CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Tropical AgriSciences

Department of Economics and Development

Analysis of market parameters for groundnuts in Mazowe district, Zimbabwe

Master's thesis

Supervisor:

Ing. Alexander Kandakov, Ph.D.

Author:

B.Sc. Donald Mbangani

Prague 2016

Declaration

"I hereby declare that this master's thesis titled **Analysis of market parameters for groundnuts in Mazowe district, Zimbabwe** is my own work and all the sources have been quoted and acknowledged by means of complete references."

22nd April 2016, Prague   ………………………..

                                                                                    B.Sc. Donald Mbangani

Acknowledgements

First and foremost, I would like to thank God for the gift of life and seeing me through the course of my study. I offer my sincere gratitude to the Government of Czech Republic for providing me with a scholarship and the Government of the Republic of Zimbabwe for granting me a manpower development leave from work.

I would like to sincerely thank Ing. Alexander Kandakov, Ph.D. for tirelessly supervising my research work, his guidance and support is highly appreciated. I also gratefully acknowledge the financial support for research that I got from the Faculty of Tropical AgriSciences at the Czech University of Life Sciences. Great appreciation also goes to Dr I.W Nyakudya, Joseph Garati and the Agritex Mazowe district team for assisting me during my data collection in Zimbabwe.

To my mom, family and friends, thank you for the support and prayers during difficult times. May God richly bless you all!

Abstract

Groundnut has been grown for many decades by small scale rural farmers in Zimbabwe as a means to boost their income. Production has been declining since the turn of the millennium due to many reasons which includes among others, having unsustained markets which has seen the country importing from neighbouring countries. The aim of the study was to investigate the availability and accessibility of groundnut markets in addition to analysing the factors influencing rural farmers' marketing decisions with particular emphasis on prices. Literature sources and previous research suggested that women take a leading role in the marketing of groundnuts and market prices are highly seasonal. To fulfil the aims of the thesis, a cross-sectional survey was conducted in Mazowe district. A questionnaire was administered to 100 respondents from 10 randomly selected wards in the district. Key informant interviews and focus group discussions were also conducted to triangulate the findings from the main survey. Data capturing was done using SPSS version 20 and the analysis was done using MS Excel. Data was analysed using descriptive statistics, Friedman rank test and time series analysis. A Likert scaling technique was used to rate farmers' perception on factors affecting price of groundnuts on the markets. Findings from the research indicated that groundnut markets are available in Mazowe district though the more lucrative ones are less readily accessible for rural farmers. Time series analysis of prices revealed that they are seasonal with the highest prices in April and lowest in July. The study concluded that three marketing channels are available in the study area and women play a significant role in groundnut marketing even though various constraints to marketing were cited.

Key words; Market channels, price, market constraints, groundnut, Mazowe, Zimbabwe

Table of Contents

List of figures

List of tables

List of abbreviations

Agritex   Department of Agricultural Technical and Extension Services

AMA   Agricultural Marketing Authority

DAFF   Department of Agriculture, Forestry and Fisheries

FAO   Food and Agriculture Organisation

GMB   Grain Marketing Board

IMF   International Monetary Fund

MAMID   Ministry of Agriculture Mechanisation and Irrigation Development

NGO   Non-Governmental Organisation

SNV   Stichting Nederlandse Vrijwilligers (Netherlands Volunteers)

USAID   United States Agency for International Development

USD   United States Dollar

WB   World Bank

ZFU   Zimbabwe Farmers Union

ZIMSTAT   Zimbabwe National Statistics Agency

1. Introduction

Groundnut has traditionally been a famous cash-cow in Zimbabwe (Dhewa, 2014). Zimbabwe's groundnut production has been declining since the turn of the millennium due to seed deficiencies and a decline in the number of farmers growing the crop. The low production in groundnuts is also due to a number of reasons which includes among others, having an unsustained market. The productivity is low and markets cannot be sustained on local production and the country has been importing groundnuts from neighbouring Malawi (Makopa, 2014; FAO, 2015).

Zimbabwe's small rural farmers are responsible for producing about 75% of the groundnuts and they use mainly Spanish cultivars that are grown in light soils (Hartdegen, 2011). Key informants estimate of smallholder groundnut production put the figure in the neighbourhood of 60 percent to 65 percent of national output (SNV, 2012). Furthermore, Malawi is the largest supplier of groundnuts to Zimbabwe followed by South Africa, Mozambique, and Zambia (FAO, 2005). Consumers buy groundnuts for peanut butter processing, for eating (whether boiled, raw or roasted) and for seed (Dhewa, 2014).

Farmers lack adequate market information on desired varieties, and are also not organised to market their crops as groups to enhance their negotiating power for better marketing deals (SNV, 2012; Makopa, 2014).This is worsened by lack of extension support on groundnuts as a cash crop. Farmers lack sufficient knowledge on expected yield by variety, types of varieties, market demand and scientific names of varieties (Dhewa, 2014). Large groundnuts processors depend on imports for their processing requirements (USAID, 2010).

The informal market has become a major player in the groundnut value chain because it presents a ready market with farmers paid cash. This market has also become a reliable source of groundnuts for small and medium scale peanut butter processors and farmers who want to buy groundnut for seed (Dhewa, 2014).Farmers and traders have agreed on their own grading. Although it has lost some of its glamour, groundnut remains both a cash crop and a wholesome food. It substitutes a lot of foods – relish, cooking oil, lotion.

2. Literature Review

2.1 General information about Zimbabwe

The Republic of Zimbabwe is a landlocked country situated in the southern-central part of Africa. It is bordered by Zambia on the north, Botswana on the west, Mozambique on the east and South Africa to the south. The country has a total of 10 provinces, 8 of which are administrative provinces and the other 2 are metropolitan provinces. Harare is the capital city and main administrative centre and the country population was estimated to be 14.1 million (WB, 2014). Zimbabwe has 3 official languages namely English, Shona and Ndebele. According to FAO (2011), the country has 39 076 000ha of land in total subdivided into 16 400 000 agricultural land, 15 311 600ha forest area and the remainder being allocated to other land uses.

In terms of economic performance, the nominal GDP of the country was estimated at 14.2 billion USD (WB, 2014) and which is rank 122 by country according to the IMF (2014). Per capita GDP was estimated at 931USD and the GNI per capita PPP was 1650 USD (WB, 2014). Zimbabwe's HDI ranking recovered to 156 in 2014, and a Multi-Indicator Cluster Survey in 2014 revealed that in several key areas, Zimbabwe has regained outcome levels of the early 1990s (WB, 2015). The services sector dominate the contribution to GDP with 54.6% followed by industry (25.1%) and lastly agriculture with 20.3% (WB, 2012). Agriculture was once considered as the backbone of the economy. Currently 60% of the 5.634 million labour force is employed in agriculture, 31% in industry and 9% in the services sector.

2.2 Groundnut Production in Zimbabwe

Groundnuts (*Arachis hypogaea* L) in Zimbabwe are principally grown by communal and resettlement farmers in Natural (Farming) Regions 2to 3 under dry land conditions. The principal growers of groundnuts are smallholders and in this farming sector the crop is predominantly considered a woman's crop (Ngulube et al., 2001; SNV, 2012) . Groundnuts are also grown in regions 4-5 under irrigation. SNV (2012) estimated that the

number of smallholder groundnuts growers was above 1.5 million whilst commercial groundnuts producers were estimated to be below ten thousand farmers.

The crop originated in South America but it is now grown in almost all tropical and sub-tropical countries. The crop is beneficial in dietary terms as it is a good source of protein, edible oils, energy, minerals and vitamins. Groundnuts are also a very good rotation crop because of its nitrogen fixing qualities while also useful in terms of the production of animal feeds (SNV, 2012). Production has traditionally been viewed as women's socioeconomic activity mainly for household consumption and to supplement household income through local sales of shelled and unshelled nuts as well as peanut butter (SNV, 2012).

Table 1 below shows productivity levels of between 0.29 and 0.71tonnes/hectare from the year 2000 through to the 2013/2014 season compared to up to 4 tonnes/hectare under irrigation as observed in studies by FAO (1997). In the 2005 season, productivity dropped to 0.29t/hectare (MAMID, 2012) reflecting farmers' inclination not to allocate prime land and other resources to groundnuts production. Waddington and Karigwindi (2001) corroborate this experience when they noted that smallholders find it more beneficial to continuously grow maize with fertilizer than rotate with groundnuts because of low yields, marginal to zero profitability and high labour costs of groundnuts-maize rotations. At smallholder level groundnuts production is not necessarily considered a commercial operation.

Table 1: Groundnut production Trends

Year	Area Planted (hectares)	Average Yield (tonnes/ha)	Total Production (tonnes)
2000	268104	0.71	190890
2001	260015	0.66	171740
2002	258065	0.47	120000
2003	239985	0.61	146727
2004	133327	0.48	64157
2005	200604	0.29	57754
2006	176208	0.47	83170
2007	275088	0.45	125000
2008	180018	0.44	80000
2009	169991	0.46	78570
2010	256208	0.41	106147
2011	200000	0.43	85000

2012	220014	0.42	93000
2013	149988	0.42	62500
2014	200000	0.42	84000

Source: FAOSTAT (2015)

In terms of seed, both Government and Seed Houses (SeedCo, Agriseeds etc) have bred over eleven groundnut varieties. SeedCo has developed three groundnut seed varieties (SC Orion,SC Nyanda and SC Mwenje). SC Orion is a long season (160 days) high yielding variety adapted to production under irrigation while SC Nyanda is a short-season variety, drought and heat stress tolerant and gives good yields in marginal rainfall areas. SC Mwenje is a short season variety, virus resistant, suitable for most value-adding market purposes, and can be used for peanut butter and most other confectionery needs (SNV, 2012).

2.2.1 Groundnut production constraints and opportunities

Hilderbrand (1995) identified the cost of credit and inputs, unattractive prices, and water scarcity as the most important constraints in groundnut production. Today, the list of sticking constraints may look quite different: competition with more lucrative cash crop, tobacco; poor access to improved seed and inadequate crop management practices. Many farmers in communal areas tend to grow only traditional varieties with mostly low yield potential (Minde et al., 2008).

The decline in productivity of groundnuts is due to several constraints that smallholder farmers encounter. These constraints include use of low yielding materials, declining soil fertility through poor crop management and low nutrient application, inadequate support services such as extension services and credit facilities, pests and diseases, and a clash in labour demand (Kumwenda and Madola, 2005). Groundnut yields are poor because of the low, unreliable rainfall, often with midseason drought.

Groundnut production is labour intensive and additional labour is required especially for stripping, shelling and even grading. Results from a gross margin experiment (Ngulube et al., 2001) reported that stripping and shelling were the major labour demanding activities in groundnut production and contributed to about 40% of the total production cost. Manual labour and hand-hoe technologies account for 85% of farm operations; only

4

a few smallholder farmers use draft animal power. Availability of seed is another major drawback because seed supply is seasonal and production is dependent on weather and price fluctuations. Seed production is mainly in the hands of smallholder farmers. When a crisis arises, farmers often sell or consume what they would have originally put aside as seed. Despite Zimbabwe having developed over 11 varieties since 1950, which yield 80% more than local ones, mostly smallholder farmers still use retained season. The market for processed seed is not developed due to low demand (SNV, 2012).

Kumwenda and Modola (2005) reported that low producer prices were one of the major marketing constraints facing smallholder farmers. Grain prices tend to rise near planting time; farmers are able to get a higher price at that time than if they sell at harvest. The ability to store grain rather than producing superior quality grain earns a premium. Other challenges that were identified included: lack of information on high-value crops, difficulty in accessing finances for exporting, poor support and advisory services, and lack of expertise on marketing skills. Access to markets due to poor road networks in the rural areas was also identified as one of the problems. The dominance of smallholder farmers in groundnut production poses a great challenge to buyers in the sense that it is costly to assemble the commodity at one point if the trader is buying large quantities. This increases handling and transport costs as well as product losses. In the remote rural areas vendors operate in consent with transport providers in circuit markets, thus overcoming poor inter-regional arbitrage, one of the most significant obstacles to trade. Small traders have not, however, the financial means or storage capacity to engage in inter-seasonal arbitrage and thus are committed to a continuous cycle of buying and selling.

Non-use of other external inputs also contributes to low productivity since farmers, mostly in communal and resettlement areas, are unwilling to invest in fertilizer, lime, chemicals and other technologies to boost productivity. Not much inter-farmer transfer of best practices e.g. through farmers' organizations focuses on groundnuts, which like other small grains do not have the 'pride of place' that crops like maize, cotton and tobacco for instance have. Groundnuts are not given priority because it is used mostly for home consumption and are generally considered a woman's crop thus given low priority among the crops that are grown by households in Zimbabwe (SNV, 2012).

Overall the production of groundnuts is constrained by production and productivity challenges, issues around farmer organization and knowledge transfer, low private sector

appetite to support production due to some negative experiences and weak marketing structures. Traditionally, the bulk of Zimbabwe's groundnuts has been produced by smallholder farmers mainly as a source of vegetable protein. However the high demand for groundnuts by the oil expressing industry as well as by confectioners makes it an even more important source of cash revenue that contributes significantly to both the rural and national economy (SNV, 2012).

2.2.2 Groundnut farming systems

Groundnut is mostly grown by resource-poor farmers, particularly women farmers (Minde et al., 2008, Derlagen and Phiri, 2012). For this reason, groundnut is referred to as a woman's crop in Malawi (Ngulube et al., 2001). Farmers grow groundnut as a sole crop or in combination with cereals such as maize (*Zea mays* L). Although farmers sometimes grow groundnut and maize together, the groundnuts often do not do well because this crop requires a lot of sunshine and the shading effect from the maize reduces yields. Therefore, the crop is mostly mono-cropped. Groundnut grows well in the plateau areas with deep, well-drained sandy loamy soils (Chiyembekeza et al., 1998).

Generally, groundnut is grown in all areas where tobacco and maize are grown. This has implications in terms of competition for labour. The very same farmers who grow tobacco and maize also grow groundnut and because maize is the staple food and tobacco is the main cash crop in these areas, groundnut is frequently given the last priority and planting is done after tobacco and maize. It has been demonstrated through on-station and on-farm experiments that late planting results in low yield due to diseases and poor pod filling (Chiyembekeza et al., 1998).

2.2.3 Post harvest processes for groundnuts

Groundnuts are shelled either at household or factory level. At household, shelling is done either by hand or hand-operated shelling machines produced and distributed locally (SNV, 2012). Groundnuts are a high value crop that can be marketed with little processing but are extremely versatile and can be used in a wide range of products. The

oil made from them can be used for cooking and they can be used to make peanut butter. In South Africa processing facilities mainly belong to various companies that produce a wide range of products. These include companies that produce peanuts, sweets, peanut-butter and cooking oil just to mention few Oil contains high amounts of energy and fat-soluble vitamins (A, D, E, and K) and essential fatty acids (DAFF, 2012).

