as making it extremely difficult for producers and processors to network.

The finding conforms with Wasike (2001) findings that good status of the road within a particular region determines the ease of transportation of farm produce from one area to another and from producer to processor. This ultimately determines the level of development of the region.

Energy was also mentioned as a major determinant of demand for soybean for processing. The respondent argued that the cost of energy is very high leading to high unit cost of production. In addition, power outages and rationing has brought down the processing levels and has led to low levels of demand for soybean for processing. It was also argued by some respondents that due to inefficiency in power supply, some of their workers have been laid down as they remain idle during rationing period. This has led to a reduction in the quantity demanded of soybean.

Lack of proper telecommunication infrastructure has also hindered efficiency in processing of soybean. This is because processors do not have access to information particularly on the prices and availability of soybean from the producers.

It can therefore be concluded that poor physical infrastructure within the country has hampered transportation of soybean from producers to processors. To meet their supply requirements firms have been compelled to import their soybean in bulk from other countries. This has reduced the unit cost of production as they have taken advantage of the economies of scale.

The study has revealed that there is a positive correlation between the level of infrastructure and the quantity demanded for soybean. Therefore it can be concluded that the level of infrastructure is significant in determining the quantity demanded of soybean by a processing firm.

## **5.2 CONSTRAINTS FACED BY THE SOYBEAN PROCESSING FIRMS**

In order to elicit as much information as possible on the constraints facing the soybean processing firms, an open ended question was asked which sought from the respondents multiple answers on the constraints they were facing.

Soybean processing firms pointed out that they have been encountering certain constraints that negatively affect their processing business. The findings are presented in Table 5.4. The constraints include high prices of soybeans; scarcity of soybean grains; poor quality soybean grains; seasonality of soybeans; poor physical infrastructure; lack of information; high transaction cost; high production cost; and competition from other processors in that order.

**Table 5. 4: Major constraints faced by soybean processing firms**

<b>Major constraints</b>	<b>Frequency</b>	<b>Percentage</b>
High price of soybeans	22	68.8
Scarcity of soybeans	17	53.1
Poor quality soybeans grains	12	37.5
Seasonality of soybeans	7	21.9
Poor physical Infrastructure e.g. roads	6	18.9
Lack of information	6	18.9
High transaction cost	5	15.6
High cost of production	4	12.5
Competition from other processors	3	9.4

Note: This was a multiple response question

Source: Field data 2007

The major constraints are further explained below,

**i) High prices of soybean**

The findings reveal that one of the major constraint processors are facing is the cost of soybean as a raw material in the firms. Specifically 68.8% of the respondents Indicated that they find soybean to be an expensive raw material. They attributed this to the scarcity and seasonality of supply of soybeans which leads to price variations and fluctuations. Firms also attributed high prices of soybean to its low domestic production, therefore they are forced to Import soybean from other countries such as Uganda, India, and Democratic Republic of Congo, among others. Importation of soybean increases the prices due to border transaction costs, transportation and also costs related to corruption at the entry points.

Some of the suppliers of soybean to processors in Nairobi who were interviewed felt that even though processors were complaining of high prices from producers, the prices offered to the producers are still very low. They argued that the cost incurred during production, transportation and other overheads are still relatively high compared to the prices offered by the processors.

## **ii) Scarcity of soybean**

Scarcity of soybean has led to high cost of soybean which has pushed up the cost of production. This has led to increase in consumer prices of the processed products. Our findings reveal that firms face a major challenge sourcing for soybean. Firms that pointed out that there is scarcity of soybean within Kenya were 53.1% of those surveyed. It was reported that the quantities available do not justify a processor investing in transportation to collect in bulk as they are not cost effective due to the small amounts available locally. They also argued that transportation cost is high due to poor state roads within the producing area.

Moreover, the results further reveal that among the surveyed firms only one percentage of processed soybeans in the past one year was locally produced and the rest was imported from other countries. Importation of soybeans was due to low domestic production as majority of the producers are small-scale farmers within the country producing limited quantities. This means that there is limited production which cannot cater for the demand of soybean.

