AN ASSESMENT OF THE EFFICIENCY OF THE GROUNDNUT SEED MARKET IN LUSAKA PROVINCE, ZAMBIA

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

By

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LIST OF ABBREVIATIONS

AGOA	AfricanGrowth and Opportunity Act
CSO	Central Statistics Office
IDE	International Development Enterprise
KG	Kilogram
MRI	Mount Makulu Research Institute
NGO	Non-Governmental Organization
NAP	National Agricultural Policy
SADC	Southern Africa Development Community
SCCI	Seed Control and Certification Institute
SCP	Structure Conduct Performance
SPSS	Statistical Package for Social Scientists
VIF	Variance Inflation Factor
ZamSeed	Zambia Seed Company

ABSTRACT

An Assessment of the Efficiency of the Groundnut Seed Market in Lusaka Province, Zambia

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This study looked at the efficiency of the groundnut seed market in Lusaka Province. A structural conduct and performance model as well as a regression model was used to generate data discussed in this report. In most Sub-Saharan African countries, there is presence of a formal seed market and the informal seed market. The formal market is characterized by improved varieties of seeds as compared to the informal seed sector.

The formal sector comprised of seed companies and retailers. It was analyzed in terms of its structure and conduct. There was strong indication of factors favoring imperfect competition, one of the factors being the concentration ratio of 57%. This showed that the formal groundnut seed market was oligopolistic. Further evidence of imperfect competition was seen through product differentiation. The formal market was characterized by difference in packaging as well as difference in varieties. There were four barriers to entry identified in the formal market; large capital, lack of credit facilities, government policy/regulation and large already established companies. The major barrier to entry into the formal seed market was found to be large already established seed companies. This was in terms of obtaining a market share from these companies. Other factors favoring imperfect competition were imperfect competition and market integration. There was evidence of horizontal market integration, as observed by the retailers having more than one shop in the same area. The conduct of the market also supported imperfect competition as there was found to be evidence of promotions carried on so as to compete for customers.

The informal market on the other hand was found to be relatively competitive. Factors favoring perfect competition included; a low concentration ratio of 22%, no barriers to entry, availability of information (although 70% was informal information), no promotions, lack of product differentiation as well as non-collusive setting of prices and quantity. The informal market was found to be inefficient based on the low profit margins as well as low farmer share. The factors found to affect marketing margins were; transport cost ($p= 0.001$), quantity traded ($p=0.002$), sex ($p=0.032$) and education ($p=0.043$). Age was found not to have an effect on marketing margins.

CHAPTER ONE
INTRODUCTION

1.1 Background

Until 1991, Zambia's economic policies were restrictive and constraining (Mwanaumo 1994) and entailed high levels of government control and interference, thereby suppressing private sector initiatives. The system was characterized by official price controls and determination, centralized delivery of support services, concentration and public sector dominance of agribusiness industries, frequent policy and institutional changes, and extensive subsidies (Chalwe 2010). In agriculture, the controls involved; output and input prices, high level of parastatal activity in both markets, and maize and fertilizer subsidies (Muntanga 1984). However, the exclusion of the market forces led to inefficiencies in the system. This led to the liberalization of the economy in 1991. In terms of the agricultural sector, this led to private companies coming in to produce and market various agricultural products. This also led to development of an improved seed sector.

The seed sector in Zambia is comprised of both the formal and informal seed sector. The formal seed sector is made up of; research institutions, the Seed Certification Authority and its Agencies (SCCI), seed companies, Non-Governmental Organizations (NGOs) and other seed outlets (National Agricultural Policy-Zambia 2004). Among the crops grown under the formal seed sector include; hybrid of crops such as maize, sunflower and sorghum. The informal seed sector on the other hand is comprised of the vast majority of the farming population (small holder farmers) and cultivates crops such as millet, groundnut, sweet potato, cassava est. Seed companies find it relatively unattractive to multiply and distribute seeds produced under the informal seed sector. This is due to poor infrastructure, no assurance of repeated sales and small holder farmers being scattered. As a result there is severe seed shortage and food insecurity especially that such crops form the basis of national security at the household level (Zulu 2000). One main reason why smallholder farmers continually recycle their seed is because seed of improved varieties is a costly input, more so in the case of groundnut. The private sector has had little interest in the groundnut seed enterprise due to low seed multiplication ratio, bulky nature of the produce, high cost of transportation and low profit margin-therefore the task of making the

seed of improved groundnut varieties available to farmers in required quantities and at the right price has been the responsibility of public sector seed services. Unfortunately, services have not been able to meet the demand of good quality of improved varieties of groundnut in many countries.

The groundnut seed, believed to be the native of Brazil to Peru, Argentina and Ghana, from where it was introduced into Jamaica, Cuba and other West Indies islands is the sixth most important oilseed in the world. It is comprised of 48-50% oil and 26-28% protein, and rich in dietary fibre, minerals, and vitamins (Ndjeunga*et al*, 2006). Groundnut is grown on 26.4 million hectares worldwide with a total production of 37.1 million metric tons and an average productivity of 1.4 metric tons/ha (FAO, 2003). Over 100 countries constitute 97% of the global area and 94% of the global production is concentrated in Asia and Africa (56% and 40% of the global area and) 25% of the global production, respectively. India along with china accounts for half of the world's groundnut production today. About 95% of world's production is consumed within country of origin, most being crushed for oil and used for cooking. Only about 5% is traded on world market.

There are over 486 varieties of groundnuts in Zambia, with about ten developed by public research since 1960 (Manintveld*et al,* 2004). Most of the groundnuts in Zambia are grown in the informal seed sector. It is grown in all the three ecological regions i.e. Region 1 (Low rainfall), Region 2 (Medium rainfall), and Region 3 (High rainfall) (Chalabesa*et al,* 1999).

However, there a number of seed companies in Zambia that produce groundnut, for instance, The Zambia Seed Company (ZamSeed) and Seed Company (SeedCo). Generally there has been a steady increase in the production of groundnuts in Zambia. According to Central Statistical Office (CSO) survey, 1987/88 farming season production was about 47 000 tons while during the 2003/04 season production was about 48 000 tons. The survey further reviewed a 2% growth.

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1.2 Problem Statement

Establishing the Structure, Conduct and Performance of the seed market is critical for agriculture-led development as seeds are the single most essential input in crop agriculture. They are the carriers of genetic potential of plants and determine the upper limit on yield while other inputs such as fertilizers and crop protection simply build an enabling environment for plant production (Hamukwala *et al,* 2011).

In Zambia studies on agricultural marketing have looked at other aspects other than marketing efficiency (Jayne and Tembo 2007). This study is relevant so as to obtain basic information about the seed market, for instance the number of seed dealers. In a study; Sorghum and Pearl Millet Improved Seed Value Chain in Zambia: Challenges and Opportunities for smallholder farmers (Hamukwala *et al* 2011) reviewed that the population of seed dealers in the area to be surveyed was not known. Another study: Seed Sector Evolution in Zambia and Zimbabwe: has farmer access improved following economic reforms? (Rusike *et al,* 2000) revealed that, there was little information about the seed sector structure and how smallholder, access improved seed, has changed following liberalization. Both studies showed a gap in knowledge which needs to be filled.