Groundnut contains about 11% carbohydrate, 30% protein, 45% oil, 2% ash and 5% water (Awoke, 2003). After oil extraction, the residues are good sources of protein useful in bakeries and in the manufacture of livestock feeds. The oil content of the kernels is between 45% and 55%. The peanuts are prepared for the oil extraction process by being shelled and cleaned. Oil production requires some type of press with which to extract the oil from the groundnuts and filtering equipment. They can be boiled or roasted for immediate consumption or used as raw material of various products in the industry. Oil extracted from the groundnut can be used as raw material for manufacturing of soap; massage oil for polio patients; body, shaving and hair creams; and fluid diet which is used to physically strengthen patients and to sharpen their appetites before and after operations. The oil cake which is by-product of oil extraction process is used to make glue for wood; animal feed; fertilizers and antibiotics (DAFF, 2012).

2.3 Groundnut subsector in Zimbabwe's economy

Groundnut is an important food legume in smallholder agriculture in Malawi, providing approximately 25% of agricultural cash income. The seeds contain 25% digestible protein and 50% edible oil. The surplus is marketed and provides a much-needed cash income to the smallholder farmers. Groundnuts, being a leguminous crop, enrich the soil with nitrogen through biological nitrogen fixation and are therefore valuable in crop rotations and soil improvement. Groundnut hauls are also valuable as fodder for animals and fuel. National commercial demand for groundnuts is estimated at between 120 000t and 130 000t per year (USAID, 2010). Production figures for the 2012/13 and 2013/14 seasons were 62 500t and 84 000 respectively (MAMID, 2012; FAOSTAT, 2015).
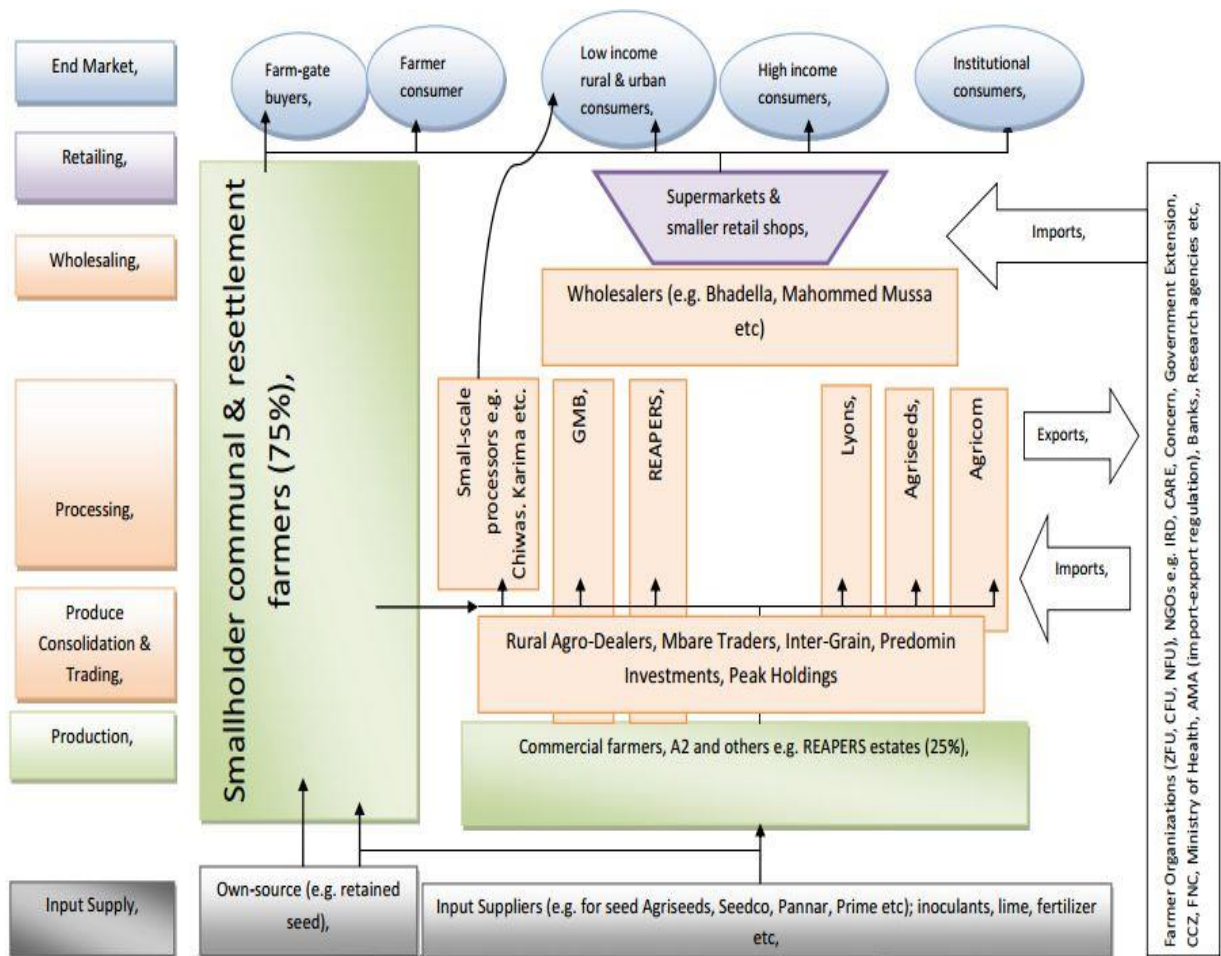
Figure 1: Groundnuts subsector map

Source: SNV (2012)

2.4 Groundnut marketing

Because of the weak marketing arrangements for groundnuts produced by smallholders not all the produce is marketed formally (SNV, 2012). Groundnuts are a decontrolled crop although previously the Grain Marketing Board (GMB) operated the only approved shelling plants. The local supply of groundnuts does not meet the requirements of local processors throughout the year. Large local processors import roughly 90% of their requirements because local groundnuts supplies dry up or become uneconomic for bigger subsector players from about August of each year till the next harvest period. Overall, processors meet their raw material demands through local

8

produce and imports from within the region mainly from Malawi and Zambia (FAOSTAT, 2015).

2.4.1 Household marketing decisions

Over the past two decades many studies have investigated how agricultural supply and transactions costs affect the decision to trade or not to trade among agricultural households (Goetz, 1992; Omamo, 1998; Key et al., 2000; Renkow et al., 2004). These studies conclude that when faced with a marketing decision concerning an agricultural commodity, households decide to either become a buyer or a seller of that commodity, or they decide not to participate in the market as an autarkic household. Thus the decision to trade or market an agricultural commodity is divided into two separate decisions. The first decision concerns if the household will buy or sell or not participate at all. The second decision concerns the amount that a household buys or sells, conditioned on the premise that they first decided to trade.

It is evident that supply conditions and transactions cost affect the two marketing decisions. A household with a small harvest would most likely not have a surplus to sell and may need to become a buyer in order to meet its consumption needs (Key et al., 2000). A remote household facing a long and expensive trip to a market may choose to not sell at all. This is especially true if the household is unaware of the market price or if ready buyers exists, dampening the household's response to price incentives (Omamo, 1998). Thus it is apparent, that both agricultural supply and transaction costs play a large and obvious role in the determination of household marketing decisions.

A World Bank study found poverty rates were no higher among women headed households in four of the six countries studied (Blackden, 1999). A study conducted in Uganda reinforces this finding. Using national household survey data, it found that women headed households are no poorer than similar households lead by males (Appleton, 1996). While it is true that women in sub-Saharan Africa usually do most of the domestic household chores like food processing and storage, they also do up to 60% of the household marketing, a more economically prominent activity (Blackden, 1999). In regions like central Ghana, they actually make up approximately the majority of market traders and often organize and lead trading organizations (Clark, 1994). Clearly, while

women certainly still face gender specific hardships, they are also finding ways to successfully participate in the market economy.

Farmers can either transport their groundnuts to the nearest town for sale, which means finding transport and incurring transport costs for themselves and their produce, but ensures them a higher per kg price and usually the choice of several buyers, or they can sell locally to stationary or roving traders. Before making the decision to transport their produce to town, farmers need access to information on prices being paid, something they don't always seem to know how to access.

Those selling their produce in their villages do so either to small-scale traders or agents buying from a fixed point or to roving traders using bicycles and motorcycles. Those for whom travelling to town is not an option due to lack of transport or capacity, for example, are subject to none of the costs and challenges of travelling to town, however, they are in a very weak bargaining position when it comes to agreeing prices. Women often fall into this group, finding a marketing trip to town too daunting. The decision where to sell the crop is also often driven by how urgently a family needs cash. If there is a buyer close by but payment will be delayed as he doesn't have cash in hand, then even though a family may prefer to sell locally they will often make an alternative plan to ease their cash flow.

2.4.2 Marketing season for groundnuts

Groundnut buyers start to prepare their marketing season in April, recruiting agents at this time, and the first early season buying commences in May (De Clerk and Ross, 2012). As the groundnut marketing season is a long one spanning more than six months, the crop is sold as and when a family requires cash. As the prices per kg more than double from the beginning to the end of the season, households will keep their unshelled nuts for as long as possible before selling. The fact that nuts sold early in the season contain more moisture slightly compensates for the low per kg prices at this time, however. Storage for long periods also comes with a risk of produce degeneration and loss due to pest attack or theft.

In their study in Zambia, De Clerk and Ross (2012) gathered that marketing commences in April/May, peaks in August and is largely finished by the end of October (Figure 2). With the exception of extremely robust households, most often households will sell a few bags early in the season to generate urgent cash in May/June and then store what they can until prices increase and a further cash requirement induces them to sell.
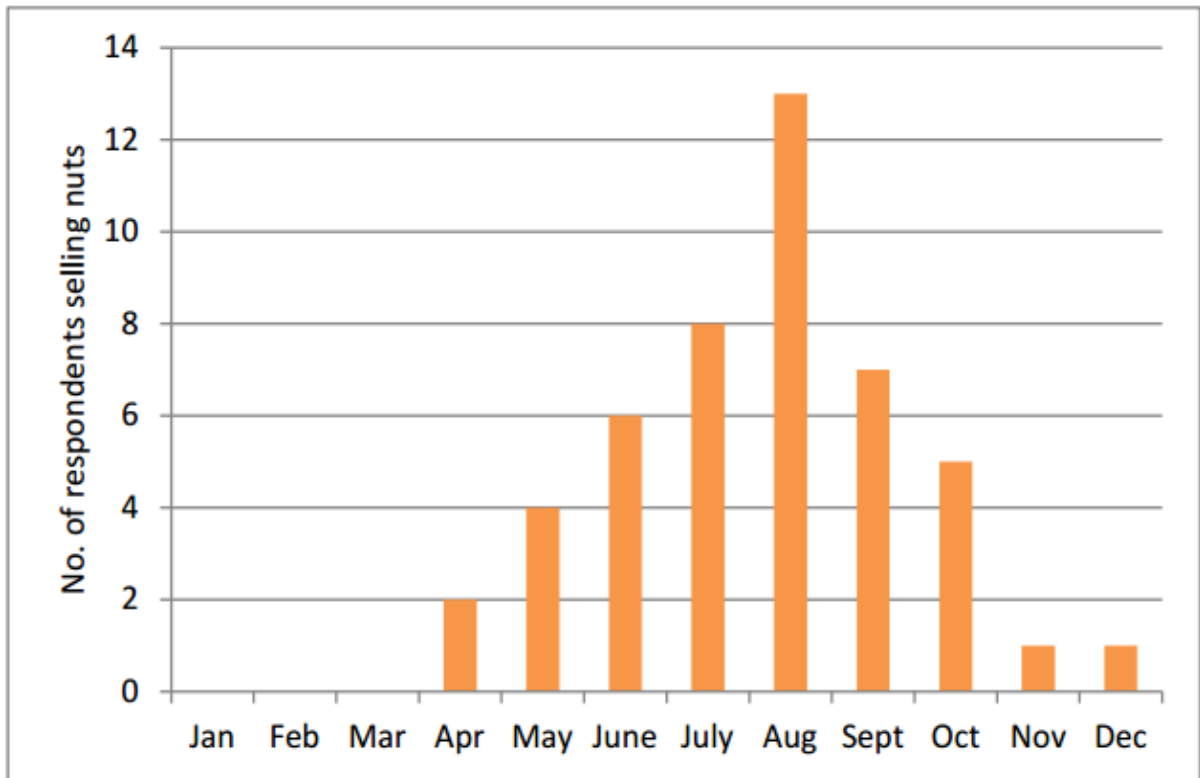
Figure 2: Timing of farmers' groundnut sales

Source: De Clerk and Ross (2012)

2.4.3 Marketing channels for groundnuts

Figure 3 describes the groundnut marketing channel in Malawi. The channel comprises producers, middlemen, traders, exporters, and processors. Farmers sell groundnuts to middlemen, traders and exporters. Traders are mainly large-scale buyers who purchase groundnut for retail and wholesale purposes whereas exporters are buyers who buy groundnut mainly for export. The traders buy from farmers and middlemen and subsequently sell to processors and exporters. The main difference between traders and middlemen is in terms of scale of operation and connectivity (Minde et al., 2008).