#### **Hi) Poor quality of soybean**

Over thirty seven percent of the processing firms said that, they do not access good quality soybeans particularly within the country. Respondents argued that soybean grown within the country are of poor quality because farmers lack knowhow on how to grow soybean. Poor quality of soybean as a raw material was reported to increase the cost of production as this has led to importation of soybean. The firms perceived the problem of poor quality soybean grains to be brought about by lack of proper research on high quality soybean planting seeds.

#### **iv) Seasonality of soybean**

Processors (about 30%) indicated that they face major challenges sourcing soybean as a raw material. This is because soybean is not grown throughout the year. The off season is characterized by low supply of soybean and high demand which makes the prices to go up. Processors said that they are sometimes forced to buy soybean in bulk to cover up for the months which they will be off season.

#### **v) Poor physical infrastructure**

The constraint regarding poor physical Infrastructure specifically referred to poor roads and was mentioned by about 19%. Poor road transport has resulted to high costs of production, as it hinders transportation of farm inputs from rural areas to the processing firms. The infrastructure constraint has also been highlighted by the Kenya's Vision 2030 as a major impediment to doing business in Kenya. The

Vision 2030 argues that poor infrastructure deteriorates security and hence the livelihoods of the people whereas, increase in the quality and quantity of Infrastructure has the potential to improve productivity, reduce production and transaction costs, and increase income while creating welfare gains.

As infrastructure is an intermediate input, the low cost and high quality of any form of infrastructure service would tend to improve price competitiveness (Alila et al., 2007). This Improvement raises incomes of the poor through diverse mechanisms. This can be through creating of employment both at producer and processor level as more and more raw materials are sourced from rural areas. This means that producers would be required to produce more for processing and the processor would employ more workers.

**vi) Lack of information**

Lack of information was mentioned as a challenge by some (19%) respondents. They argued that this is due to poor telecommunication network especially in areas where soybeans are grown. Processors on the one hand are not in a position to get proper information on the availability and prices of soybeans. Producers on the other hand do not have information on the available markets for their soybean such as the processing firms.

**vii) High cost of production**

Respondents (12.5%) argued that locally processed products such as soy beverages and soy spices are expensive compared to imported

products because of high unit cost of production and high transaction costs. This is brought about by inadequate necessary utilities such as energy, water, or telecommunication. This raises the unit cost of production as well as the prices of processed products thereby depressing demand. When asked whether they face any difficulty in paying their suppliers, more than a third of the firms said that they found it difficult to pay their suppliers because of the high cost of production.

Other constraints that were mentioned include high transaction cost (15.6%) and competition from other processors (9.4%).

All the constraints mentioned hinder efficiency in processing of soybean. This is because they affect accessibility of soybeans as well as transportation from producers to processors. It can therefore be concluded that constraints are significant in determining quantity demanded of soybean by the soybean processing firms.

## 5.3 STRATEGIES FOR INCREASING PROCESSING

### 5.3.1 Awareness and Market Expansion

To solve the problem of scarcity of soybean, most of the processors suggested increased domestic production. The first strategy suggested was promotion of awareness of the socio-economic importance of soybeans through campaigns directed towards the farmers and the general public. Such a strategy it is envisaged by respondents, could increase domestic demand of soybean and their products and eventually lead to the expansion of the present market for the processed products.



Moreover, increase in domestic demand of soybean and their products actually means ready domestic market and producers are likely to be encouraged to grow more soybeans for processing. Increase in local on-farm production of soybean means availability of raw materials for processing. This leads to low cost of raw materials and hence low cost of production for processing firms. This therefore opens up the possibility of processors buying soybean in bulk during the high season for processing in future during low season. This could lead to a wider market for the farmers who would be encouraged to grow more soybeans.

Increase in production of soybeans would lead to reduction in the importation of soybean as a raw material. This would lead to a decrease in prices of processed products as the cost of production will be low. Eventually, this leads to more competitive prices for both producers and processors.

### **5.3.2 Inputs: Government subsidy, Irrigation and Technology**

Respondents argued that the problem of seasonality and scarcity of soybean could also be addressed through encouraging production of soybean through irrigation particularly in Arid and Semi-Arid Lands (ASALs). Government should subsidize farm inputs as they are currently very expensive for small scale farmers to afford. This strategy could serve to streamline output production throughout the year and hence ensure a steady and regular supply of soybean to the processing firms throughout the year, resulting to price stability.