The groundnut seed is the sixth most important oilseed in the world, containing 48-50% oil and 26-28% protein. Its oil is edible, used as a cooking medium, in soap making, manufacturing cosmetics and lubricants and many more. It is also known for its ability to survive in less favorable agro-climatic conditions. In terms of revenue, some countries earn high profits from export. The United States of America (USA) is a good example. It exported groundnuts totaling to $223 million in the year 2004. Zambia can also earn a lot of revenue from export of groundnuts. Zambia can rake in more than US$1.3 billion per annum through the export of organic groundnuts under the African Growth and Opportunity Act (AGOA) (Muyanwa 2011).
Despite all these advantages and potential for high revenue in groundnuts, Southern Africa Development Community (SADC) Seed update in the year 2007 reviewed the following about groundnut production in Zambia. 417 hectares of groundnuts were planted, 835 tons of certified seed was produced while national seed demand was 2414. This implied a deficit of groundnut seed on the market. On the other hand, seeds such as Maize, Cowpea, Sorghum, Bean, Millet and

Rice showed a surplus. It is thus only logical to deduce that the deficit was not as a result of climate (poor rains) but as a result of low farmer participation in production and marketing groundnut seed. As earlier mentioned the potential for good profit in production of groundnut seed is high. Why then the low farmer participation? What is the organization of the market and how it affects participation by farmers? These are some of the many questions that this study attempted to answer.

Another reason why this study was undertaken was to help those companies or organizations wanting to enter the groundnut seed market find out the possible barriers to entry in the market. An example is Freskpikt, which according to Times of Zambia newspaper Tuesday 2011, wanted to start producing groundnut seed.

1.3 Objectives

General objective of the project was to determine the efficiency of the groundnut seed market in Lusaka Province.

The specific objectives were as follows:

1. To determine the structure and conduct of the formal seed market.
2. To determine the structure, conduct and performance of the informal seed market.
3. To measure marketing margins at the farmer to retail level to determine efficiency.
4. To identify factors affecting marketing margins.

1.4 Rationale of the Study

In Zambia there is so much reliance on maize, although the majority of the rural people do not solely really on maize. There are other crops that make the food basket of the rural poor. Other staple food crops include; sorghum, millet, pearl millet, finger millet and cassava. Food legumes include groundnuts, cowpea, beans, Bambara, pigeon pea and pick pea (Chalabesa *et al,* 1999). The over reliance on maize leads to the neglect of other major crops such as groundnuts which is a major source of protein. This neglect on other crops further leads to an emergence of an

informal sector that pays minimal, if any attention to developing better varieties to enhance productivity, but rather focus on the recycling of seed year in year out.

The groundnut seed can be used as a major source of energy due to its high oil and protein content. The oil is used as cooking oil in India and China, and can also be used in Zambia to substitute for the more expensive cooking oil found in stores. Milk and butter (peanut butter) some of the other products obtained from groundnuts. The locals are able to make this butter and mix it with other foods such as sweet potato, which makes a meal that can substitute for Nshima (local meal that uses maize as its basic component). The findings of this study will provide information for government, agricultural policy makers and other organizations, with the hope of a change of policy towards diversification.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Marketing efficiency has been usually separated in to its components when carrying out a research. Some studies look at the structure; others look at the conduct and performance. Few look at all three components of marketing efficiency. The reason for analyzing the marketing efficiency is that it enables the potential investor to access whether he/she can penetrate that market and the potential problems that will be faced. Studies have been done about different aspects of groundnut seed.

This section summarized the existing empirical evidence on marketing efficiency of the groundnut seed market. The first part of the review identified studies that have been done concerning marketing efficiency of maize and groundnut seed. It also identified studies on the informal and formal seed market. The section ends with a look at the conceptual framework.

2.2Known Findings

To understand the organization of the market and assess the degree of competition hybrid maize seed production and retailing, the structure and conduct of the market was analyzed in Trans Nzola District, a major maize producing area in Western Kenya. The structure of the market was analyzed in four aspects, namely: market concentration, product differentiation, market integration and conditions for entry in the hybrid maize seed business. The market conduct considered the behavior and activities of the participants, in particular concerning price and promotion. Primary data was collected randomly from a random sample of 30 traders out of the 46 that sell hybrid maize seed within the district, and 30 farmers within the district. The major result was that the previous Kenya Farmers Association's monopoly had been reduced and there were many seed traders in retail.

An analysis of the market structure reviewed that there were several factors that favour imperfect competition, including unequally distributed shares of transactions among traders, product differentiation and barriers to entry. The market was categorized as oligopolistic with 61.7%

going to the largest four firms. Competition was lacking mainly due to barriers to entry such as institutional restrictions and high initial capital. In terms of production there was a clear monopolistic seed production, with the Kenya seed company producing 96.7% while Pioneer Company producing the remaining 3.3%. Some of the recommendations included the need for competition in the maize seed market and the reduction of import tax on seed.

A study in Malawi: Assessment of the Current Situation and Future Outlooks for the groundnut Sub-Sector revealed that the government Marketing Agency-ADMARC, exerted strong monopoly power during 1980s through an intensive network of rural buying points at which producers were paid guaranteed prices. However, following the liberalization of produce marketing in the early 1990's, grain marketing activities are conducted by private traders as well as by ADMARC. The continued participation of ADMARC had partly been attributed to the sluggish response of the private sectors in groundnut marketing following liberalization. The sluggish response by the private sector, which is also the case in a number of African countries, had in part been attributed to high transaction costs associated with trading in rural areas characterized by under-developed road networks.

The study further revealed that the key actors in groundnut market in Malawi include; small- and large-scale producers, intermediate buyers, farmer associations, processors and consumers. The most prevalent groundnut marketing system involved individual farmers selling groundnuts to intermediate buyers. Other prevalent marketing systems involved (i) individual farmers selling groundnut to local markets; (ii) farmers' groups pooling together their groundnuts and selling to large buyers/companies; and (iii) farmers selling groundnut grain for seed to NGOs. There were several categories of buyers which included, intermediate buyers, processing and packaging companies, and other consumers of groundnuts (Assessment of the Current Situation and Future Outlooks for the groundnut Sub-Sector in Malawi;International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

Another study undertaken in Niger and Senegal; Comparative Analysis of Seed System in Niger and Senegal, (Ndjeunga *et al,* 2006), revealed that private sector showed little interest in multiplying and distributing seed of cross- or self-pollinated crops such as pearl millet and groundnut, respectively.

It further showed that seed systems in sub-Saharan Africa indicate that even in countries such as Zimbabwe where the formal seed system is comparatively advanced, seed companies concentrate on crops where they can achieve higher profit margins (e.g., maize, sunflower, soybean) in order to obtain competitive returns on their research and marketing investments. For millet, sorghum, and groundnut, mostly non improved cultivars and farmers' saved varieties are used (Neuendorf 1995).

2.3 Common Methods of Marketing Efficiency Analysis

In economics the perfect competition model is usually used to be the standard against which the structure and conduct of a market is compared and evaluated. Large number of buyers, low barriers to entry, product homogeneity and complete knowledge of alternative choices on the part of the producer and consumer characterize the competitive market model (Nambiro *et al,* 2001). To analyze efficiency in terms of prices marketing margins are usually used. Marketing margin is the difference between the retail price and farm gate price of the farmer's product.