The traders are like middlemen but they operate on a larger scale and mostly come from the big cities or outside Malawi. They sometimes employ local people or buy from small middlemen within the community. The traders sell the groundnuts to exporters and processors, who can also buy groundnuts directly from the farmers. The exporters are buyers who are able to repackage (grading and packaging) whereas the processors are buyers who produce various groundnut products such as confectionery, peanut butter, cooking oil. They also have the opportunity to export these products or sell them in supermarkets (Minde et al., 2008).
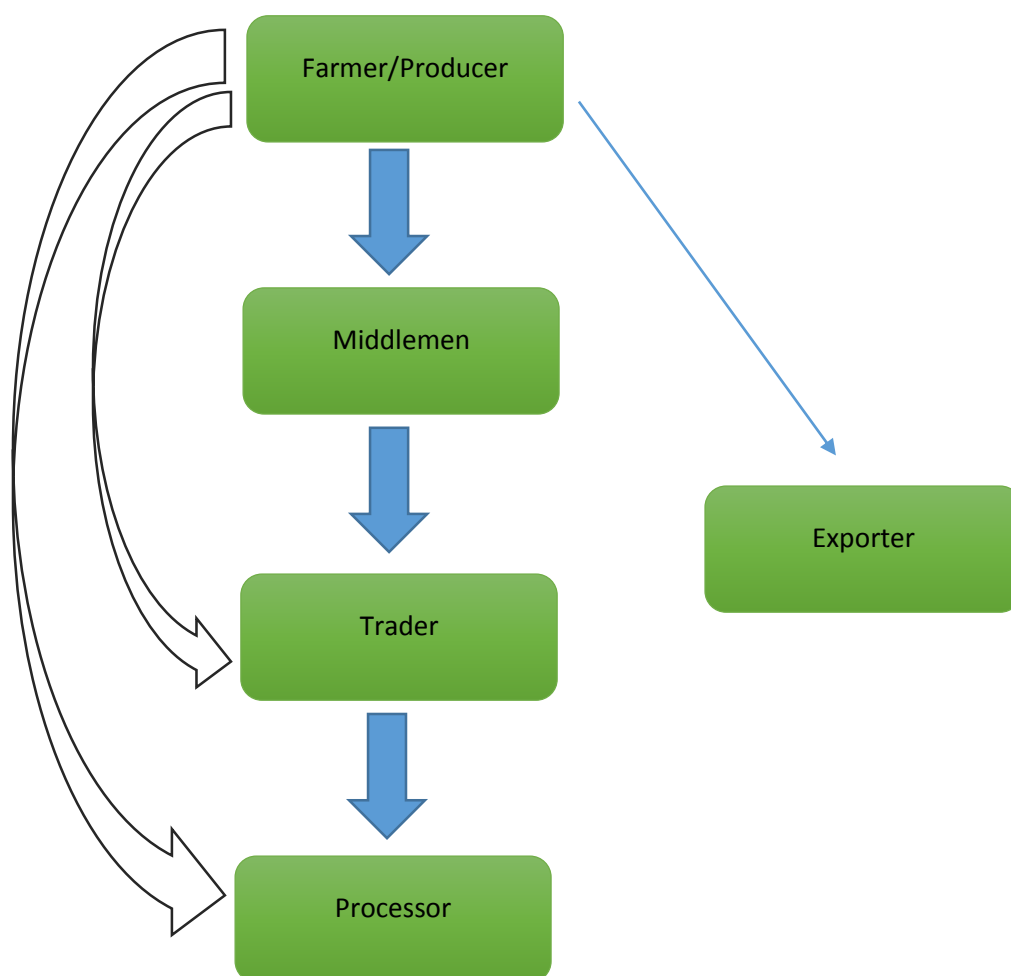
Figure 3: Typical groundnut market channel

Source: (Minde et al., 2008)

SNV (2012) observed that Zimbabwe's groundnuts subsector has four main market channels which are; the On-farm, Poor urban, High income urban and Institutional buyer's market channels. In the on-farm market channel groundnuts are consumed as a raw product or processed into roasted peanuts or peanut butter. The volumes entering

this market are unaccounted for. The poor urban market channel consumes groundnuts as a raw product, roasted peanuts or peanut butter. This channel is serviced by retailers and supermarkets operating in the high density areas and through local small scale processors sourcing groundnuts directly from smallholder farmers of Mbare Market. Like the on-farm market, this is also unaccounted for or fully quantified (SNV, 2012).High income urban market channel is supplied by supermarkets and also consumes imported peanut butter. Institutional buyer's market channel. This channel is made up of schools, hospitals, hotels and restaurants. These institutional buyers mostly purchase directly from the processors and few quantities from wholesalers and retailers.

The first two channels are largely supplied through the informal marketing channels not necessarily by the formal private sector-led processing model. The informal marketing framework has remained flexible in terms of the business model and over the years expanded its reach especially with the growth in appropriate technology for shelling and peanut butter making. Actors in this market segments have become aggressive and also sophisticated with the result that formal processors have almost been pushed out. Some home-based processors of peanut butter have coalesced into clubs that export peanut butter to neighbouring countries (SNV, 2012).

The high income urban market channel is a specialized one where consumers for products like peanut butter look for specific qualities like consistency and smoothness. This is the segment facing serious challenges in terms of accessing groundnuts from the local market for processing into locally marketed products and exports. Actors supplying this segment like GMB noted significant unmet demand with orders of up to 200t/month not being supplied (SNV, 2012).

2.4.4 Main traits of groundnut buyers

Along the groundnut marketing channels the buyers are characterized according to their legal status and size. Using these categories groundnut buyers can be characterized as sole proprietors, partnerships, local private traders, foreign traders, and small-,medium and large-scale local consumers (local community). Most buyers (52.9%) were sole proprietors, whereas 41.2% were in a partnership, and only 2.9% each were corporations or associations (Minde et al., 2008).

13

Groundnut buyers perform different business functions according to their sizes. These functions are wholesale, retail, credit provision, local demand forecasting, storage, provision of advisory services and risk bearing. It was established that most of the large-scale traders did not provide credit to the producers and were not involved in the retail business as compared to the small- and medium-scale traders.

Groundnuts are bought by a number of large and small-scale buyers. The main buyers in Zimbabwe include the GMB, Reapers, Agriseeds, Intergrain, Agricom, Predomn Investments and Peak Holdings. Leading small-scale processors include Chiwas and Kurima Investments, Bescom Enterprises and Rotvic. There is also a host of small processors and informal traders involved in the buying and resale of groundnuts. The middlemen sell to processors or to other traders at main markets like Mbare in Harare (SNV, 2012).

The produce mobilization framework was better when the Grain Marketing Board provided the link between farmers and the private sector. However, GMB is not playing that role effectively any more as it is also venturing into processing. This has created space for informal middlemen and formal commodity brokers who purchase groundnuts from farmers for onward selling to private companies in the subsector (SNV, 2012). This leaves farmers without any support for their production as these actors only come for buying. Discussions with the end-users of groundnuts showed that such companies had more flexibility than what GMB used to offer, although the unmatched comparative advantage of GMB is that it has better infrastructure across the country (SNV, 2012).

2.4.5 Marketing information systems for groundnuts

The availability of market information allows farmers to make an informed decision on which crops to cultivate depending on the needs of the market and the prices offered for the various crops. Access to market information is very important in setting up and running a successful business. Most traders established contacts for sourcing and selling groundnuts from other businessmen. Minde et al. (2008) observed the major sources of groundnut marketing information to the farmers were the buyers, neighbours, organizations, radio programs, and local leaders (Figure 4). This shows that there are

linkages among the buyers and that the buyers sometimes come through local leaders in conducting their business in the villages.

A large proportion of buyers do not have problems in obtaining market information since most of the information was obtained from fellow buyers who have easy access to the local leaders .The main difficulty in obtaining market information was attributed to lack of sufficient networking mechanisms with fellow buyers. This meant that they had to do their own market research and in the process they had to face transportation problems in reaching the farmers.
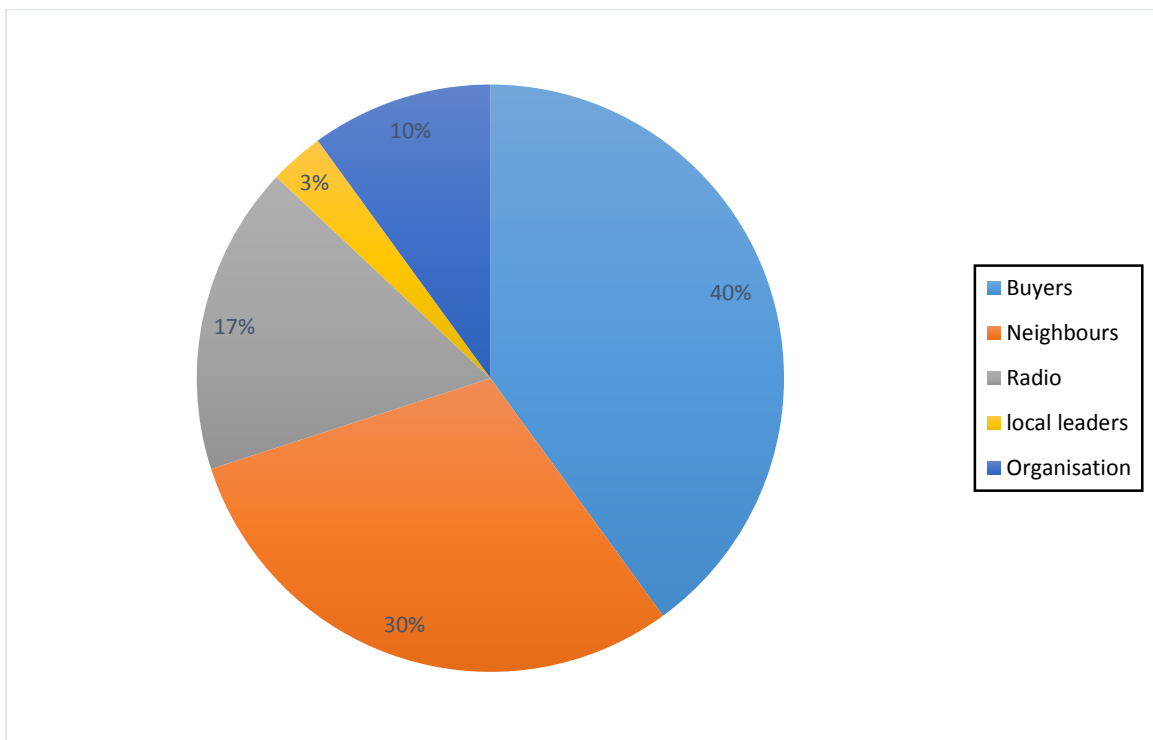
Figure 4: Major sources of groundnut market information

Source: (Minde et al., 2008)

However, buyers still faced problems in sourcing other types of information required for them to successfully run their business. For example, they found it difficult to obtain information about where to sell groundnuts in large quantities, accurate prices, and where to find steady markets. Farmers also identified some specific types of information that they wished to get access to. Some of these included where to sell in large quantities, where to get accurate price information, as well as where to source for credit to boost .By

virtue of the main producers being in the smallholder sector, extension services are mainly provided by Agritex with private sector related extension available to contracted farmers under Reapers, Agriseeds and Willards Foods for instance (SNV, 2012).

2.4.6 Pricing of groundnuts

There are different ways through which the price of groundnuts can be determined. In the past, the government, through GMB determined the price of groundnuts (SNV, 2012). However, with liberalization, prices are now increasingly determined by the players in the market. This has resulted in spatial and temporal price variation. It has also been established that the government plays a very minimal role as far as groundnut pricing is concerned. Where farmers determined prices, three methods were used, namely cost of production method, price offered in the previous year, and prices from the neighbouring markets .The cost of production method involved farmers taking into consideration all costs incurred up to taking the produce to the selling point. Then the farmers added a desirable mark-up on the costs to act as profit (Minde et al., 2008).

2.4.7 Marketing constraints for groundnuts

De Clerk and Ross (2012) cited the constraints faced by farmers when marketing their groundnuts to be low prices, distance to market, transport to market and lack of an organised and consistent market. Constrained local supply, which increases costs of mobilizing produce (logistics of buying small quantities of groundnuts from individual farmers and transporting it to processing plants) and at times creates an unproductive stampede amongst subsector actors for the available produce (SNV, 2012). Farmers are not producing big nuts. As such, the big nuts submarket needs to be fully understood as there is potential considering this is the type of produce most large scale processors demand. Unlike tobacco and cotton for instance which cannot be processed on-farm, groundnuts are highly susceptible to side marketing and on-farm processing, making it unattractive for contract farming (SNV, 2012).

High cost of production per unit and processing due to lack of a guaranteed supply of groundnuts throughout the year. As a result some companies have had to close at times

in the year e.g. GMB and REAPERS Shelling plants, Kurima Investments etc (SNV, 2012). Poor rural road networks which also pushes production costs. Trust deficits where farmers for instance insist on cash payments forcing large scale buyers to use Cash in Transit (CIT) services to reduce their exposure to risks. However, this increases companies' costs of participation in the subsector and reduces their competitiveness especially given the growing number of small scale processors active in the peanut butter value chain.

2.5 Financial returns from groundnuts

The production of a hectare of groundnuts costs USD404.00. The inputs include 80kg seed (USD144), 200kg Compound D (US$120), 200kg Gypsum (USD24) and 69 labour days. Table 4 below indicates financial returns from hectare of groundnuts, assuming that the farmer's yield is 900kg per hectare.

Table 2: Expected financial returns from a hectare of groundnuts

Item	Unit	Total
Minimum producer price	USD/kg	0.6
Expected yield	Kg/ha	900
Production costs	USD/ha	404
Gross return	USD/ha	540
Profit/Loss	USD/ha	136
Return per USD invested		1.34
Break even yield	Kg/ha	673.33
Return to family labour	USD/day	1.97

Source: SNV (2012)

3. Aims of the thesis

The main aim of the thesis was to determine the availability and accessibility of groundnut markets and to analyse and gain insight into factors influencing farmers' marketing decisions with particular emphasis on prices and their seasonality.

The specific objectives of the study were to;

1. Determine the availability and accessibility of groundnut markets for rural farmers

2. Analyse and gain insight into factors influencing farmers' groundnut selling decisions

3. Identify and assess marketing constraints faced by rural groundnut farmers in Mazowe district

4. Evaluate the seasonal trends in groundnut prices using time series analysis

The following research questions were crafted in order to elucidate the objectives of the research and to assist in confining the research to the main aim it sought to achieve;

1. Which are the main markets for smallholder groundnut farmers and how accessible are they?

2. What are the key farm household characteristics influencing groundnut marketing decisions?

3. What are the main challenges faced by smallholder groundnut farmers and how severe are these to maximising income?

4. Do the groundnut prices on the market follow a seasonal trend and which months are have more favourable prices for the farmers?

4. Methodology

4.1 Introduction

The purpose of this chapter is to describe the methodological framework that was used to achieve the study objectives as well as to answer the research questions highlighted in the previous chapter. This chapter first introduces the study area, research design, sampling design and data collection methods. In the later stages the data analysis tools will be elicited with special focus on time series analysis which was used to model seasonal fluctuations in the price of groundnuts based on secondary data.