In addition, processors suggested that to increase productivity, they require to be trained by the Government on efficient methods of processing to address the high unit cost of production. They noted that there is need to carry out research with assistance from the Government to come up with different products and different ways of utilizing and processing soybean. Coming up with different kinds of soybean products means that consumers will have different choices. This would lead to increase in demand for raw materials as demand for soybean products would Increase.

### **5.3.3 Research**

With respect to poor quality soybean grains, respondents argued that the National Research Institutions (NARIs) such as the Kenya Agricultural Research Institute (KARI) should be more aggressive in coming up with high yielding and top quality varieties for increased production and productivity. According to them, producers need to be trained on the best farming practices to produce high quality soybean grains for processing. In addition, some processors pointed out that agricultural extension officers should be deployed in rural areas to train producers.

However, a researcher on soybean with KARI said that although there has been a problem of poor quality, research on soybean has been ongoing in KARI and started way back in the 1970's in Kitale. It was specifically carried out on use of soybean as a pasture. Thereafter, a lot of research has been carried out in other parts of the country to come up with good quality seeds for human consumption. These areas include Njoro, where breeding was done on crop improvement to come

up with high yielding varieties. In Njoro, KARI came up with more than 10 improved varieties which were mostly picked up by some few large-scale farmers. Other parts of the country where research has been carried out on soybean are Thika, Kisii, Kakamega, Embu and Katumani. The researcher further pointed out that even though many high quality seeds have been produced small-scale producers do not seem to be keen at picking up the seeds for planting. This is due to lack of sufficient extension services on the ground and inadequate facilitation for promotional activities. Weak linkages between seed companies and the producers have also contributed to low level of adoption. These linkages should be strengthened.

#### **5.3.4 Infrastructure: Roads, Telecommunication and energy**

Another strategy that can increase processing of soybean that respondents mentioned is to improve transport, telecommunication and energy infrastructure. This would enable proper and efficient transportation and communication between processors and producers from production areas. Good transport system such as roads enables processors to access the raw materials on time and cuts on transportation costs. This is because they would facilitate quick transportation of soybean from producer to the processor. Good roads also means accessibility of the market by the producers which would encourage them to produce more leading to increase in producers income hence improvement of their standards of living.

Improved telecommunication facilitates easier and cheaper cost of communication in much the same way good roads lower transaction costs. This is because producers and processors are able to

communicate with one another and make informed decisions in regard to the prices of soybeans and areas to source them. The respondents argued that the current use of mobile phones will highly improve the level of telecommunication particularly if adopted by the local producers. In connection to this, Wasike (2001) has argued that development of physical infrastructure is prerequisite for economic growth and poverty reduction. Production costs, employment creation, access to markets, and investment depend on the quality of infrastructure, especially roads.

The Government should ensure there is adequate supply of energy for the agro-processing industries as argued by the respondents. They pointed out that the unit cost of production was currently very high because of the power outages and rationing. During power outages and rationing employees remain idle and must be paid their dues as it is not their fault. This decreases productivity of a processing firm, at the same time increases the cost of production. Respondents also claimed that the cost of fuel is very high and should be reduced by the Government in order to increase productivity by the processing firms. They argued that reduction in fuel prices would translate to low cost of output thus making a firm more competitive.

#### **5.3.5 Policy Interventions: Incentives, Taxes and Cooperatives**

Processing firms also expressed their desire to be supported with incentives by the Government. Incentives should include reduction of taxes on imported soybean which is used as a raw material by the agro-processing firms. With such Incentives, the processing firms would be in a position to offset the usually high prices of soybean

grains. In the meantime, producers need to be encouraged to grow more soybeans so that processors could start sourcing their soybean locally rather than importing them.

Another incentive that respondents said could increase the level of processing is reduction of the taxes on finished soybean processed products by the Government. Reducing the taxes on the final products means reduction in the prices of the products which translates to low cost of a product for consumers. This could encourage more consumption of the processed products by consumers, meaning raised demand for the final products. This would finally lead to increase in processing of soybeans.