2.4 Conceptual Framework

Economists have classified the various market structures into; perfect competition or pure competition, monopolistic competition, oligopoly and monopoly. Three forms of monopolistic competition, oligopoly, and monopoly are generally grouped under the general heading of imperfect competition, since these three forms of market differ with respect to the degrees of imperfection in the competition in the market. Monopolistic competition is the least imperfect and monopoly is the most imperfect form of market structure, oligopoly lies in the middle of the two.

The popular basis for classifying market structures rests on two crucial elements (1) the number of firms producing a product and (2) the nature of product produced by the firms, that is, whether it is homogeneous or differentiated. The price elasticity of demand for a firm's product depends upon the number of competitive firms producing the same or similar product as well as on the degree of substitution which is possible between the product of the firm and other products

produced by the rival firms. Therefore, a distinguishing feature of different market categories is the degree of price elasticity of demand faced by an individual firm (Ahuja 2005).

To a lay person, "competition" has the connotation of intense rivalry. We say that a market is purely competitive if each firm assumes that the market price is independent of its own level of output. Thus, in a competitive market, each firm only has to worry about how much output it wants to produce. Whatever it produces can only be sold at one price: the going market price (Varian H.R 2006).

Perfect competition is said to prevail where there is a large number of producers producing a homogeneous product. The maximum output which an individual firm can produce is very small relative to the total demand for the market product so that a firm cannot affect the price by varying its supply of output. With many firms and homogeneous product under perfect competition, no individual firm in it is in a position to influence the price of the product.

CHAPTER THREE
METHODS AND PROCEDURES

3.1 Introduction

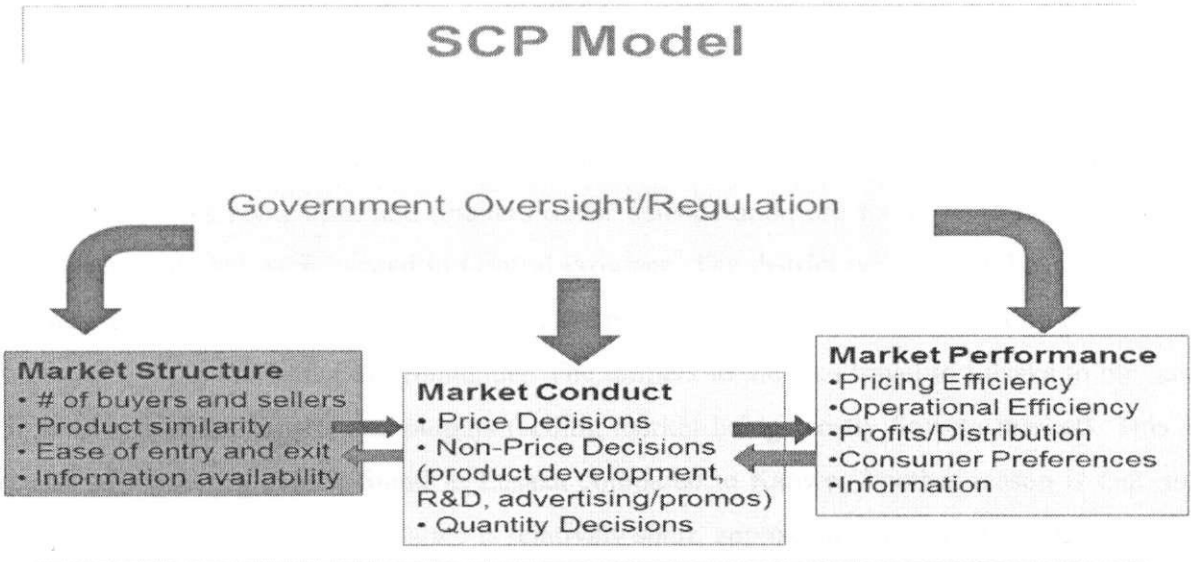
In this study, the Structure Conduct Performance Model was used as well as regression analysis model.

3.2 Structure Conduct Performance (SCP) Model

The SCP Model is the primary model used in studies of marketing efficiency. The structure of the informal and formal market was analyzed by calculating concentration ratio and looking at other factors such as; Product differentiation, barriers to entry and information availability. Conduct of the market was determined through the identification of pricing and quantity decisions as well as the promotions undertaken by the participants of the informal and informal groundnut seed sector. Market performance refers to the economic result of market structure and conduct (Lawrence 2007). The performance was determined through the calculation of marketing margins and market share. The model was used to identify the formal and informal groundnut seed market into one of the four structures; 1.perfectly competitive, 2.oligopolistic, 3.monopolistic 4.monopoly.

The figure below shows the SCP model and the factors that can be analyzed under the structure, conduct and performance of the market. It also shows government oversight or regulation. This is government influence in the running of the market, such as the setting of prices which is common in the maize market.

Figure 1: The Structure Conduct Performance (SCP) Model.



3.3 Regression Model

To find out the factors affecting marketing margins a regression model was used. Marketing margin was the explained variable while the explanatory variables were transport cost, quantity traded, sex, age, education and farm size. In summary the regression model shall be defined as;

$Y = \beta o + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + E$

Where:

Y = Marketing Margin

X1 = Transport Cost

X2= Quantity traded

X2 = Sex (Categorical variable hence dummy variable was created)

X3 = Age

X4 = Education (Categorical variable hence dummy variable was created)

X5 =Farm size

E = error term

3.4 Sampling

3.4.1. Area of Study

The study was undertaken in Lusaka Province and Central Province. This was because the main outlets of the seed companies and retailers under consideration are found in Lusaka Province. The farmers sampled were located in Central Province. The district was Chibombo, specifically in Mungule. Mungule was chosen because of the project that had been carried out by IDE in that area regarding the marketing of groundnuts. The farmers in the area travel to Lusaka to buy and sell their agricultural inputs and outputs (selling market being mostly Soweto market). This is because of the larger market found in Lusaka compared to Kabwe. Another reason is that, the distance between Lusaka and Mungule is relatively short, approximately a one hour drive, hence relatively inexpensive to move to and from the market.

3.4.2 Sampling Method

Three groups were sampled; farmers, seed retailers and seed companies. The farmers were taken to represent the informal seed sector while the seed retailers were taken to represent the formal seed sector.

Informal Seed Market

As stated above the farmers were provided by International Development Enterprises (IDE), a Non-Governmental Organization (NGO). Thus, the sampling frame was obtained from the NGO's register. A sample of about 111 households was drawn using simple random sampling, facilitated by the random number generator in Microsoft Excel.

Formal Seed Market

The population of seed dealers in Lusaka was not known. Thus, snowball sampling was used. That is, known seed retailers were asked to identify other seed retailers that they knew who would be identified for interviews. 10 seed dealers were interviewed. For the seed companies, data was collected from Central Statistical Office in Lusaka.

3.5 Data Collection

The primary data was collected using structured questionnaires. Secondary data was collected from Central Statistical Office (CSO).