4.2 Study Area

This study was conducted in Mazowe district which ids the southernmost district in Mashonaland Central Province of Zimbabwe located at coordinates 17°10′0″S 31°0′0″E with an average elevation of 1217 m. According to ZIMSTAT (2012), the district population is 233 450 inhabitants occupying an area of 4354.16 km² – density: 53.6 inhabitants/km². It is located in Natural Region II and the dominant soil types are greyish brown sands and sandy loams derived from granitic rocks with a pH range of 4.0-4.3 (Nyamapfene, 1981).The rainfall ranges from 750 to 1 000 mm/year and is fairly reliable, falling from November to March/April. Because of the reliable rainfall and generally good soils, NR II is suitable for intensive cropping and livestock production. The cropping systems are based on flue-cured tobacco, maize, cotton, wheat, soybeans, sorghum, groundnuts, seed maize and burley tobacco grown under dryland production as well as with supplementary irrigation in the wet months (Vincent and Thomas, 1961; Moyo, 2000). Irrigated crops include wheat and barley grown in the colder and drier months (May-September). In total, the district has 30 880 farming households, 23448 of these are communal farming households of which 18750 are groundnut farming households. The district is divided into 35 wards of which 13 are rural wards and the rest are commercial farming areas (MAMID, 2014).
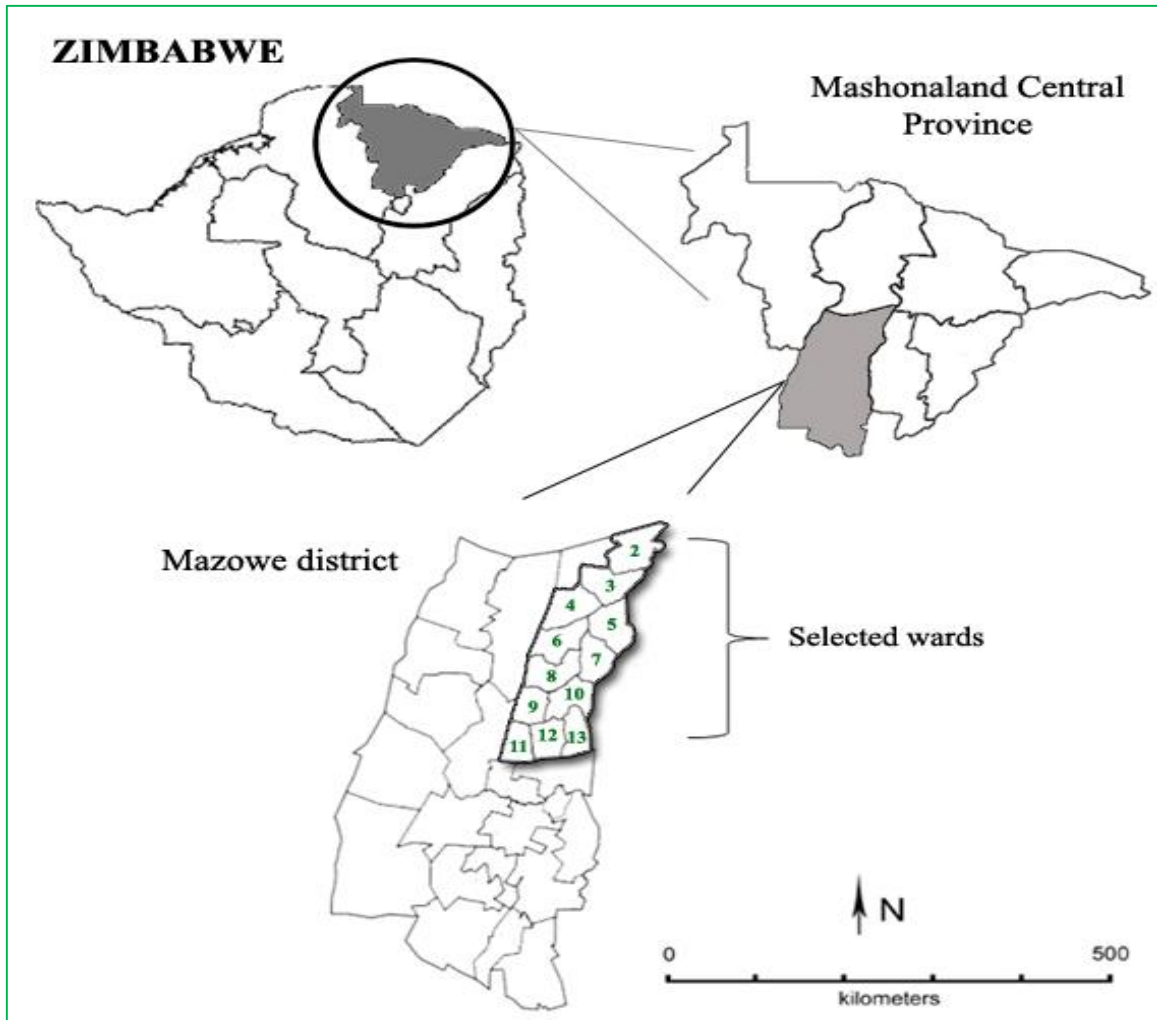
Figure 5: Map of study Area

Source: Author (2016)

4.3 Research Design

The study used the cross sectional survey research design because it is regarded as the best method to collect original data for the purpose of describing phenomena which is too large to observe directly (Best and Kahn, 2013). The population of the communal households in Mazowe is very large (N=23448); therefore the survey research design would enable the researcher to complete the study in a short time by choosing a manageable number sample to represent the rest. To survey basically means to see over or observe things in their natural setting in order to derive meaning (Best and Kahn, 2013). Furthermore, as Leedy (2014) explains, the survey design is the most suitable method to gather and obtain information where little is known about the phenomenon. The survey

20

research would therefore be the most ideal since it entails gathering raw information from a representative sample of communal households in Mazowe. Bogdan and Biklen (2006) thus conclude that the survey design is good in original data collection. At the same time, the survey research design is strong in that it does not influence the research respondents (Bogdan, and Biklen, 2006). This means that it does not control the respondents. Instead, it observes and describes the opinions and perceptions of this defined group. The results from the sample would then be generalized to the entire population. The research design is therefore fairly cheap and information can be collected from a large population in a relatively short period of time.

4.4 Sampling Design

The target population of this study was rural groundnut farmers in Mazowe district. A large sample was ideal but not sufficient in itself since the principles that underlay the selection of the participants were equally important. The researcher used probability procedures to make up the sample. Cohen and Manion (2011) defines probability sampling as a method in which each all members of the population have an equal chance or a non-zero probability of being chosen. Multi stage sampling was done with a similar procedure to Kuboja and Temu (2013). Initially, Mazowe district was purposively selected due to the presence of communal groundnut farmers and its proximity to the researcher's location. Random sampling was then used to select 10 out of the 13 rural wards. Each ward is comprised of several villages which are mainly organised according to clans. The respondents were chosen using random numbers and were extracted from village registers obtained from Agritex extension workers.

For the purposes of this research, the population comprised the total number of rural groundnut farming households in the district. According to the Second Round Crop and Livestock Assessment from MAMID (2014), the district has an estimated of 18 750 communal groundnut farmers in thirteen wards. Best and Kahn (2013) define population as, any group of individuals who have one or more characteristics in common that are of interest to the researcher. The groundnut farmers of Mazowe communal area were ideal since their social and economic background is consistent. In addition, the farmers concerned are all communal who face similar environmental, economic, and social

challenges. The sampling population (N=18750) was too large and therefore too costly to cover adequately for the purposes of the research. Best and Kahn (2013) argues that it is impracticable if not impossible to study a whole population in order to arrive at generalizations. It was therefore too expensive and impractical to collect data from all the communal farmers within a realistic period. Bell (2014) even believes that it is not worth the time and effort to investigate every one when statistically useful data can be equally drawn from a representative portion of the same population. In this study, a representative sample (n) was chosen from the entire population (N) of communal farmers in Mazowe. A sample of minimum 96 respondents was sufficient as calculated using Raosoft Sample Calculator at 10% error margin and 95% confidence level. In order to have equal distribution of respondents from the 10 wards, each ward had 10 farmers randomly selected from village registers and in total 100 groundnut farmers were interviewed. A sample can be visualized as a small part of the universal population which is selected for observation and from which certain valid and reliable inferences can be made of the population (Borg and Gaul, 1996).The features of the sample should match that for the population to warrant any economical but statistical deductions to be made. A sample should be large enough to serve as an adequate representation.

4.5 Data Collection

The study employed a combination of quantitative and qualitative methods of data collection. Primary data was collected from farmers through interviews using a detailed questionnaire. Questionnaires are useful in that vital information can be obtained from many participants within a short time frame (Cohen and Manion, 2011). The information was directly administered by the researcher. The questionnaires have an added advantage of being filed therefore they provide a permanent and verifiable record of the collected data (Leedy, 2014). The research combined closed-ended and open-ended questions. Best and Kahn (2013) argue that closed questions are particularly useful when high levels of data specificity are required. Respondents were instructed to choose one response from a given set therefore there is no room left for them to waffle or to give unintended answers. The collected data would therefore be easier to compare and analyse.

Tuckman (1994) concludes aptly that closed questions reduce the tendency by respondents to include petty details, which may complicate data analysis and comparison of the data. Although the free response questions were few, their inclusion was worthwhile since Cohen et al. (2011) posit that fixed response items have a tendency to suffocate or restrict the respondents. The questions were however fewer because they encourage respondents to waffle which may complicate the interpretation of the data. To test for validity and usability, the tools were pre-tested with 5 communal households before the actual research since Borg and Gaul (1996) argue that a smaller number is enough to evaluate the effectiveness of the instrument. The questionnaires were also given to the supervisor and some colleagues for editing and rephrasing. Key informant interviews and focus group discussions were conducted as means for triangulation of methods to collect the same data. Secondary data on prices was collected from weekly bulletins from the Agricultural Marketing Authority (AMA). Data was collected for the years 2010 to 2015.

4.6 Data Analysis

Data analysis was done using SPSS version 20 and MS Excel. Specific tools included Friedman ranking tests, descriptive statistics and time series analysis. The data was mostly subjected to descriptive statistical analyses to establish the groundnut production and marketing trends and also to establish relationships between different variables in order to explain certain key features in the groundnut industry.

4.6.1 Time series analysis

Technical Analysis is the forecasting of future price movements based on an examination of past price movements –historical data/time series. Time series analysis is used as it accounts for the fact that data points taken over time may have an internal structure (such as autocorrelation, trend or seasonal variation) that should be accounted for.

There are several ways of decomposing time series variables (e.g., additive model, multiplicative model). The basic multiplicative model is given as:

$$P_t = T_t \text{ x } S_t \text{ x } C_t \text{ x } I_t$$

Where:

P_t is the time series variable of interest

T_t is the long-term trend in the data

S_t is a seasonal adjustment

C_t is the cyclical adjustment factor

I_t represents the irregular or random variations

4.7 Limitations of the study

The main shortcoming of this study was that it did not analyse the entire groundnut value chain. This did not constrain fulfilling of the main aims of the research but it could have enabled further analysis into roles of different players in the chain as well as calculation of key indicators like the marketing margin. Retail prices were also ignored in the study since groundnut farmers are mainly interested in wholesale prices. The questionnaire was only administered to groundnut farmers and views of the consumers were not taken into account for the purposes of the study. Literature sources on the same subject were confined to groundnut value chain analysis in other neighbouring countries and very few studies of the same kind have been published in the host country. Farmers also found it difficult to provide sufficient records from past marketing activities and this reduces the accuracy of responses.

5. Results

5.1 Socio-economics characteristics of sampled households

The socio-economic characteristics presented under this section include: gender, marital status of household head, age, and educational level of household heads. Other characteristics include: household size, family labour availability, source of income and land holding sizes.

5.1.1 Gender status of respondents

The majority of respondents were female (73%) whilst their male counterparts only accounted for 27% as shown in figure below.
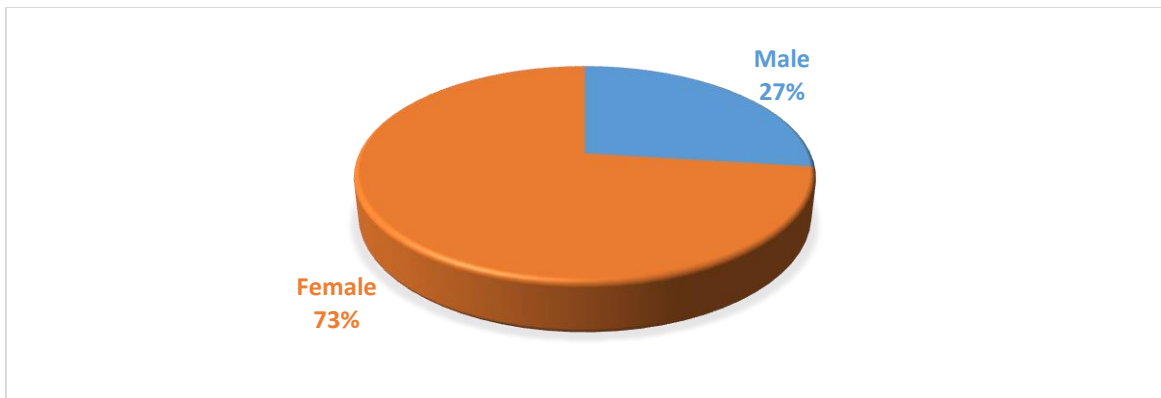
Figure 6: Gender status of respondents

In addition, most of the sampled households were male headed, accounting for about 65 %. Female-headed households accounted for a relatively smaller proportion of about 35 % of the sampled households as shown in figure 7 below.
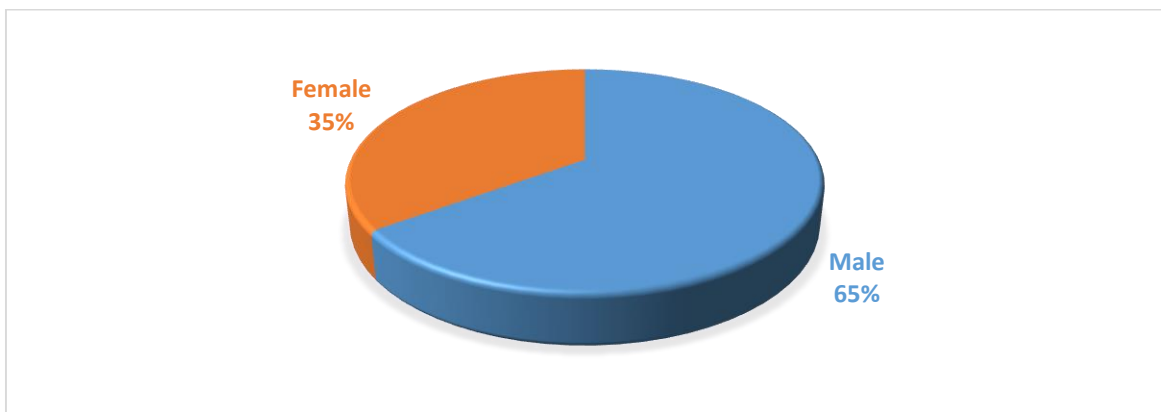
Figure 7: Gender status of household head