Some respondents argued that since soybeans are grown by small-scale farmers, these farmers could join hands and form cooperative societies for collective bargaining. This could be through marketing their products together and enjoying economies of scale. This would help processors to buy in bulk and reduce transportation costs.

# CHAPTER SIX

## 6.0 SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

### 6.1 Summary of findings

The study set out to investigate and analyze factors determining demand for soybean as a raw material utilized in the soybean processing firms in Nairobi. The study aimed at finding out the constraints faced by these firms and how they could be addressed. It also aimed at highlighting possible viable ways of boosting domestic processing of soybean.

The study found out that several factors determine demand for soybean as a raw material in the processing firms. The main factors include: the size of the firm (which was measured in terms of the number of workers employed by a firm); age of the firm since it was established (calculated by subtracting the year it was established from the year the study was carried out); prices of soybean (measured in Kenya shilling per a ton of soybean); quality (looked in terms of protein content, moisture content and the size of the soybean itself); and the level of the infrastructure. The findings revealed that all the above variables are significant in determining quantity demanded by soybean processing firms within Nairobi.

The study further revealed that among the constraints processing firms are facing there is a major problem of scarcity of soybean and high prices of soybean due low domestic production. Therefore majority of the processors have to import soybean as a raw material for processing. Poor physical infrastructure particularly roads was pointed out to be a hindrance for moving soybeans from rural areas where they are grown to the city where processing is carried out.

The suggested ways of boosting domestic processing by processors include awareness creation on socio-economic importance of soybean and their processed products; Increased production of soybeans particularly through growing of soybean in arid and semi-arid lands which would lead to availability of soybean locally for processing; intensifying research to identify the best quality soybean seeds and different products to be processed from soybeans; development of the physical infrastructure which has hampered transportation of soybean from the farms to the processing firm; provision of incentives such as low cost energy and reduction of taxes on final products by the Government.

## 6.2 Conclusions

The following conclusions can be drawn from the study findings. That processing firms are not able to fully utilize their processing capacity due to several constraints they encounter. From the findings it was evident that a large proportion of the soybean being processed by the firms is imported. The constraints which the firms are facing should be addressed accordingly for effective and efficient operation of the processing firms.

To address the problems some of the strategies are: upgrading of roads for quick transportation of soybeans to the processing firms as currently roads are in poor conditions; improvement on telecommunication to enable ease of communication between producers and processors since there is lack of information between producers and processors; provision of adequate and cheaper energy to the processors by the Government as it is currently very high; provision of extension services to the grass root level, whereby producers would be trained on proper farming methods to increase their production and productivity of soybean; and intensifying on research to come up with quality soybeans because they are currently of poor quality.

It is also evident that there is a significant relationship between the quantities demanded and the following variables: size of the firm; age of the firm; prices of soybeans; quality of soybeans; and the status of the physical infrastructure. As the firm grows in size, so is its demand for soybean. Age of the firm determines the quantity demanded in that older firms demand more compared to the younger firms. Price of soybean is also shown to be a major determinant of the quantity demanded. When the price of soybean goes up, quantity demanded by a firm declines, meaning a negative relationship. The higher the quality of soybean the higher is its demand. Demand is high where there is good physical infrastructure.

Whereas soybean processing firms are already considering the price at which they buy soybean high, these prices are relatively low compared to the production cost. This indicates a problem because the prices are



not an incentive to producers and discourages them from increasing production of soybeans.

### 6.3 Policy Recommendations

Drawing from the results of this study it is clear that demand for soybean as a raw material for processing is determined largely by *inter alias* the level of infrastructure. These include good roads, provision of reliable and sufficient energy and proper telecommunication systems. From the study findings it is evident that the low level of infrastructure within the country and in particular, areas where soybeans are grown has hindered growth of the sub-sector. The study in this connection recommends that the Government should come up with appropriate policies and action plans to improve the physical Infrastructure within the country (see Alila *et at.*, 2007). Such policies should include adequate budgetary allocation which would ensure Improvement of the infrastructure.