3.6 Data Analysis

Data was entered in SPSS and analyzed in a STATA.

CHAPTER FOUR
RESEARCH FINDINGS

4.1 Introduction

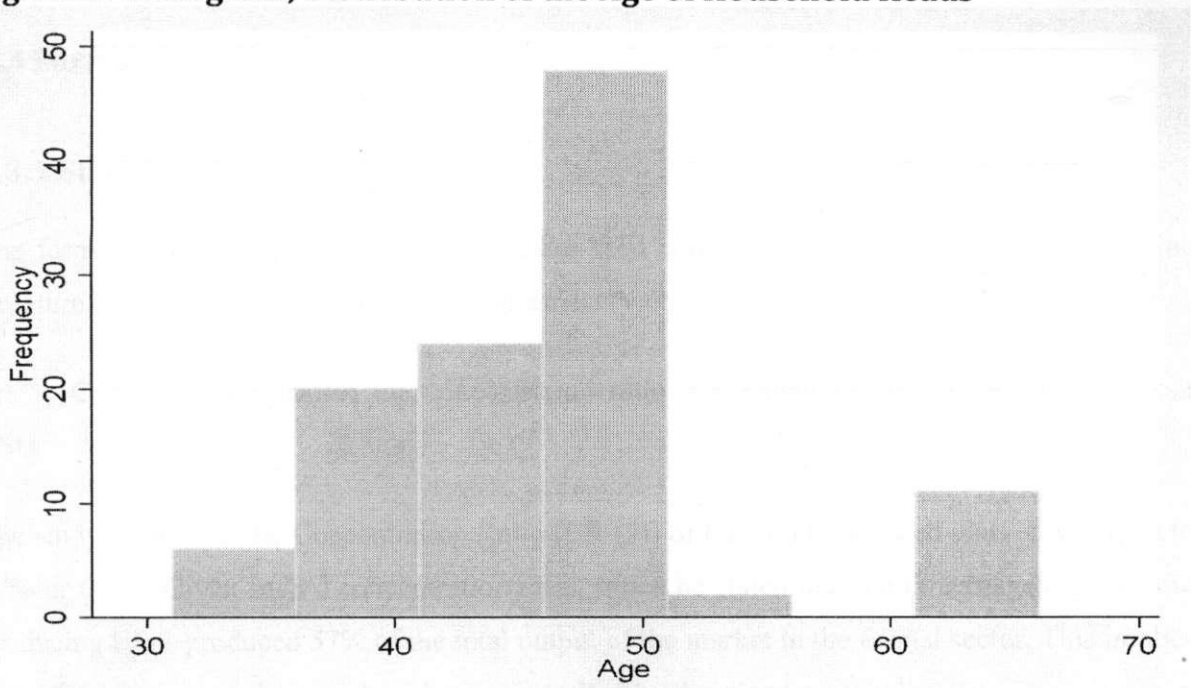
This chapter presents the findings of this research beginning with the demographics of the sample interviewees, structure and conduct of the informal seed market, structure, conduct and performance of the informal seed market, regression results and the chapter ends with conclusions and recommendations.

4.2 Demographic Data

4.2.2 Age Distribution

Of the 111 farm households that were sampled the age ranged from 31-63 years of age. The mean age was 45 years.

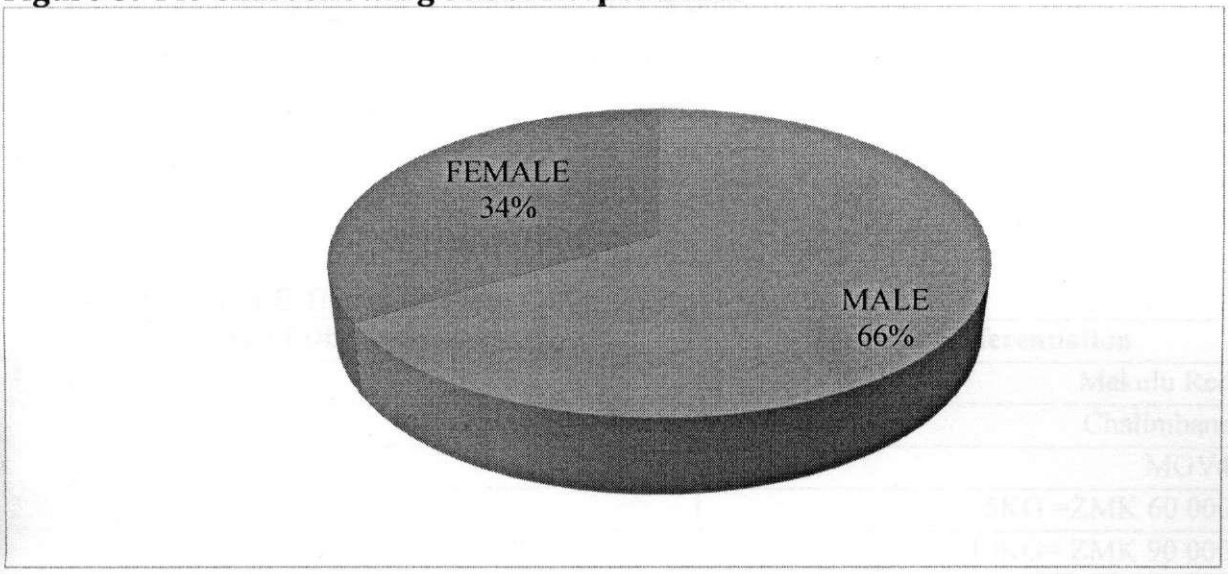
Figure 2: Histogram; Distribution of the Age of Household Heads



4.2.3 Sex

There were more males than females. The study covered 73 males representing 64% and 38 females representing 34%.

Figure 3: Pie Chart showing Sex of Respondents



4.3 Formal Seed Market

4.3.1 Structure

The formal seed market was comprised of the seed companies and dealers. To determine the structure of the formal seed market, several aspects were analyzed.

(a) Concentration Ratio: the concentration ratio was calculated based on the data from CSO.

The study found that the Concentration Ratio [CR (3)] of the groundnut seed market wasequal to 57% or 0.57. Given such a concentration ratio, it can be stated that the threebiggest groundnut producing firms produced 57% of the total output of the market in the formal sector. This implies that 57% of the groundnut seed market is controlled by threeseed companies.

(b) **Product differentiation:** was the second factor that was analyzed.

To determine the product differentiation in the groundnut seed market the factors considered were groundnut seed varieties, packaging and pricing. Table1 below shows presence of product differentiation in the groundnut seed market. This is due to the presence of different groundnut seed varieties (Makulu red, Chalimbana and MGV4). There was evidence of variation in packaging with the most prominent being 5kg and 10kg costing ZMK 60,000 and ZMK 90,000, respectively.

Table 1: Product Differentiation

Type of Differentiation	Specific Differentiation
1.Variety	Makulu Red
	Chalimbana
	MGV4
2.Packaging and Price	5KG =ZMK 60 000
	10KG= ZMK 90 000

(c) **Barriers to entry:** this being the third aspect of product differentiation analyzed.