5.1.2 Age of Household Head

Figure 8 below shows the age distribution of the household heads in the sampled households. The youngest household head was aged 25 and the oldest was 92 years of age. It can be seen that 38% of household heads were aged between 50 and 60, 27 % were aged between 40 and 50, 15 % aged between 60 and 70 years old, and 12% aged above 70 years. A small proportion of 8% was aged 40 years and below as represented below.
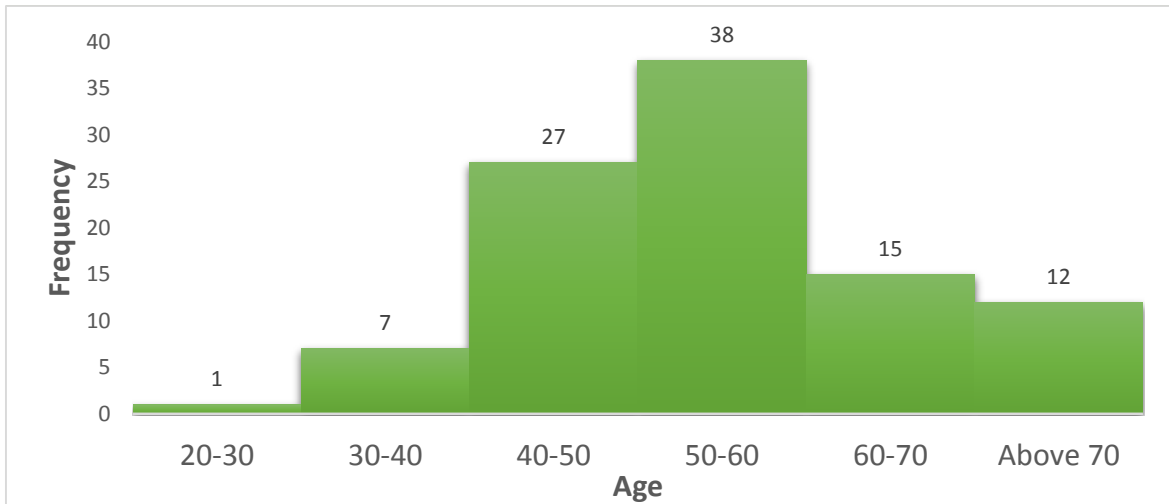
Figure 8: Age distribution of household heads

5.1.3 Marital status of Household head

The majority of the household heads (64%) were married and monogamy was the most common marriage arrangement. 33% of the household heads lost their spouses and the others farmers were either divorced, living separately or single as presented in figure 9 below.
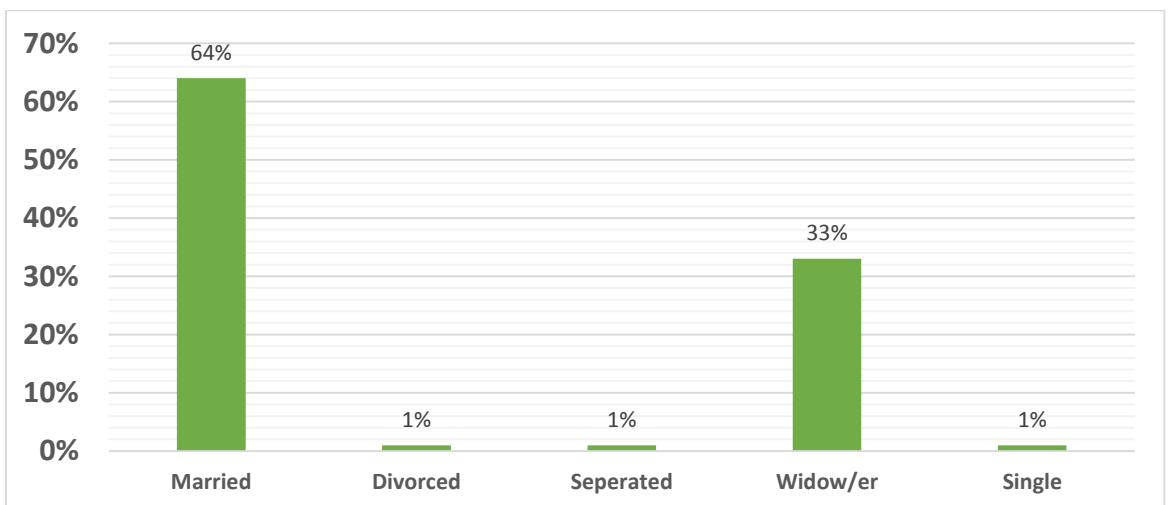
Figure 9: Marital status of Household head

5.1.4 Education level and literacy of household head

Fifty percent of the household heads attained secondary level education. The mean years of schooling for this group was about 12.8. This was followed by those with primary level education accounting for 38 % of the total household heads. A paltry 11% did not participate in any formal schooling and only 1% of the household heads attained post-secondary education as shown in figure 10 below.
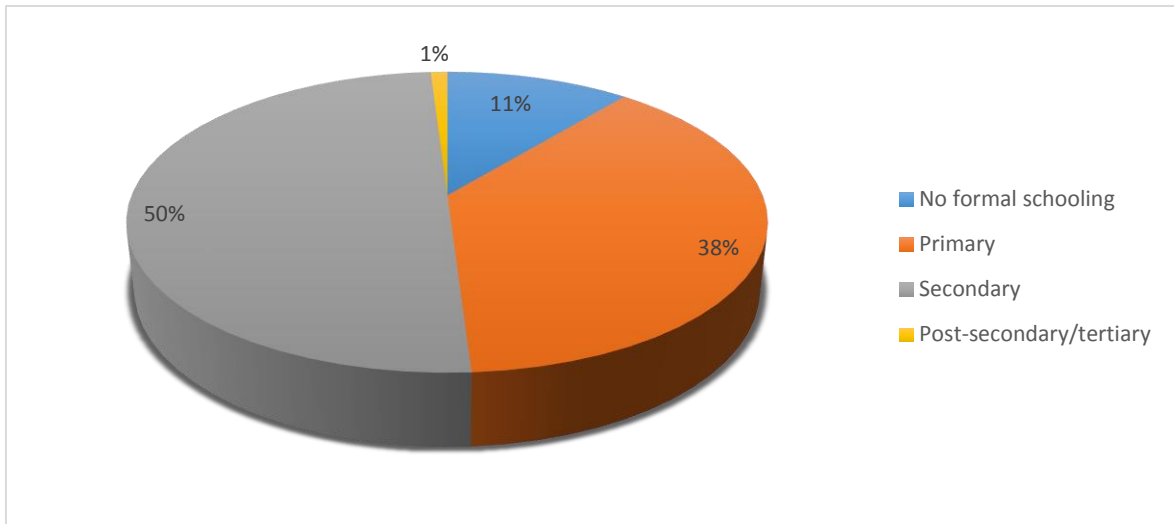
Figure 10: Education level of household head

Although they had completed different levels of education as shown in figure 10 above, the majority of the household heads (91%) are able to read and write. Only 9% of the household heads indicated that they were illiterate as shown in figure 11 below.
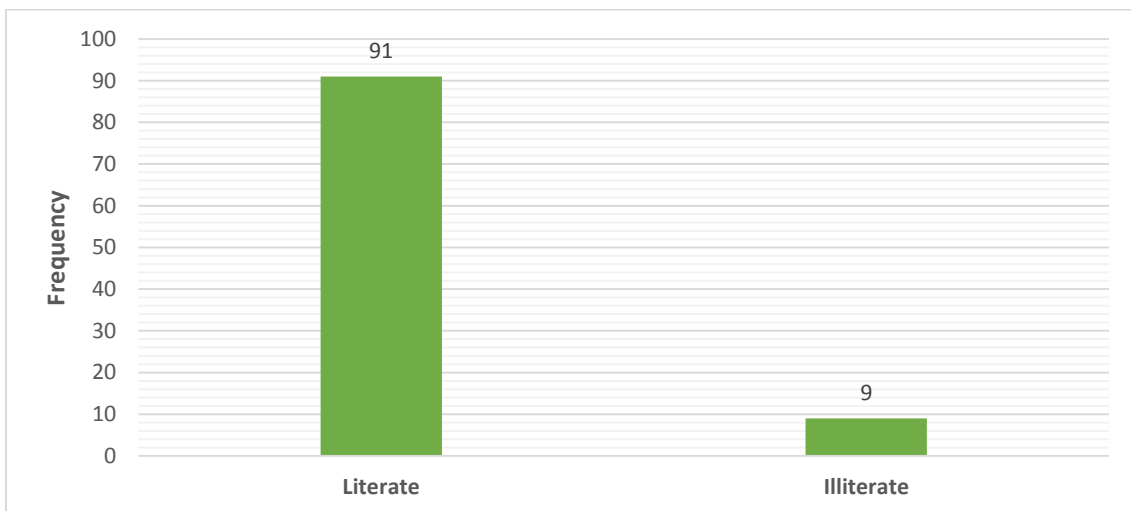
Figure 11: Literacy of household heads

5.1.5 Household Size and Number of Active Persons

Household sizes from the sample ranged from 1 to 11 members. On average, each household had 5 members. The majority of the households had between 1 to 5 members (65%) followed by household with 6 to 10 members (33%) and only 2% of the households had more than 10 members as shown in table 3 below.

Table 3: Sizes of sampled households

Household size	Frequency (%)
1 to 5 members	65
6 to 10 members	33
Above 10 members	2
Total	**100**

The average man/adult equivalent unit was 3.88. In addition, 94% of the households indicated that all members were fully able to participate in daily chores including farming activities and 6% of the households indicated that some members were partially disabled due to sickness or accidents. On average 3 members of the households were involved in the growing of groundnuts.

5.1.6 Main source of Household Income

The majority of the households (85%) indicated farming as their main source of income. These household are involved in subsistence farming with different degrees of market concentration and they normally sell surplus food crops. Other sources of income included vegetable gardening (2%) , fishing (1%), pension (2%), remittances (3%), formal employment (3%), casual employment (3%) and 1% of the households operated a small business for their main income as shown in figure 12 below
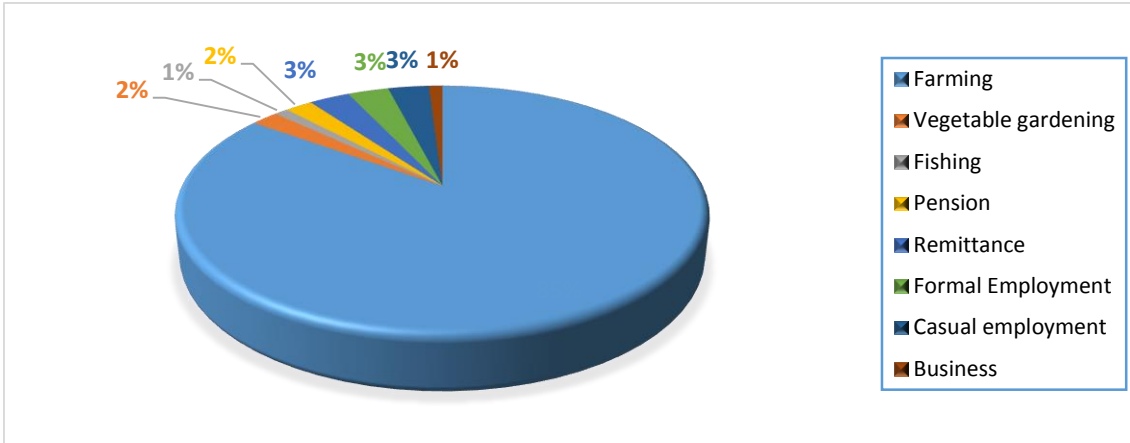
Figure 12: Main sources of household income

5.2 Groundnut cultivation and production

5.2.1 Land holding sizes

Most of the households (98%) owned at least one hectare of land and only 4% owned less than a hectare. The average land holding size was 2.61 hectares. 77% of the owned land was cultivated for crops with the remaining 33% being account for by land for building settlements, keeping livestock and sometimes for fallow land purposes. There was no leasing of land among the sampled households. The bigger chunk of farmers owned between 1to2 hectares of land (44%) which also represented the most common cropped hectares with 35% as shown in table 4 below.

Table 4: Land holding sizes

Land holding size (ha)	Farmers Owning (%)	Farmers Cultivating for all crops (%)
< 1	4	11
1- < 2	44	35
2- < 3	32	35
3- < 4	9	12
4- < 5	7	6
>5	4	1
Total	**100**	**100**

5.2.2 Groundnut plot sizes and yields

Groundnut plot sizes in the sampled households ranged between 0.02 to 1 hectare and this reflects that there is a lot of competition with other crops especially maize. On most of the plots it was grown as a monocrop on the small pieces of land that remained after maize was cultivated for food security. Groundnuts production accounted for a mere 21% of the total cultivated areas indicated in table 4 above. In terms of yields, 51% of the households achieved less than 0.5 t/ha, 33% between 0.5 to 1t/ha, 9% between 1 to 1.5t/ha, 3% between 1.5 to 2t/ha and 4% above 2t/ha as shown in figure 13 below. The average yield for the sampled households was 0.55t/ha.
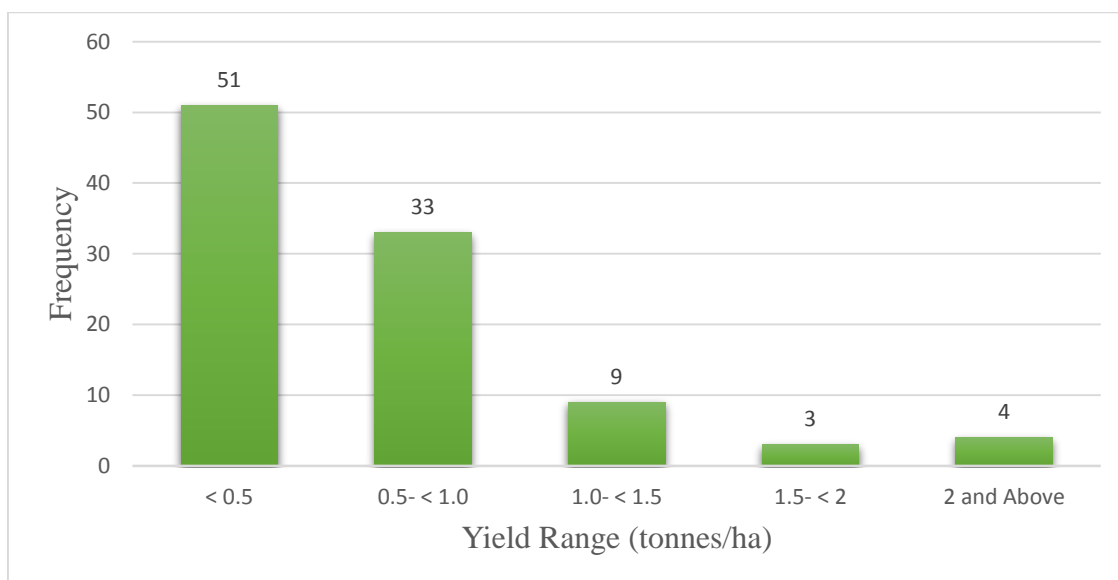
Figure 13: Average yields for groundnuts

5.2.3 Reasons for growing groundnuts

Table 5 below shows the results from the Friedman ranking test used to analyse the Likert scale data on the main reasons for growing groundnuts by the sampled households. Each household had an opportunity to rank the five main reasons pre-identified from several literature sources. The ranking scale was from 1 to 5 with 1 being the most important and 5 for the least important. Growing groundnuts as a source of income was ranked as the main reason with a mean rank score of 1.5. This was followed by food security with a mean rank of 2.24, then social status with 3.48. The least ranked reasons were crop

30

rotation and cultural status with mean ranks of 3.65 and 4.13 respectively as indicated in the table below.