Secondly, the study has revealed that majority of the processors rely on imported soybean as their raw material. Importation of the raw materials has translated to high cost of production due to the high cost of transaction incurred which includes import duties. The Government should provide an enabling environment for doing business particularly by giving incentives to the processors, among them could be through easing Importation procedures and reduction of import duties *{Ibid}*. By so doing this could improve competitiveness as the cost of production would be reduced. This would also lead to creation of employment meaning growth in size of the firm which would translate to higher demand for soybean.

Thirdly, the challenge of poor quality soybean can be resolved through provision of adequate funds to National Agricultural Research Institutions (NARIs) such as the Kenya Agricultural Research Institute (KARI) by the Government for research to come up with high quality varieties for processing. Extension officers should be employed and be based at the grass root level where production of soybean is being carried out. These officers should impart skills and knowledge to producers on the best farming practices to increase production and produce high quality soybean grains for processing.

Since majority of soybean producers are small scale farmers, the study recommends the Government to encourage them to engage in farming as a business and take a business approach to farming in order to make a profit (Jaffee and Morton, 1994). This may help them to produce quality soybean at competitive cost.

#### 6.4 Areas for further research

This study was limited to soybean processing firms in Nairobi and specifically looked at determinants of demand for soybean as a raw material. Further research should be carried out on why there is low domestic production of soybean and yet Kenya has a huge potential for producing soybean which has not been exploited.

Further research should also be carried out on alternative value addition strategies for processing soybean, which could lead to increase in demand for soybean as a raw material and also for the products processed.

Finally a study should be conducted to develop time series data on prices, production and processing of soybean to establish reliable relationships. This would guide policy formulation.

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## Appendix Is List of Soybean Processors

### MICRO-ENTERPRISES (FROM 1 TO 10 EMPLOYEES)

No.	Name	Physical Address	Tel. No.	No. of employees
1	Aromatic Foods Ltd		020-251173	10
2	C & R Food Industries	Dakar Kd. Off Enterprise Rd	020-551901	10
3	Cremex Ltd	Nganga Kihoto Hse. (Jr. Fl. River Rd.	020-249499	8
4	Llectro Machine Seiko Gikomba	Gikomba	020-0762511	9
5	Gitcmbura millers kawangware	Naivasha Rd.	020-3866127	7
6 ~	Kavumba Supply Store	Otiende Shopping Centre	020-606560	4
7	Kirinyaga Flour Mills	Afya Co-Op Hse Tom Mboyu St.	020-249340	8
8	Malakisi Agencies Ltd	Mogadishu Rd	020-650756	9
9	Montigclli Pasta Ltd	Jabavu Rd	020-2713113	15
10	Nairobi home bakers	Rc Insurance Gr. Fir	020-222500	6
11	National Inga Industries	Ind Area Commercial street	020-557829/020-530446	9
	Ngaru Flour Mills	Kirima Hse 5 <sup>th</sup> Parklands Ave.	020-3748259	4
13	One Stop Fntcrprisc	Ramcsh Guatana Rd	020-3746768	6
14	Top Food Ltd	Kombo Munyiri Rd	020-6762920	2
IS	United Millers Ltd	Ideal comcr 1 floor, Lusaka rd	020-534955/6	10
lb	Virpal Vrajpal And Co Ltd	Biashara St	020-221975	5