The main barriers to entry in the groundnut seed market as shown in Table 2 below were: large capital, lack of credit facilities, government policy/regulation and large already established companies. The major barriers according to 90% respondents is the large established companies followed by large capital, government policy/legislation and lack of credit facilities barriers as identified by 40%, 31% and 30% of the seed retailers interviewed, respectively. In comparison, lack of credit facilities, government policy/legislation, large capital and large already established companies were identified not to be the major barrier to entry in the formal seed sector by 70%, 69%, 60%and 10% interviewees, respectively.

Table 2: Barriers to Entry in the Formal Seed Market

Barrier	Yes (%)	No (%)
Large capital	40	60
Lack of credit facilities	30	70
Government Policy/Regulation	31	69
Large already established companies	90	10

(d) Information availability

Of the 111 farmers that were interviewed 30% had information about the seed prices and quantities in the market while all the retailers claimed to know the prices and quantities of groundnut seed in the market. This showed that at the farm level there is incomplete information with regard to groundnut seed prices and quantities.

(e) Market Integration

There was evidence of horizontal market integration. Seven of the retailers that were interviewed owned other outlets within Lusaka. The presence of the integration cannot be said to contribute to efficiency but to increase volume of sales. The retailers were discovered to be involved in sell of other products apart from groundnut seed. These products ranged from simple agricultural chemicals to farm machinery.

4.3.2 Conduct

To determine the conduct of the formal groundnut seed market, factors analyzed included

a) Pricing decisions
b) Quantity decisions
c) Promotion/Advertising

The prices for the groundnut seed are determined by individual companies. There is no collusion or cartels when it comes to making price and quantity decisions. All retailers covered in the sample were discovered to carry out promotions. This is so as to increase the volume of sales and a form of competition.

To summarize the section on the formal seed sector, it can be said that the groundnut seed sector in Zambia at the formal level is Oligopolistic. This can be seen from the concentration ratio of 57% because it falls in the 50-80% range as shown in Table 3 below. To support the classification of this market as Oligopolistic, theory states that such a market structure will have barriers to entry, differentiated products in terms of packaging, pricing etc. and also have a presence of incomplete information. The study made discoveries that are in line with this theory i.e. there was evidence of barriers to entry (main barrier being large already established companies), product differentiation (5KG, 10KG, Makulu red, Chalimbana, MGV4), lack of complete information (only 30% of the smallholder farmers had access to information about market prices and quantities).

In terms of the market conduct, the groundnut seed market was found not to be a cartel because pricing and quantity decisions are made individually. Each company sets their on price without the consulting other companies.

Table 3: Concentration Ratio Ranges and Market Classification

Concentration Ratio Range	Classification
0-33%	Perfect Competition
33%-50%	Monopolistic Competition
50-80%	Oligopolistic
80-100%	Highly Oligopolistic
100%	Monopoly

4.4 Informal Seed Market

4.4.1 Structure

To analyze the informal seed market a total of 111 smallholder farmers were sampled. Several components of a market structure were analyzed and the following were the discoveries.

(a) Concentration Ratio:

This was calculated based on own survey data collected from the farmers.A Concentration Ratio [CR (6)] of equal to 22% was found. This concentration ratio states that the six largest groundnut producing farmers produced 22% of the total output of the market, hence stating 22% controlling power.

(b) Product Differentiation:

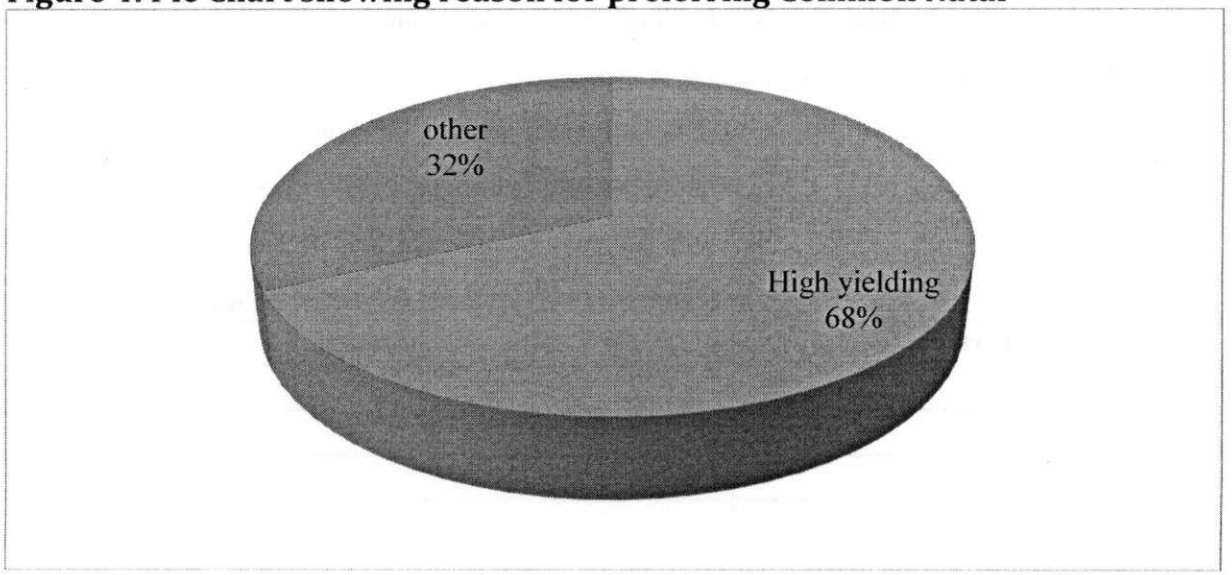
To determine product differentiation groundnut seed varieties, packaging and pricing were looked at. Several varieties were discovered to be present in the informal seed market with the most prominent variety being common natal. As in Table 4 below, about 46% of the farmers indicated they used the common natal seed variety. With its most distinguishing feature being its small size (this is how the farmers used to describe it).

Table 4: Groundnut Seed Variety

Groundnut Seed Variety	Number	Percent
Makulu Red	10	9.01
Chalimbana	21	18.92
Chipego	2	1.8
Common Natal	51	45.95
Other	27	24.32
Total	111	100

The pie chart in Fig 4 below shows that 68% of the population surveyed believed that the high yielding nature of common natal was the main reason its preferred more compared to other varieties.

Figure 4: Pie Chart showing reason for preferring Common Natal



Among all the farmers' interviewed none were involved in packaging their products so as to attract customers. Farmers sold their groundnuts mostly in gallons and 50kg bags. In terms of price, the price of ZMK 5, 000 PER 5kg pack found to be the same among farmers was offered. The similarity in pricing of products was attributed to the fact that all farmers interviewed lived in the same area and accessed same local markets.

(c) Barriers to entry:was the third aspect of product differentiation analysed.

The study established that there was no form of barrier to the entry and exit with regard to groundnut informal seed sector. This implies that the farmer can freely choose to produce groundnuts or not without any major impediments.