Table 5: Ranking of reasons for growing groundnuts

Reason	N	Mean Rank	Std. Deviation	Min	Max
Source of income	100	1.50	.990	1	5
Social Status	100	3.48	1.049	1	5
Food security	100	2.24	.911	1	5
Ceremonial/ Cultural	100	4.13	.661	2	5
Crop Rotation	100	3.65	1.395	1	5

5.2.4 Types and main sources of inputs used

In order to cultivate groundnuts, farmers need to source for a variety of inputs ranging from land, seed, fertiliser, chemicals, labour amongst others. These inputs also present the largest component of the cost of production for groundnuts. In terms of seed, the majority of the households (86%) chose to use retained seed for previous harvests since they couldn't afford to purchase fresh one from the open market. The average cost of seed on the open market was USD 1.00 per kg and only 4% of the households opted to purchase their seed. Other households used carry over seed (8%) as well as gifts and remittances (2%) as shown in figure 13 below.
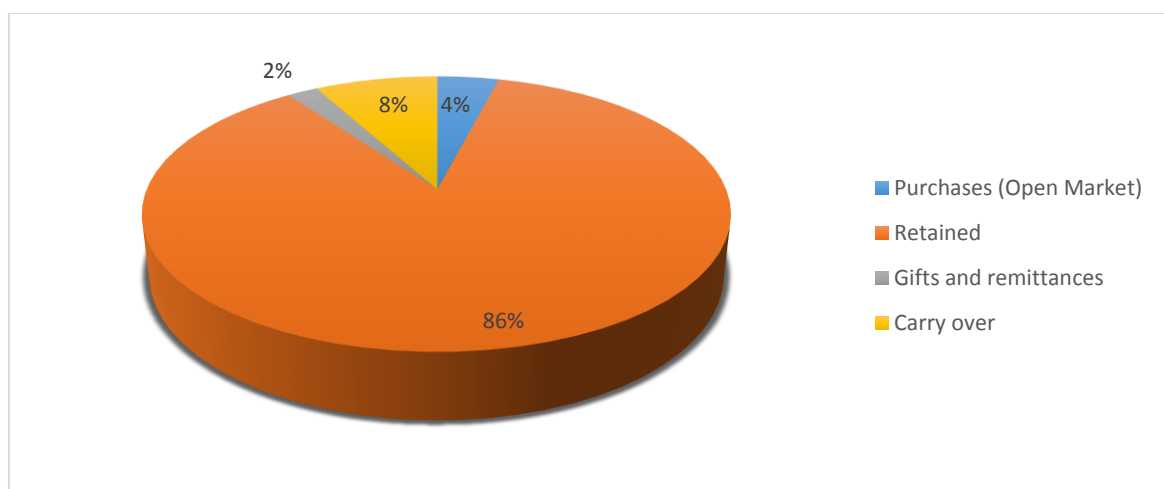
Figure 14: Sources of seed

Only 16% of the sampled households used fertiliser in the growing of groundnuts. The type of fertiliser was Gypsum and it was purchased from the open market at USD 14.00 per 50kg bag. 99% of the households did not use any chemicals opting for natural means of weed and pest control and only a single household used chemicals purchased from the open market. Due to the relatively small areas cultivated to groundnuts, 100% of the households used family labour.

5.2.5 Groundnut varieties

The sampled households indicated that they cultivated either local varieties or certified commercial varieties sourced from the open market. However, the local varieties were more popular with the farmers. These included *Tumbe, Kabhutsu, Kasawaya,Chizezuru and Makulu* red. The local variety *Tumbe* was the most cultivated with 62% of the households having grown it either on its own or with other varieties. It was favoured because it is a high yielding, early maturing variety with high fat content. Farmers who cultivated it ranked it as the most profitable amongst their choices of varieties. *Kabhutsu* and *Kasawaya* were grown by 40% and 24% of the farmers respectively and they also had high profitability rankings as shown in table 6 below. The certified commercial varieties were not widely grown by the farmers despite having a very high profitability rank and attributes desired by many commercial processors. The included Falcon, Flamingo, Natal Common, SC Nyanda and Valencia. Farmers cited the high costs as the main hinderance from growing these commercial varities. Valencia was the most popular amongst the commercial varieties although it was grown by only 5% of the households as shown in table 6 below.

Table 6: Groundnut varieties and their profitability

Variety Name	Households growing (%)	Mean profitability rank (1=Most profitable 5=Least profitable)
Chizezuru	1	2.0
Falcon *	1	1.0
Flamingo*	2	1.0
Kabhutsu	40	1.38

Kasawaya	24	2.2
Kemutatu	1	2.0
Makulu Red	4	2.3
Natal Common*	2	1.0
SC Nyanda *	3	1.0
Tumbe	62	1.0
Valencia *	5	1.0
Zambia Red	3	2.8

*Certified Commercial variety

5.2.6 Harvesting

All the households indicated that they do manual harvesting using hand hoes. The early planted crop is harvested in February and March. 4% of the households indicated that they harvested their groundnuts in February whilst 9% harvested in March. Most of the harvesting was done in April and May with 58% of the households indicating that they harvested in April and 29% harvested in May as shown in figure 15 below.
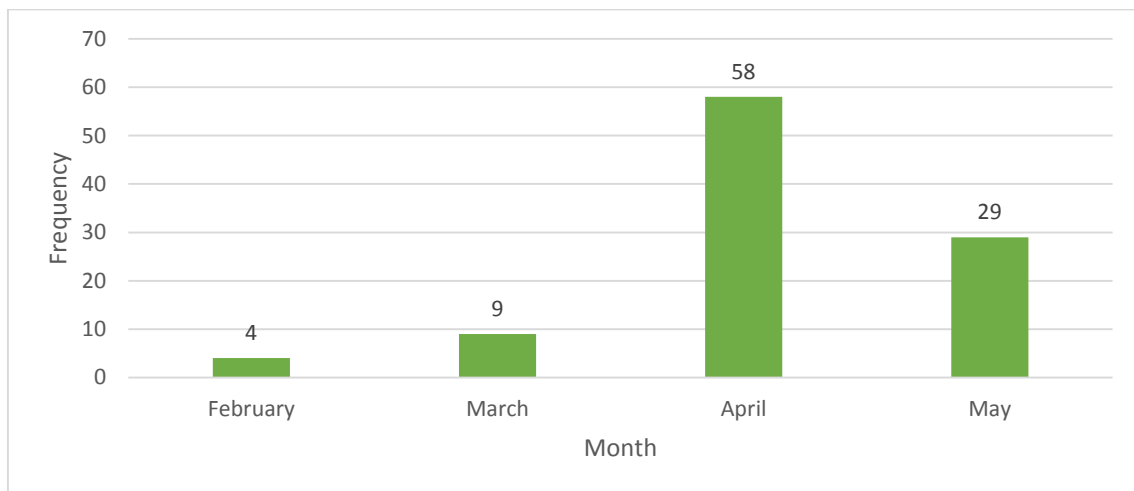
Figure 15: Months for harvesting groundnuts

5.3 Groundnut marketing

Marketing and selling of groundnuts commences soon after post-harvest processes have been completed. The decision to start selling differs in different households. However, the majority of households (92%) indicated that the responsibility of marketing

groundnuts solely rests on the female spouses in the households. A paltry 11% of the households entrusted the male spouses to handle the marketing of groundnuts and in 7% of the sampled households, both spouses share the responsibilities of marketing groundnuts as indicated in figure 16 below. 94% of the farmers marketed their groundnuts individually and the other 6% were part of grouped arranged marketing through cooperatives/associations.
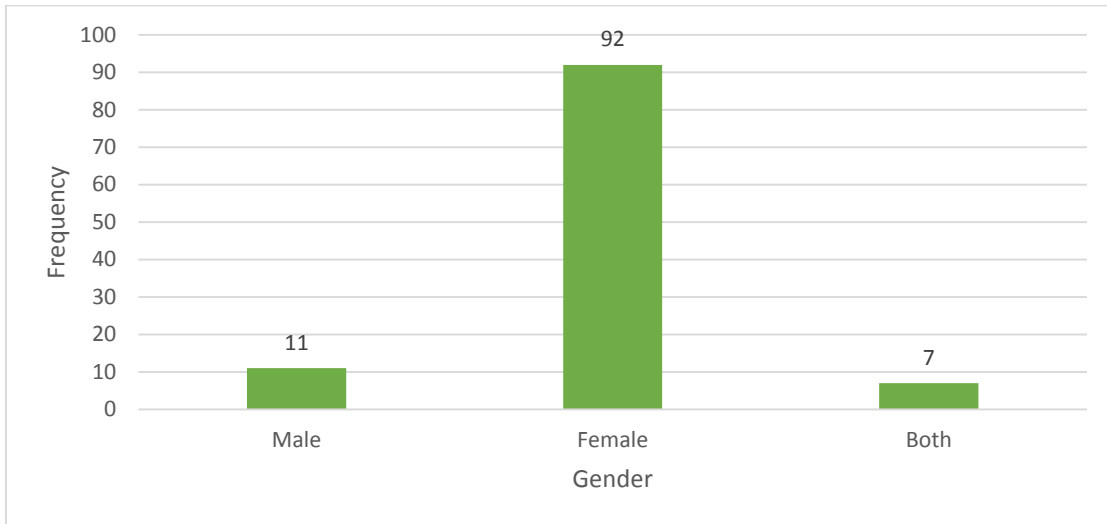
Figure 16: Responsibility of marketing groundnuts for households

5.3.1 Main reasons for selling groundnuts

The households provided ranking on the main reasons for selling groundnuts. Results from the Friedman ranking test show that income was the most important reason for selling groundnuts with a mean rank of 1.10. Food security was ranked second with a mean rank of 2.28, followed by social status and ceremonial purposes with mean ranks of 3.09 and 3.56 respectively as indicated in table 7 below.

Table 7: Main reasons for selling groundnuts

Reason	N	Mean Rank	Std. Deviation	Minimum	Maximum
Income	100	1.10	.438	1	4
Status	100	3.09	.668	1	4
Food security	100	2.28	.604	1	4
Ceremonial	100	3.56	.770	1	4

1= Most important   4= Least important

5.3.2 Post harvest processes

Groundnut farmers perform various post-harvest processes before the sell their groundnuts. These range from shelling, packaging, grading and sorting to other value adding processes like roasting, boiling and peanut butter making. All the households indicated that they shell and package their groundnuts before selling whilst 61% indicated that they grade and sort their harvest before selling it as shown in figure 17 below.
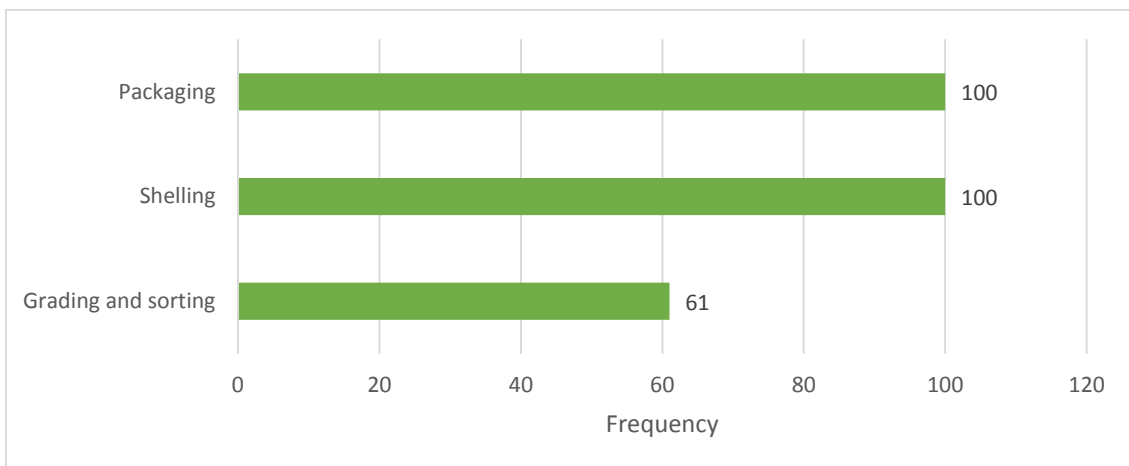
Figure 17: Post harvest processes for groundnuts

The majority of the households (91%) also indicated that they used 50Kg grain bags for packaging their groundnuts for storage as well as marketing purposes. As shown in figure 18 below, only 9% of the households used bulk packaging which is less costly but poses risk to the product since it will be badly exposed during storage or transportation.
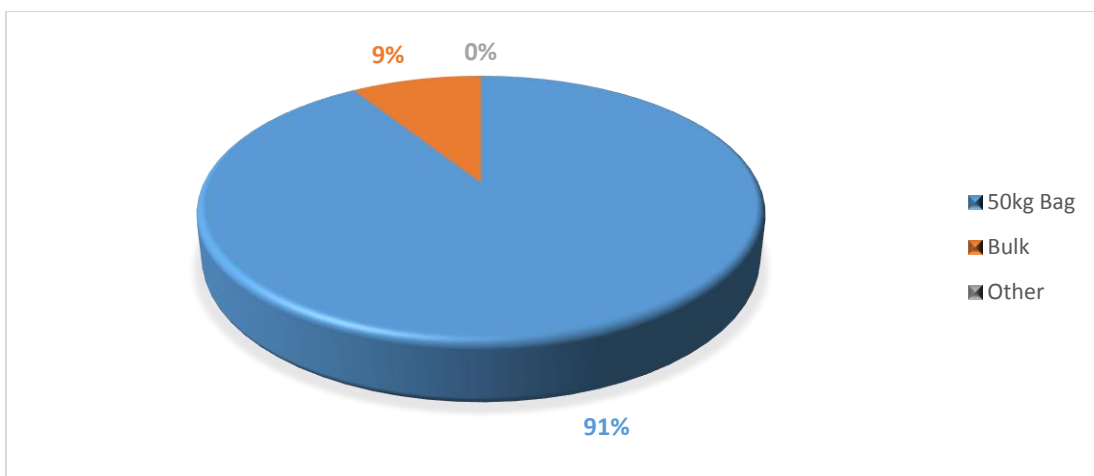
Figure 18: Type of packaging