**SMALL ENTERPRISES (FROM 11 TO 50 EMPLOYEES)**

No.	Name	Physical Address	Tel. No.	No. of employees
1	Ambica Foods I.td	Kilomc Rd	020-225741	25
2	Dandora Millers Ltd	Komarok Rd	020-785066/ 787825	45
3	Express Bakery Ltd	Carton Hsc Ground fl .Std St.	020-250322	20
4	Galaiya Food Industry	Off Likoni Rd. Next To Barclays Bank	020-540918 020-554532	30
5	Golden Grains 1 td Oshwal Millers	Dakar Rd	020-531350/1	20
6	Golden Harvest Mills	Mogadishu Rd	020-534200/1	30
7	Honey Care Africa Ltd	Jamhuri Park ASK showground. Muringa ave	020-3874448	30
8	Jamho Hour Millers Ltd			44
9	Kenya Flour Mills	Kirinyanga Rd	020-249340	15
10	Kenya Millers Ltd	Runycnjes Rd Off Nanyuki Rd	020-552064/ 553670	48
11	Miritini Kenya Lid	Funzi Rd. Ind Area	020-531636/4	30
12	Nice Maize Miller	Bandari Rd	020-533494	35
13	PJ Products Ltd	F. nterprise Rd	020-531311/2	20
14	Popular Tastes Industries Lid	Lokitaung Rd Off Likotu Rd	020-551852	20
15	Premier Oil Mills Ltd	Lusaka Rd. Ind. Area	020-651342/3	45
16	Sapphire trading & marketing Ltd	Kijabc St, Opp Text Book Centre CLK Bldg	020-224566/ 316221	11
17	Spiceworld Ltd	Nanyuki Rd, Ind Area	020-555999/ 020531442	30

18	Supa Snacks	Bamburi Rd Off Enterprise Rd	020^558758/ 531229	35
10	Vilcos Food Products	Kariobangi	020-6765744/ 785020	40

**MEDIUM ENTERPRISES (FROM 51 TO 100 EMPLOYEES)**

<b>No.</b>	<b>Name</b>	<b>Physical Address</b>	<b>TeL No.</b>	<b>No. of employees</b>
1	Chirag(Kenya)Ltd	Off!Enterprise Rd. Next To Roto Moulders. Ind. Area	020-557898/ 650777	60
2	Kapa Oil Refineries I.id	Main Mombasa Rd	020- 6420000/823526	90
3	Nairobi Flour Mills Ltd	Horn* Bay Rd. Ind Area	020-536663/ 556608	80
4	Premier Food Industries Ltd (Manufacturers Of Sauces. Squashes. Jams. Canned Fruits, Juices And Vegetables)	Baba Dogo Rd. Ruaraka	020-8563239/965	85
5	Soy Afric Ltd		020-556740	95
6	Sunrise Textiles & Knitwear Mills	Mwanzi Rd	020-3740848	76
7	Wcctabix Horn (Weetabix Ltd.)	Lusingeti Rd. Off Likoni Rd.Ind Area	020-536114/ 533130	70

**LARGE ENTERPRISES (MORE THAN 100 EMPLOYEES)**

No.	Name	Physical Address	Tel. No.	No. of employees
1	Agro-Chemical & Food Co Ltd	Jccvan Bharai Bldg 3 <sup>rd</sup> fl. Harambec Ave.	020-230083/251453	200
2	Deepa Industries Ltd	Hola Rd. OIT Baricho Rd. Ind. Area	020-552638/553886	113
3	C.iloil Co Ltd	Likoni Rd. Ind Area	020-651585/559789	180
4	House of Manji			510
5	Jainbo Biscuits			365
6	Kabansora Millers Lid	Old Airport Rd/ Kabansora Rd	020-823990/537	200
7	Nestle Foods Kenya Lid	Pate Rd	020-532569/70	106
8	Pentbc Flour Mills l.td( Maize Mill Section)	Homa bay Road.Ind Area	020-531060/084	300
9	PROCTOR AND ALLAN (F.A)LTD	Lusaka Rd, Near Enterprise Rd Roundabout, Ind. Area	020-556361/5	120
10	Propack Kenya Ltd	Road A, Off Baba Dogo Rd	020-8561185/8562477	200
11	Rafiki Millers Ltd	Off Mombasa Rd	020-559592/3	150
12	Trufoods Lid	Jogoo Rd	020-557700/ 557814/559612/651364	155
13	Unga Ltd	Commercial Si. Ind Area	020-532472/5344126	500
14	Unga maize millers	Dakar Rd	020-531441/556842	1505
15	Unilever Kenya Lid	Commercial Si, Ind. Area	020-69022000/532505	450



## Appendix II: Questionnaire

# UNIVERSITY OF NAIROBI INSTITUTE FOR DEVELOPMENT STUDIES

## SURVEY QUESTIONNAIRE FOR THE SOYBEAN PROCESSING FIRMS

### INTRODUCTION

My name is Lucy Nyambura Njaramba, a postgraduate student at the University of Nairobi, Institute for Development Studies (IDS). I am carrying out a cross section survey for my Master of Arts (M.A) Degree in Development Studies Project Paper. The focus of the study is to assess the factors that influence demand for raw materials in the food processing firms and in particular soybeans. Your company is one of those selected for the study. I would appreciate if you will be kind enough to spare a few minutes and share with me some of your thoughts based on your experience regarding my topic. The information you give is needed purely for academic research purpose and will therefore be treated with strict confidence. In no way will your name or that of your company appear in the final report.