(d) Information availability

Similar to the formal situation, only 30% of the farmers had indicated having access to first-hand information about seed prices and quantities while, majority (70%) relied mostly on their fellow farmers to provide such information; and mainly through word of mouth. This is to say, information is available though not formal in the informal groundnut seed sector. Table 5 below

shows the major sources of information that include word of mouth, radio, television, newspaper and magazine in the informal seed sector. Except for 17% and 13% other farmers that indicated having accessed information through the radio and television, respectively none accessed the same through newspapers and magazines. Farmers attested to the fact that most information accessed was on maize and rather than on groundnuts. Implying there generally is information gap among farmers with regard to groundnut seed varieties.

Table 5: Source of Information in the Informal Sector

Source	Percent
Radio	17
Television	13
Newspaper	0
Magazine/Brochure	0
Word of Mouth	70

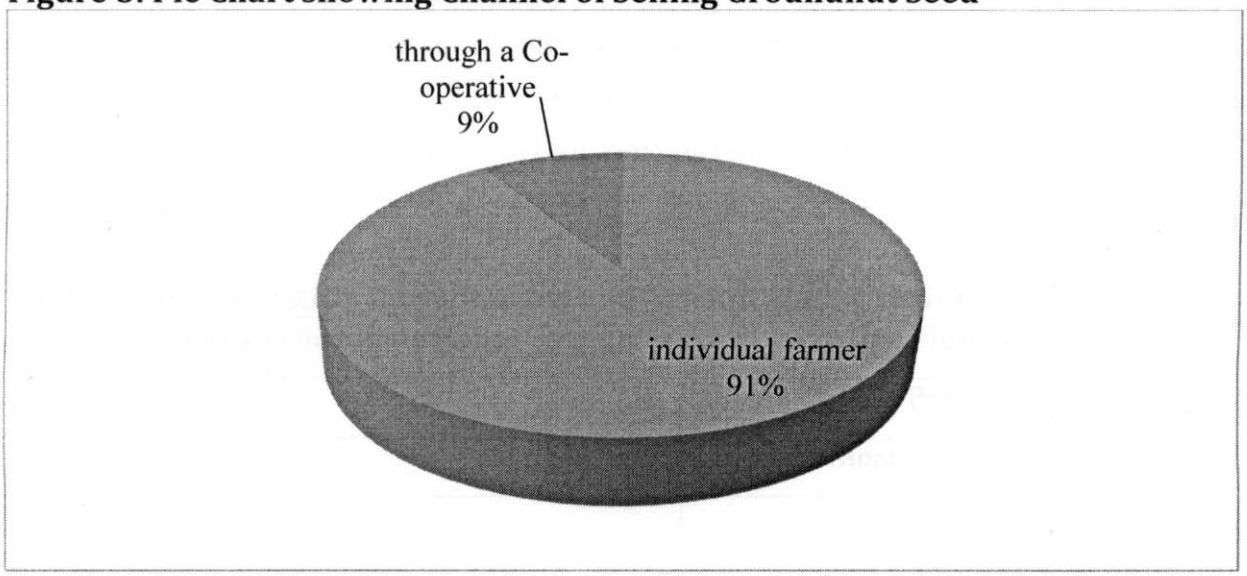
4.4.2 Conduct

The conduct of the informal market was analyzed based on the following factors;

a) Pricing decisions
b) Quantity decisions
c) Promotion/Advertising

A small percentage (i.e. 9%) of farmers as shown in Fig.5 sold their produce via co-operatives. The large majority (91%) engage in individual sales of groundnuts. The market price was according to farmers determined through market forces. None of the farmer carried out any sought of promotion/advertising so as to attract customers.

Figure 5: Pie Chart showing Channel of Selling Groundnut Seed

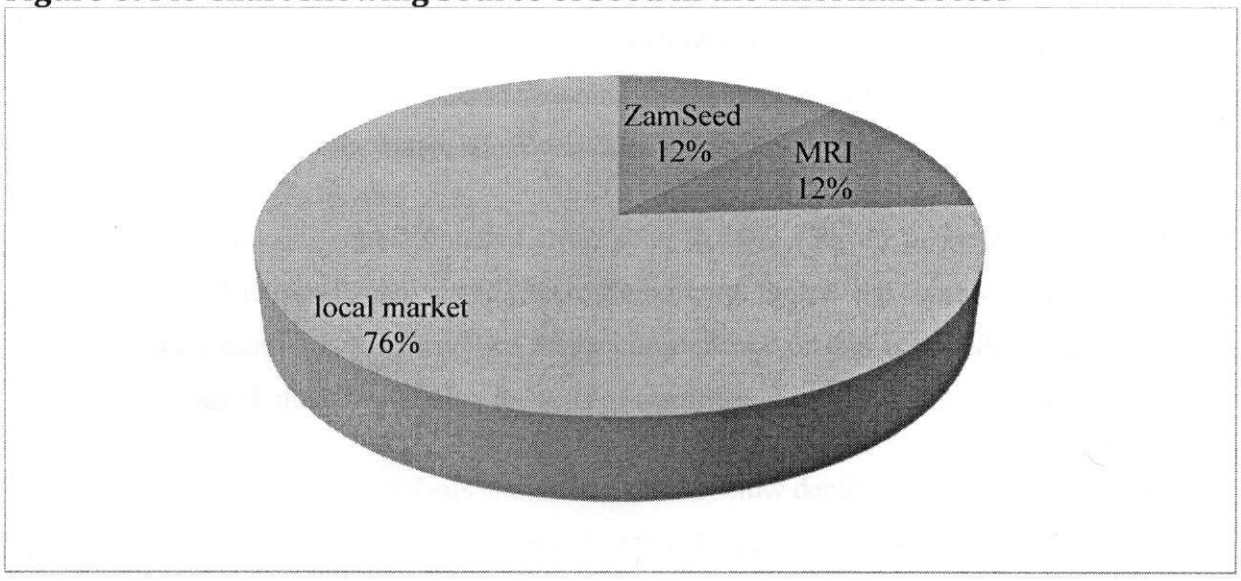


4.4.3 Performance

To determine the performance of the informal seed market, marketing margins and farmers' market shares were calculated. This study found that farmers' market margins were ZMK 34,261per 5Kg (i.e. ZMK 6852/ Kg when they sold groundnut seed while; their market share on average was 35%. Both these values were by all standards low.

In summary, this section on the informal seed sector reveals that the groundnut seed sector in Zambia at the informal level is relatively competitive though not efficient. Table 6 below gives the classification of a market based on the range where the concentration ratio falls. In this study the concentration ratio for the informal seed sector was found to be 22% falling in the 0-33% range hence the informal groundnut seed market can be classified as relatively competitive. In support of this classification, theory states that such a market structure will have no or minimal barriers to entry and exit, no product differentiation in terms of packaging, pricing etc. and also availability of information. The study made discoveries that are in line with this theory i.e. there was no evidence of barriers to entry and exit, product differentiation, lack of complete information (30% of the farmers got their information formally while 70% obtained information through informal ways i.e. through word of mouth).

Figure 6: Pie Chart showing Source of Seed in the Informal Sector



II. Seed Quantities Purchased

There is evidence that most of the groundnut seed was recycled. This as shown in the Table 7 below was represented by 32%. The highest number quantity of seed to have been purchased was in the range of 5-10kg as attested to by 29% of respondents.