Value addition is a critical post-harvest process to increase income from raw agricultural produce. A greater number of the farmers (68%) indicated that they add value to their groundnuts before selling them whilst 32% made no attempt to enhance their produce. Peanut butter was the main product of the value addition process with 67% making it. The other products were roasted nuts and boiled nuts processed by 52% and 8% of the farmers respectively as indicated in figure 19 below.
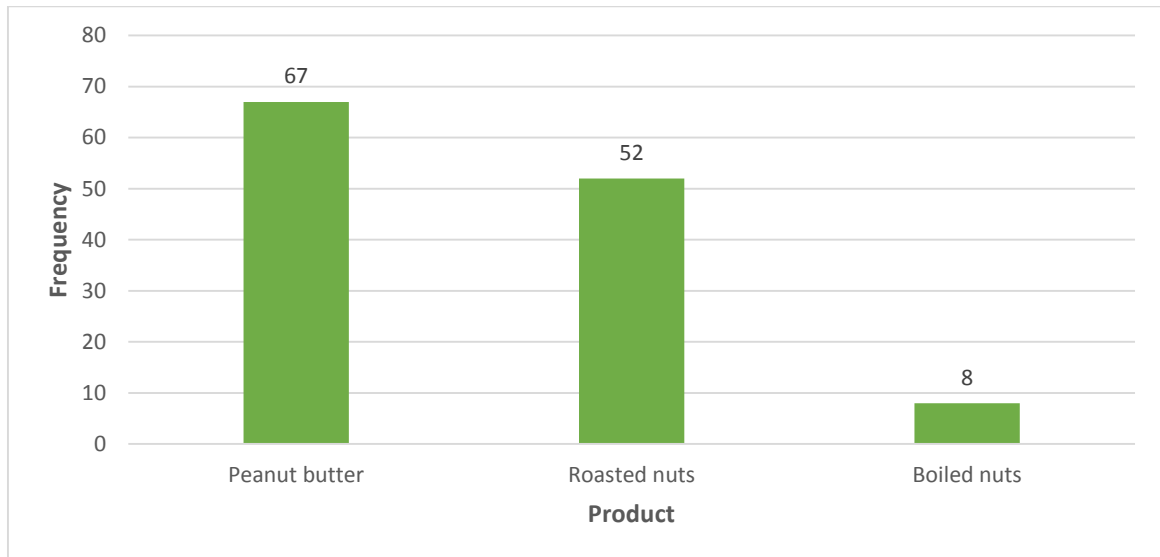
Figure 19: Processed products sold

5.3.3 Marketing channels and market types

Three main market channels were identified in the study area and these are on-farm, middlemen and urban market channels. Farmers have the option to use one or all of the market channels throughout the marketing season. As shown in figure 20 below, 93% of the farmers used the on-farm market channel and this is attributed to the fact that it is the least costly channel since transportation and other transaction costs are significantly reduced. Middlemen are less preferred by farmers and only 18% of the households chose to use this channel. Informal discussions indicated that most middlemen are unscrupulous in the way they conduct business and they normally reap off unsuspecting farmers hence their decreasing popularity. The urban market channel was only used by 3% of the farmers though it can potentially offer better choice of customers. This can be a direct result of the high transaction costs associated with this marketing channel.
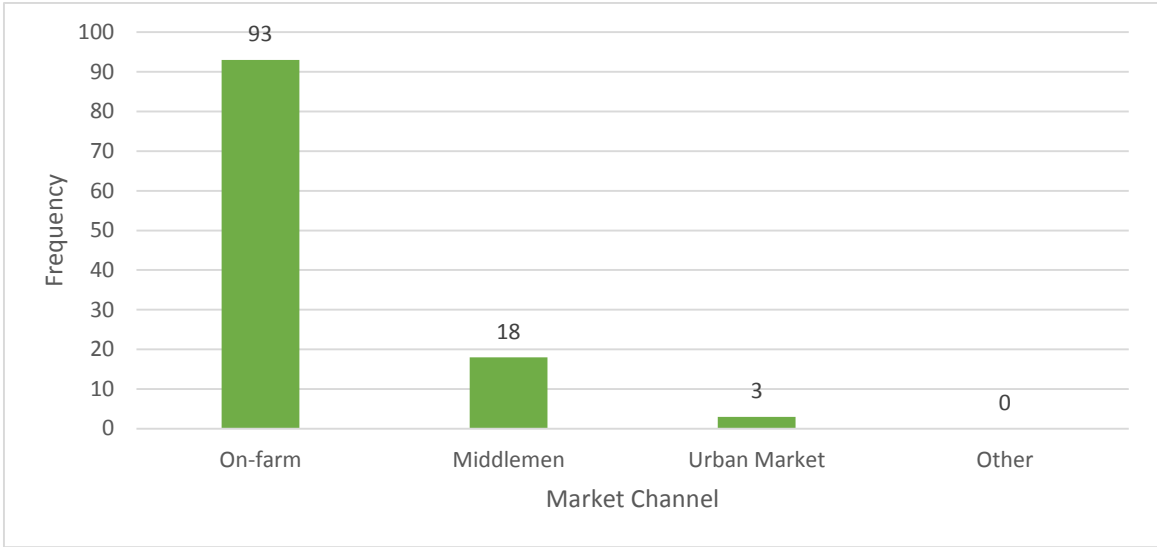
Figure 20: Marketing channels used

Using the above mentioned channels, farmers sell their groundnut products to individuals, processors, schools and supermarkets. 99% of the farmers sell their products directly to individuals mainly to reduce transportation costs since they use the on-farm channel. These individuals can be final consumers or middlemen intending to resell to more lucrative markets. As shown in figure 21 below, 8% of the farmers sold their groundnuts to processors whilst 9% sold to local schools. Processors produce several groundnut products such as confectionery, peanut butter, cooking oil and sell them in supermarkets.
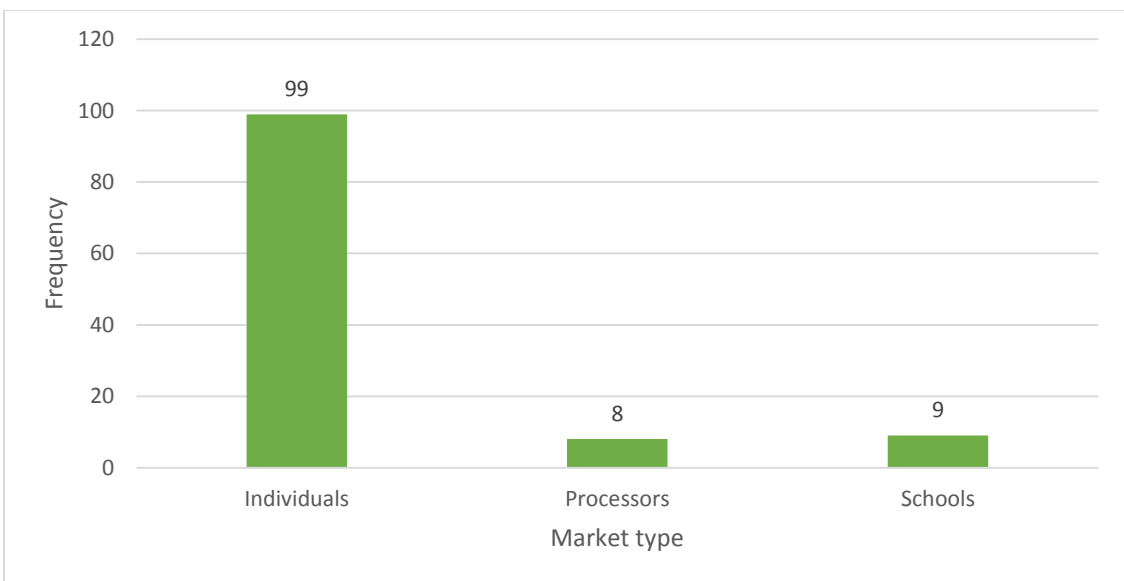
Figure 21: Types of markets used

Before selecting a market type and marketing channel to use, groundnut farmers considered several reasons as shown in figure 22 below. 45% of the farmer's indicated that they choose a market which is nearest to reduce the burden of transport costs. Cheap transport was states as the second important factor with 34% of the farmers choosing markets based on the cost of transportation. 13% selected markets based on the variety of customers the market provides whilst 8% are attracted by high prices as shown below.
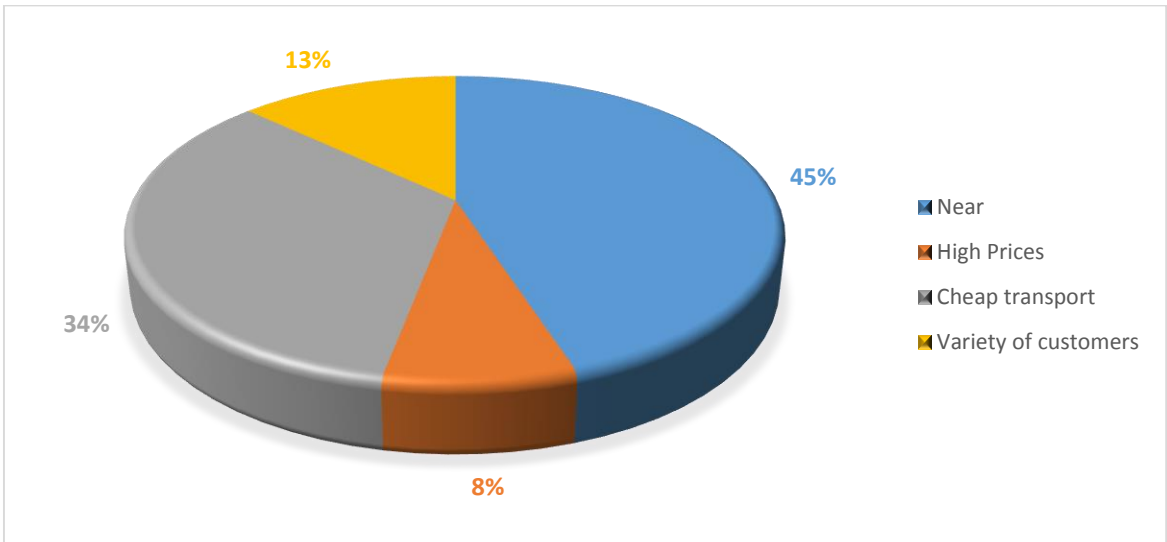
Figure 22: Reasons for selecting markets

The majority of the farmers (55%) indicated that they were least satisfied with their markets. A further 25 % were less satisfied with the markets they have easy access to. A smaller minority of the farmers indicated that they were somewhat satisfied or most satisfied with the markets available in their area and this accounted for 10% in each category as indicated in figure 23 below.
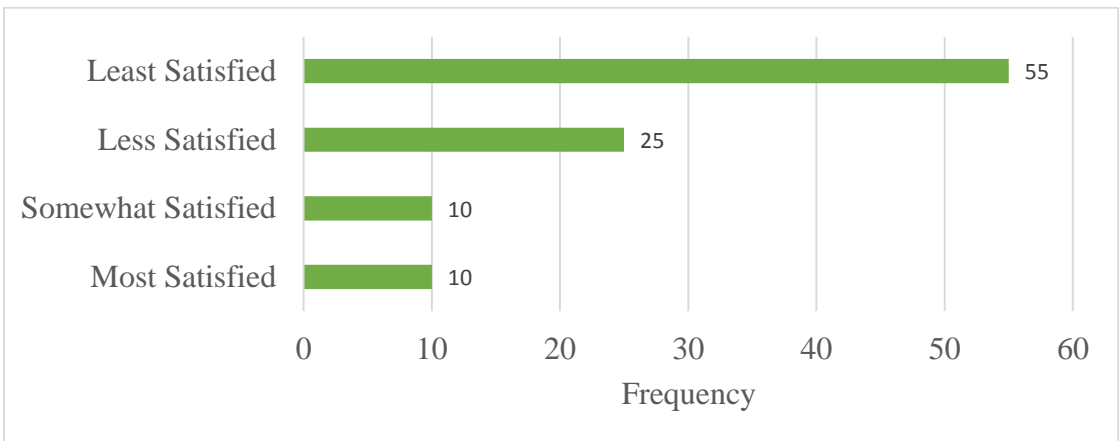
Figure 233: Level of satisfaction with markets

Distance was cited as a major factor to consider when marketing groundnuts. Sampled farmers indicated a range of 0 to 92km travelled in pursuit of more lucrative markets. 52% of the farmers travelled less than 10km to market their produce. Table 8 below shows the distances households had to move in order to market their groundnuts. A combined 48% of the farmers travelled more than 10km to market their groundnuts and this distance significantly contributes to marketing costs.