Thank you for your consent



5	50% domestic 50%foreign	
6	Other (specify)	

11 Kindly outline the organisational structure of your firm?

12. Which category does your firm fall in?

<i>Code</i>	<i>category</i>	<i>Tick as appropriate</i>
1	Multinational corporation	
2	Local	
3	Others (specify)	

13. What are your main products processed from soybeans, in order of importance?

- a)..... b)  
c)..... d)

B. Availability of soybeans

14a) In the past one year where did you get your raw materials (soybeans)?

<i>Code</i>	<i>Source</i>	<i>Tick as appropriate</i>	<i>Quantity in tonnes</i>
1	Own produce		
2	Locally		
	Outside Nairobi town (specify the areas within Kenya)		
3	Import		

Regionally (specify the countries within Africa)

internationally (specify the countries outside Africa)

14b) Why did you prefer the above mentioned source?

15a) On average, how many tonnes of soybeans do you need in one year?

15b) How much was delivered by your suppliers last year?

15c) How did you deal with the deficits? *(for those who's supply is less).*

<i>Code</i>	<i>Action taken</i>	<i>Tick as appropriate</i>
1	Sourced from other suppliers (specify from where)	
2	Reduced production	
3	Substituted soybean with other products (specify)	
4	Other action (specify)	

16a) Were the soybeans delivered on time by your suppliers?

1. Yes
2. No

16b) If no. what action did you take?

<i>Code</i>	<i>Action taken</i>	<i>Tick as appropriate</i>
1	Followed up the suppliers	
2	Bought from other suppliers	
3	Waited until they supplied	
4	Other action (specify)	

17a). Has there been any shift in terms of the regions you source your soybeans over the past one year?

- 1) Yes
- 2) No

17b). If yes to the above question, kindly respond to the following questions

<i>Old sources</i>	<i>Now sources</i>	<i>Reasons for the shift</i>

### C. Constraints

18 What are the major constraints you face while sourcing soybean as a raw material?

- a)
- b)
- c)

19. Kindly suggest how the above mentioned constraints could be addressed?

a)

b)

c)

d)

20a) How much (in Kenya shillings) were you willing to buy a ton of soybean in the past one year?

20b) How much on average (in Kenya shillings) did you pay for a ton of soybean in the past one year?

21a) When buying soybean, do you have to pay cash or you are given credit by your suppliers?

<i>code</i>	<i>Mode of payment</i>	<i>Tick as appropriate</i>
1	Must always pay cash	
2	Given credit by some suppliers	
3	Always given credit	
4	Others (specify)	

21b). In the past one year how much on average did you pay (in Kenya shilij^ per ton of soybean when you paid in cash?

21c) In the past one year how much on average did you pay (in Kenya shi||j\_h per ton of soybean when you paid on credit *(for those who bought on credit*

21d) *{If there is any difference between 021c and Q21b ask}* Kindly explain you profer to buy on credit.

22a) In the past one year was it difficult to pay your suppliers?

1. Yes
2. No

22b) If yes, What made it difficult?

22b) What action did you take?

<i>Code</i>	<i>Action taken</i>	<i>Tick as oppopr</i>
1	The suppliers gave us credit	
2	We shifted to buying to other suppliers	
3	We continued buying from them since there were no other suppliers	
4	Other action (specify)	

21b). In the past one year how much on average did you pay (in Kenya shillings) per ton of soybean when you paid in cash?

21c). In the past one year how much on average did you pay (in Kenya shillings) per ton of soybean when you paid on credit *(for those who bought on credit)?*

21d) *{If there is any difference between Q21c and Q21b ask}* Kindly explain why you prefer to buy on credit.