Table 7: Seed Quantities Purchased

Quantity Purchased	Number	Percent
Recycled the seed(0KG)	35	32
< 5kg	10	9
5-10kg	33	29
10-15kg	11	10
>15kg	22	20
Total	111	100

4.5 Regression Results

Regression was used so as to find out the factors that affect marketing margins at farmer to retail level. Marketing margin was regressed on transport cost, quantity, age, sex, and education. Dummy variables were created for sex and education since they are categorical variable and ultimately avoid the dummy variable trap.

The regression was done for a total of 111 observations from the sample survey. The overall model was significant at 90%, 95% and 99% as shown by the p-value of 0.000. The model's goodness of fit was found to be 0.5281 meaning that about 53% of variations in the dependent variable are explained by the independent variables.

The model was run using robust standard errors so as to correct for the heteroskedasticity present (test used was Breusch-Pagan test). Heteroskedasticity means the errors in the regression equation have a common variance. The major consequence of this is that the estimates of the variances are biased, thus invalidating the tests of significance.

The results of the regression analysis shown in Table 8 below depict factors that were significant and affected marketing margin at the farmer to retail level to be transport, quantity traded, sex, and education. Transport cost had a coefficient of -0.8137178. This means that when transport cost increases by ZMK1 the marketing margin reduces by ZMK 0.8137178. Hence, transport cost reduces the value of the marketing margins. Transport cost was significant at all 90%, 95% and 99% confidence level. This is true because transport is a cost. Therefore, an increase in a cost should definitely lead to a loss of revenue, which in this case is marketing margins. This is also saying that the further the farmer from the market the lower his/her market margin.

Quantity traded was another factor that was discovered to affect marketing margins at farmer to retail level. The coefficient was found to be 84.75406. This meant that an increase in the quantity traded by 1kg would result in an increase in marketing margins by ZMK 84.75406. This in another way is saying that increasing quantity traded leads to increase in the marketing margin. Therefore, a farmer who produces more groundnuts is likely to have a higher marketing margin than a farmer compared to one who produces less. Quantity traded was significant at 90%, 95% and 99% confidence level.

Sex was found to affect marketing margins at 90% and 95% confidence level. Since sex is a categorical variable a dummy variable was created (female was dropped). The coefficient of sex was found to be 3613.11. This means that a male farmer will have ZMK 3, 613.11 higher marketing margins than a female farmer. Education of the farmer was another categorical variable with a coefficient of 3409.5. The categories were primary education and secondary

education. Primary education was dropped. A coefficient of 3409.5 meant that a person with secondary education will have ZMK 3,409.5 higher marketing margin than a farmer with primary education. This can be attributed to the superior marketing and negotiation skills that a person with a secondary education has over a farmer with a primary level of education. Education was found to be significant at 90% and 95% confidence interval.

Age and farm size were not found to be significant at 95% and 99% confidence interval. However, farm size was found to be significant at 90%, with a coefficient of -1361.305.A residual value or constant of the model was found to be 6723.016. This implied that if all other factors that affect marketing margins (transport cost, quantity traded, sex, education and farm size) were zero, marketing margins would be equal to ZMK 6, 723.016.

Table 8: Regression Results

Variable	Coefficient	Robust Std. Errors	P-Value	P > t	95% Confidence Interval	
Transport Cost	-0.8137178	0.235121	-3.46	0.001	-1.280025	-0.347410
Quantity Traded	84.75406	26.33576	3.22	0.002	32.52329	136.9848
Sex	3613.11	1660.772	2.18	0.032	319.3613	6906.859
Age	-61.43938	85.03029	-0.72	0.472	-230.0769	107.1982
Education	-3409.305	1663.934	-2.05	0.043	-6709.325	-109.2849
Farm size	-1361.427	813.8603	-1.67	0.097	-2975.527	252.6728
Constant	6723.016	5790.464	1.16	0.248	-4761.003	18207.04

Test for Multicollinearity

To test for multicollinearity, VIF test was done in Stata. Multicollinearity occurs when the explanatory variables (in this study the explanatory variable were transport cost, quantity traded, sex, education, age and farm size) are highly intercorrelated.

When the explanatory variables are intercorrelated, it becomes difficult to disentangle the separate effects of each of the explanatory variables on the explained variable (in this study the explained variable was marketing margin). This leads to failure to give decisive answers for the

questions posed in the study. A VIF test will show whether there is presence of multicollinearity in the model.

The results of the VIF test are shown in Table 9 below. The criterion is that the VIF should be less than 10 or 1/VIF should be less than 1. All the variables in the model had a VIF of less than 10 or 1/VIF less than 1. The mean VIF was found to be 4.41, which was also less than 10. This meant that the explanatory variables were not intercorrelated.

Table 9: Results for Multicollinearity

Variable	VIF	1/VIF
Quantity traded	9.36	0.106861
Transport Cost	9.24	0.108191
Education	2.58	0.388033
Sex	2.34	0.426744
Age	1.55	0.644194
Farm size	1.41	0.709332
Mean VIF	4.41	

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the conclusion and recommendations of the study based on the findings and interpretations of the study.

5.2 Conclusion

The study found that there are differences in the structure and conduct of the informal and formal groundnut seed sector. The major differences were that the formal markets tended to be more oligopolistic while the informal market was more competitive. The factors that favour imperfect competition within formal sector were identified and include unequally distributed market share, product differentiation, incomplete information, advertising /promotional activities and barriers to market entry such as large capital needed, lack of credit facilities, government policy/legislation and the presence of the large already established companies. Major barriers for formal markets being large already established firms.

In the informal seed sector factors that favour perfect competition were identified to be large number of producers, similarity of product sold by the farmers, availability of information, and the lack of promotions. Due to the low marketing margins ZMK 34, 261 per 5Kg (i.e. ZMK 6, 852/ Kg and small market share on average 35% that the farmers had, the informal market was found to be inefficient.

Transport cost, quantity traded, sex of the farmer and education level were identified as factors that affected marketing margins at farmer to retail level, This study has established that transport cost reduces the level of marketing margins while the quantity traded by the farmers increases the level of marketing margins while, a male farmer will have a higher marketing margin compared to a female farmer. Likewise, farmers with a secondary compared to those with a primary level of education obtained higher marketing margins.

5.3 Recommendation

Based on the conclusion made above, the following recommendations are being made:

There is need to promote competition in the formal groundnut seed sector. One of the ways would be to offer credit to those companies that want to enter the market. This would lead to decrease in the market power that the already established companies have. There is also need for the private seed companies to carry out promotions that would make the small holder farmer access complete information with regard to groundnut seed prices and quantity.

Given the generally low marketing margins found in the informal groundnut seed markets, there is need for the government as is the case with maize to both provide market centers for groundnut seed and improve the rural road networks within the farmers area that could eventually lead to the lowering of the transportation costs of farmers produce.

There is need for established seed companies as well as the government though policy legislation to encourage integration of formal and informal groundnut seed markets so that there is exchange of information and good practices related to purchases of improved seed varieties.

The existing diversification efforts of especially the Ministry of Agriculture and Livestock need to be further supported if the farmers over reliance on growing maize were to be shifted towards growing other crops of value such as groundnuts.

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APPENDIX: QUESTIONNAIRE

Questionnaire 1: Farmer Questionnaire Questionnaire serial number: | | |

The University of Zambia

Department of Agricultural Economics and Extension Education

Marketing Efficiency of Groundnut Seed Market

In Lusaka District

This questionnaire is for academic purpose only. You are rest assured that all the information you provide will be treated as private and confidential as possible. Please answer all the questions honestly. Your cooperation will be highly appreciated.

Instructions: Please tick (√) the box or mark with a cross (χ) when answering as shown below

1. Do you like groundnuts?

a. Yes [√]

b. No [ ]

Respondent Details | *For official use only*

. District.....

. Name of Respondent.....

. Age at last birthday.....

. Sex

a. Male [ ]

b. Female [ ]

. Marital status

a. Single [ ]

b. Married [ ]

c. Widowed [ ]

d. Divorced [ ]

6. Highest education attained

   a. No education [ ]
   b. Primary [ ]
   c. Secondary [ ]
   d. Tertiary [ ]

7. What is the annual income (ZMK)?

   a..500000 [ ]
   b. 500000-1000000 [ ]
   c. >1000000 [ ]

9. What is your household size?

   a. Less than 5 [ ]
   b. 5-10 [ ]
   c. More than 10 [ ]

10. Age distribution of house hold(*Please write the number of you household members who lie in each of these ranges in the brackets provided)*

    a. <15yrs [ ]
    b. 15-30yrs [ ]
    c. 31-45yrs [ ]
    d. >45yrs [ ]

Farm Details

11. What are the main Crops that you grow?

	Yes	No
a. Maize	[ ]	[ ]
b. Groundnuts	[ ]	[ ]
c. Beans	[ ]	[ ]
d. Cowpea	[ ]	[ ]
e. Rice	[ ]	[ ]
f. Soyabean	[ ]	[ ]
g. Sorghum	[ ]	[ ]
h. Millet	[ ]	[ ]
i. Cassava	[ ]	[ ]

j. Sweet Potato [ ] [ ]

k. Others.....

12. What is the approximate size of your farm?

a. <5acre [ ]

b. 6-10 acre [ ]

c. 11-20 acre [ ]

d. >20 [ ]

13. Do you own or hire the land on which you farm?

a. Own [ ]

b. Hire [ ]

14. What is the roofing material for the main farm house made of?

a. Iron [ ]

b. Asbestos [ ]

c. Tiles [ ]

d. Grass/straw [ ]

15. What is the wall material for the main farm house made of?

a. Burnt bricks [ ]

b. Concrete blocks [ ]

c. Mud bricks [ ]

d. Pole and dagga [ ]

e. Grass [ ]

16. What is the main source of water for the farm?

a. Community pump [ ]

b. River [ ]

c. Dam [ ]

d. Tap [ ]

e. Own Well [ ]

Groundnut Seed Details

17. How do you allocate your labour between groundnuts and other crops?

    a. Equally [ ]
    b. More than half for other crops [ ]
    c. More than half for groundnuts [ ]

18. What is the total amount of groundnut seed you bought for this farming season?

    a. 0kg(recycled the seed) [ ]
    b. <5kg [ ]
    c. 5-10kg [ ]
    d. 10-15kg [ ]
    e. >15kg [ ]

19. If you recycled your seed, why do you do this?

    .....

20. What groundnut variety do you prefer most?

    a. Makulu Red [ ]
    b. Chalimbana [ ]
    c. SC Orion [ ]
    d. SC Nyanda [ ]
    e. SC Mwenje [ ]
    f. Other (specify.....

21. Why do you prefer this variety?

    Early maturity [ ]
    a. Disease resistant [ ]
    b. High yielding [ ]
    c. Other (specify).....

22. Which seed company do you buy your groundnut seed mostly from?

a. SeedCo Limited [ ]

b. ZamSeed [ ]

c. Pannar Seed [ ]

d. MRI seed [ ]

e. Other (specify).....

23. How did you hear about this company?

a. Radio [ ]

b. T.V [ ]

c. Newspaper [ ]

d. Magazine/Brochure [ ]

e. Word of mouth [ ]

f. Other.....

24. Why do you prefer seed from this company?

a. Lower cost [ ]

b. Good packaging [ ]

c. Early maturing seed [ ]

d. High yielding [ ]

e. Other (specify).....

25. Is the information about the seed prices readily available?

a. Yes [ ]

b. No [ ]

26. How do buy your seed?

a. Has an individual farmer [ ]

b. Through a Co-operative [ ]

27. How much do you buy a 5kg packet of groundnut seed?

.....

28. How much do you sell a 5kg packet of groundnut?

.....

29. How much do you spend on average every farming season to make the groundnuts ready for sale? .....

30. How much do you earn on average every farming season from the sale of groundnuts?

.....

THANK YOU FOR YOUR COOPERATION

Questionnaire 2: Retailer Questionnaire Questionnaire serial number: | | | .

The University of Zambia

Department of Agricultural Economics and Extension Education

Marketing Efficiency of Groundnut Seed Market

In Lusaka District

This questionnaire is for academic purpose only. You are rest assured that all the information you provide will be treated as private and confidential as possible. Please answer all the questions honestly. Your cooperation will be highly appreciated.

Instructions: Please tick (√) the box or mark with a cross (χ) when answering as shown below

1. Do you like groundnuts?

a. Yes **[√]**

b. No **[ ]**

---

1. Name .....
2. How long have you been in operation?

a. <3 years [ ]

b. 3-5 years [ ]

c. 6-10 years [ ]

d. 10years [ ]

3. What groundnut variety do you sell?

	Yes	No
a. Makulu Red	[ ]	[ ]
b. Chalimbana	[ ]	[ ]
c. Chishango	[ ]	[ ]
d. Chipego	[ ]	[ ]
e. Common Natal	[ ]	[ ]

4. Do farmers ask for specific varieties?

a. Yes [ ]

b. No [ ]

5. Which seed company do you deal in?

	Yes	No
a. SeedCo Limited	[ ]	[ ]
b. ZamSeed	[ ]	[ ]
c. Pannar	[ ]	[ ]
d. MRI Seed	[ ]	[ ]

e. Other.....

6. Are there any contracts on quantity of seed delivered by seed companies?

a. Yes [ ]

b. No [ ]

7. Do any seed companies offer seed on credit at times?

a. Yes [ ]

b. No [ ]

8. Are you aware of seed prices and quantities available in the market?

a. Yes [ ]

b. No [ ]

9. Do you carry out any promotions to attract customers?

a. Yes [ ]

b. No [ ]

10. Do you solely deal in seeds?

a. Yes [ ]

b. No [ ]

11. Do you have any other outlets in Lusaka?

a. Yes [ ]

b. No [ ]

12. What are the main challenges when entering this business?

	Yes	No
a. Large capital needed	[ ]	[ ]
b. Lack of credit facilities	[ ]	[ ]
c. Government policy	[ ]	[ ]
d. Large already established companies	[ ]	[ ]

13. What is the total groundnut quantity of seed you seed did you sell between the period November 2011-January 2012? .....

THANK YOU FOR YOUR COOPERATION