22a) In the past one year was it difficult to pay your suppliers?

1. Yes
2. No

22b) If yes. What made it difficult?

22b) What action did you take?

<i>Code</i>	<i>Action taken</i>	<i>Tick as appropriate</i>
1	The suppliers gave us credit	
2	We shifted to buying to other suppliers	
3	We continued buying from them since there were no other suppliers	
4	Other action (specify)	



D. Quality of soybean

23. Do you consider the quality of soybean that you use in your processing?

1) Yes

2) No

24. If yes, kindly explain the soybean qualities that you look out for.

<i>Code</i>	<i>Quality looked for</i>	<i>Tick as appropriate</i>
1	Protein percentage (specify)	
2	Oil percentage (specify)	
3	Preferred variety (specify)	
4	Others (specify)	

25a Is your firm interested in organically produced soybean?

1) Yes

2) No

25b. If yes. how much (in Kenya shillings) per ton do you pay for organically produced soybean?

25c. How much (in Kenya shillings) per ton do you pay for normally produced soybean?

**E. Prices of soybeans**

26. How have the quantities and prices of your soybean changed over the past five years'?

<i>Year</i>	<i>Total quantity of soybean used (ton)</i>	<i>Price of soybean (Ksh./ton)</i>
2005		
2004		
2003		
2002		
2001		

27a. What is your estimation of this firm's future demand *{in terms or quantity}* for soybean'?

<i>Future quantity of soybean demanded by this firm will:</i>	<i>Tick as appropriate</i>	<i>By what percentage?</i>	<i>Reasons</i>
<b>Decrease</b>			
<b>Remain</b>			
<b>Increase</b>			

**F. Prices of substitutes**

28a). Do you normally shift to buying soybean substitute?

1) Yes

2) No

28b) If yes, kindly explain why you shift to buying substitutes.

<i>Code</i>	<i>reasons</i>	<i>Tick as appropriate</i>
1	Increase in prices of soybeans	
2	Lack of the required amount of soybean	
3	Increase in demand for processed products	
4	Others (specify)	

28c). Kindly state the substitutes you shift to.

a)

b)

c)

29a. How have the quantities and prices of your.....(*Name the 1<sup>st</sup> substitutes mentions in 28c*) changed over the past five years?

<i>Year</i>	<i>Total quantity..... (ton)</i>	<i>Price of..... (Ksh./ton)</i>
2005		
2004		
2003		
2002		

2001

29b How have the quantities and prices of your.....(Name the 2<sup>nd</sup> substitutes mentions in 28c) changed over the past five years?

Year	Total quantity.....(ton)	Price of.....(Ksh./ton)
2005		
2004		
2003		
2002		
2001		

29c. How have the quantities and prices of your.....(Name the 3<sup>rd</sup> substitutes mentions in 28c) changed over the past five years?

Year	Total Quantity/.....(ton)	Price of.....(Ksh./ton)
2005		
2004		
2003		
2002		
2001		

G. Possible ways of Increasing domestic soybean production and processing

30a. Is there a way processing of soybeans in your firm could be increased?

- 1) Yes
- 2) No

30b. If yes. kindly explain how it can be increased?

30c. If no. kindly explain why?

31. Could you kindly give me some suggestions on how domestic production of soybean could be increased?

Code	Ways of increasing production	Tick as appropriate
1	Training and educating producers	
2	Supply of quality seeds to the producers	
3	Awareness creation on the utilisation of soybeans	
4	Provision of extension services to the producers	
5	Higher payment to producers	
6	Prompt payment to producers	
7	Forming of marketing organisations by producers	
8	Increase in research on soybeans	
9	Offering credit to farmers	
10	Information dissemination to the producers	
11	Others Specify	

32a Do you think the government can do something in order to increase soybean production"?

1) Yes

2) No

32b If yes. what do you think the government should do in order to increase production?

33a) Is there anything the government should do to increase soybean processing in your firm?

1) Yes

2) No

33b If yes. what do you think the government should do in order to increase processing?

34. Kindly suggest how best you can promote the linkage between this firm and small-scale soybean producers.

Thank you for your time.