Table 8: Distance to markets

Distance to market	Number of households
Less than 10	52
10-20	6
21-30	13
31-40	5
41-50	4
51-60	6
61-70	3
71-80	3
81-90	7
90-100	1
Total	**100**

5.3.4 Market information sources and accessibility

The importance of having a credible and accessible source of market information cannot be overemphasized if groundnut farmers are to make good profits from selling their products. Farmers indicated that they need information on buyer requirements, in-demand varieties, transport costs, prices and the best times to sell their groundnuts. The majority of the farmers have access to this information although the sources differed amongst households and using more than one source was very common. Agritex was cited as the most used source of market information with 90% of the farmers indicating as one of their main sources of information. 25% of the farmers depend on information from other farmers in their communities. 14% of the farmers use the parastatal GMB as a source of market information. Other sources mentioned were NGOs, AMA, farmers' unions and buyers as shown in figure 24 that follows.
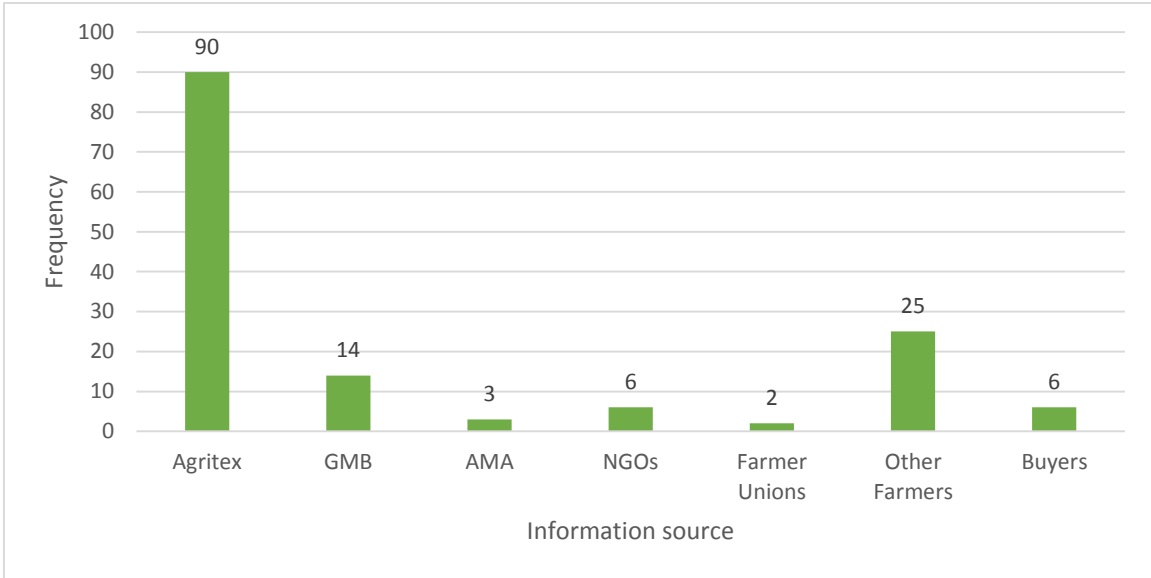
Figure 244: Main sources of market information

5.3.5 Timing of sales

Selling of groundnuts can be done virtually throughout the whole year but on a farming calendar it commences around April/May with farmers selling fresh groundnuts and peaks around July/August as shown in figure 25 below. The majority of the households sold their groundnuts from June and August with a combined 81% of the respondents having done that. The remainder chose to sell in the off-season from October to December, a period synonymous with better prices since supply will be declining on the market.
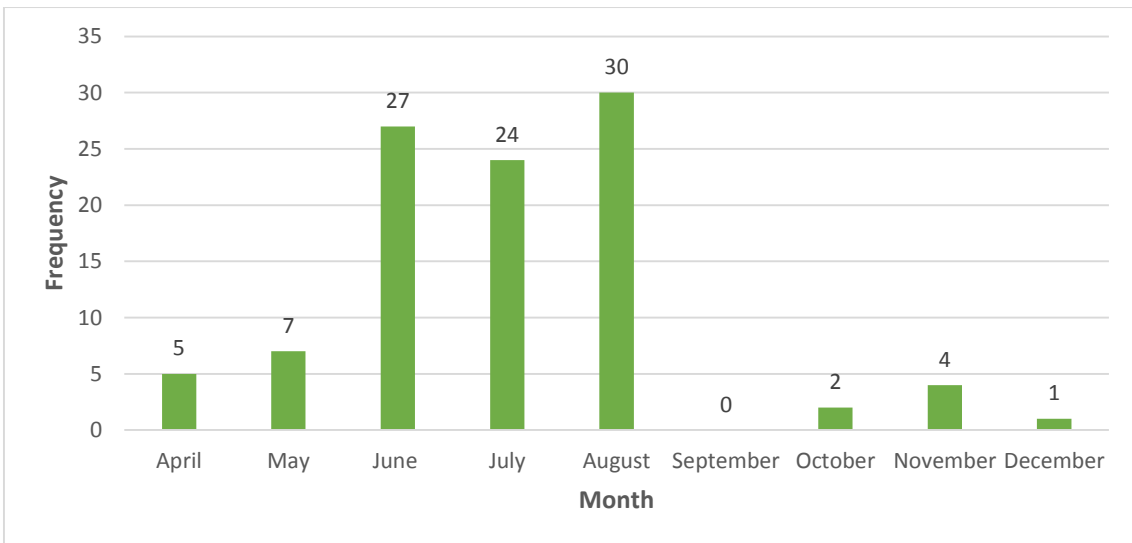
Figure 255: Timing of groundnut sales

5.3.6 Groundnut prices

Figure 26 below shows the time series analysis of the prices for shelled groundnuts from 2010 to 2015. As shown in the figure below, prices have been slowly increasing since 2010. The lowest price in the time series was USD 0.91/kg recorded in January 2010 and the highest was USD 1.398 in March 2015 as shown in figure 26 below.
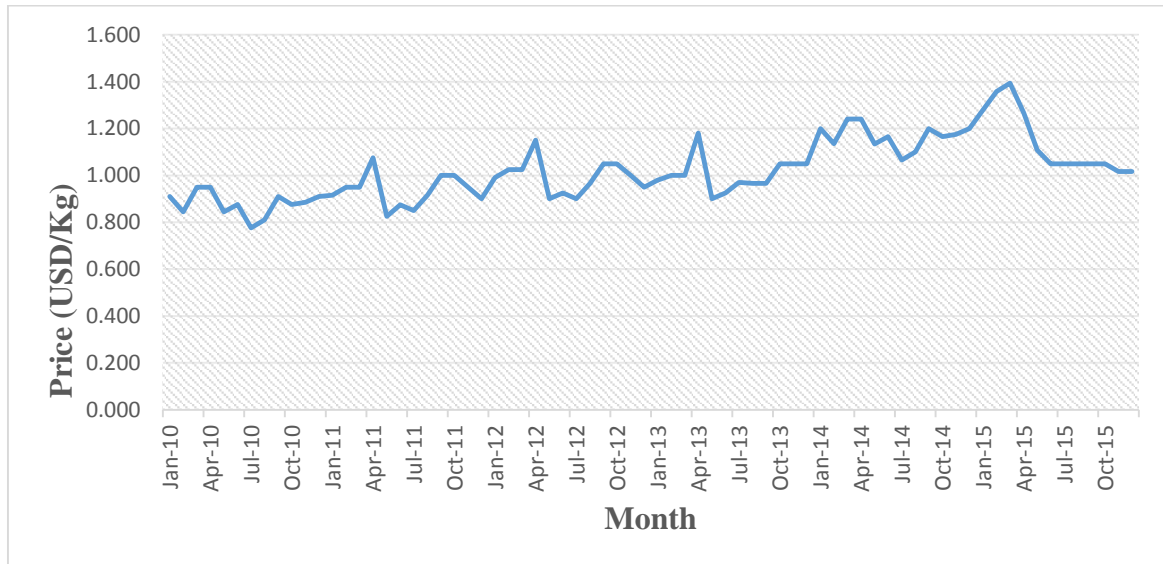
Figure 266: Groundnut price trends

Moving averages and seasonal factors were then used to reduce the effect of short term fluctuations (noise). Figure 27 below shows the seasonal indices for each month based on average seasonal factors for 5 years. For the period 2010 to 2015, the month of April had the highest prices on the market with an average of USD 1.14/Kg whilst July had the lowest prices at USD 0.91/Kg.
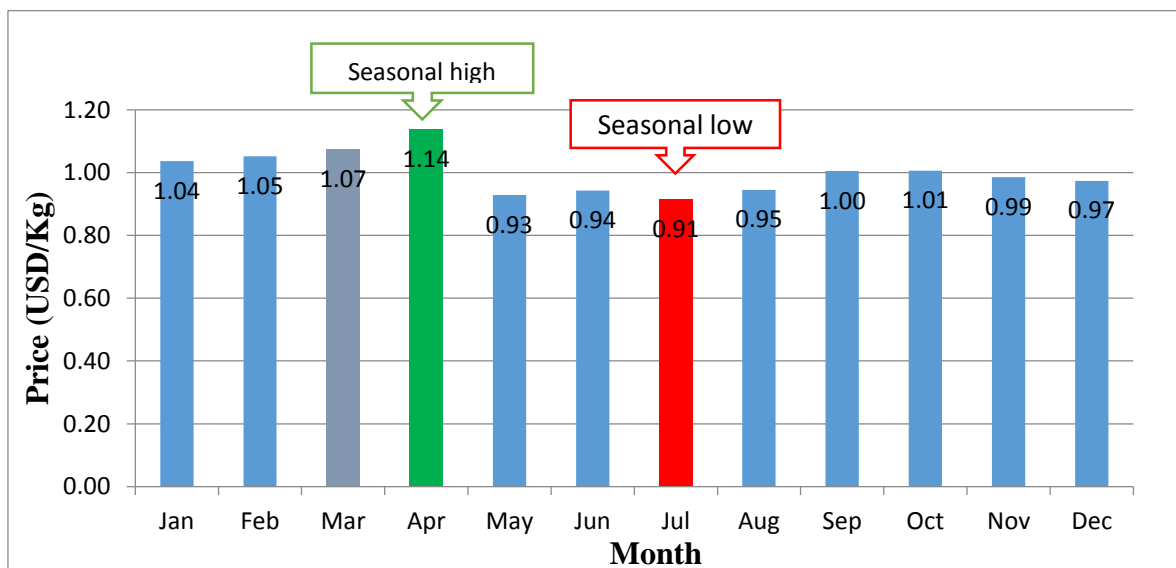
Figure 277: Groundnut price seasonal index

41

Figure 28 below shows a combination of the 12 month trend seasonal indices and nominal price trends for 2014 and 2015. In addition, the figure below also shows price projections for September to December 2015 obtained after combining the deseasonalized data and the seasonal index. The mean absolute deviation (MAD) for the lower and upper bounds of projection was 0.14 which represents a USD 0.14 accuracy allowance for the prediction. As shown in figure 28 below, the predicted prices for October, November and December 2015 where USD 1.00, USD 1.04 and USD1.04/Kg respectively. On the other hand, the actual prices for the same months where USD1.05, USD1.02 and USD 1.02 respectively (see annex 2). The differences between the projected prices and the actual prices are 0.05 and 0.02 which are both below the MAD of 0.14 thus indicating the predictive power and accuracy of the model.
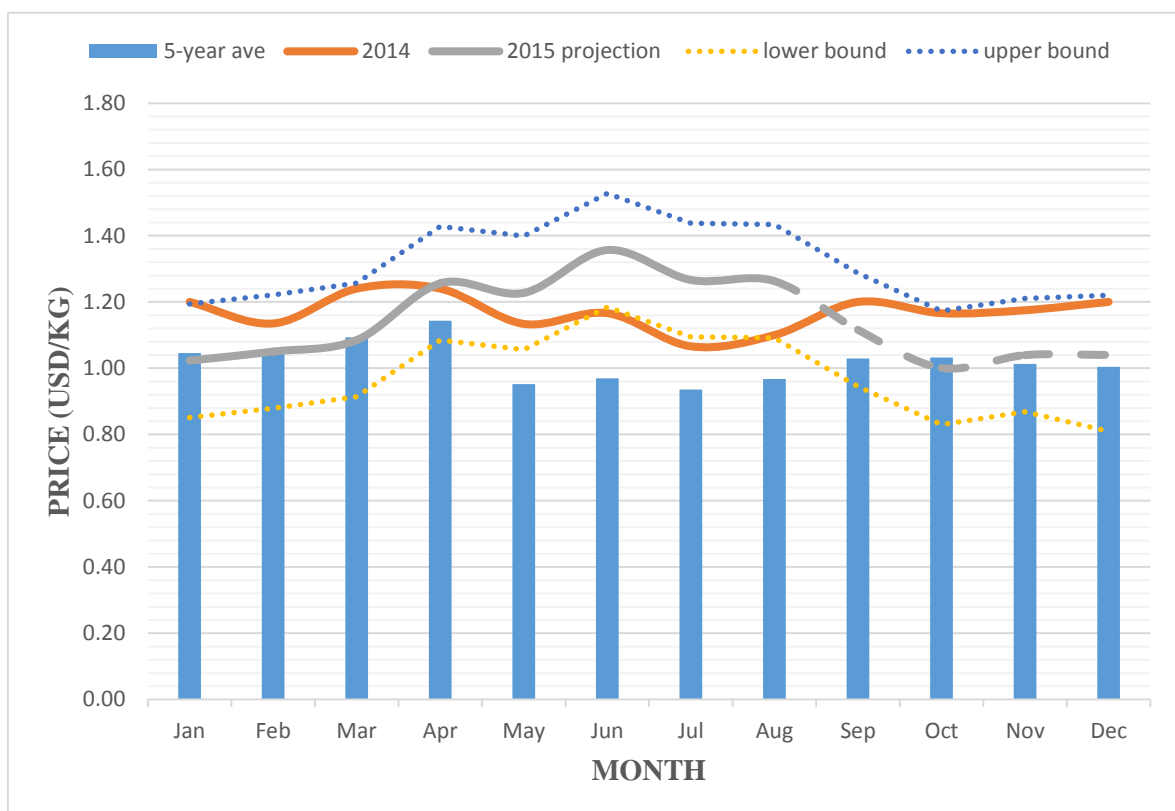
Figure 288: Time series analysis and price projections

Table 9 below shows the mean ranking of the main factors influencing the price farmers fetched for their groundnuts. Shelling, processing, grading and training on the best methods were cited as the main factors as indicated by their mean ranks of 1.75, 1.82, 1.83 and 1.92 respectively. The other factors like having adequate access to market

information, quantity delivered, market type and the distance to market also had a high effect on the price the farmers received as shown in the table below.

Table 9: Factors influencing price

	N	Mean Rank	Std. Deviation	Minimum	Maximum
Grading	100	1.83	.76984	1.00	3.00
Shelling	100	1.75	.67527	1.00	4.00
Processing	100	1.82	.74729	1.00	3.00
Distance	100	2.62	.99701	1.00	5.00
Information access	100	2.02	.86873	1.00	4.00
Quantity delivered	100	2.27	.91270	1.00	5.00
Market type	100	2.30	.90863	1.00	4.00
Training	100	1.92	.583	1.00	3.00

1-Very high   2-High   3-Moderate   4- Low   5- Very low

5.3.7 Marketing constraints faced by farmers

60% of the farmers indicated that they faced difficulties when marketing their groundnuts and the other 40% did not face major obstacles. Distance was cited as the main constraint when marketing groundnuts as was the case with 43% of the farmers. Buyer requirements were the second main challenge and 19% of the farmers indicated that buyers had specifications which made it difficult to market their produce. Transport was cited by 9% of the farmers as a major constraint as shown in figure 29 below.
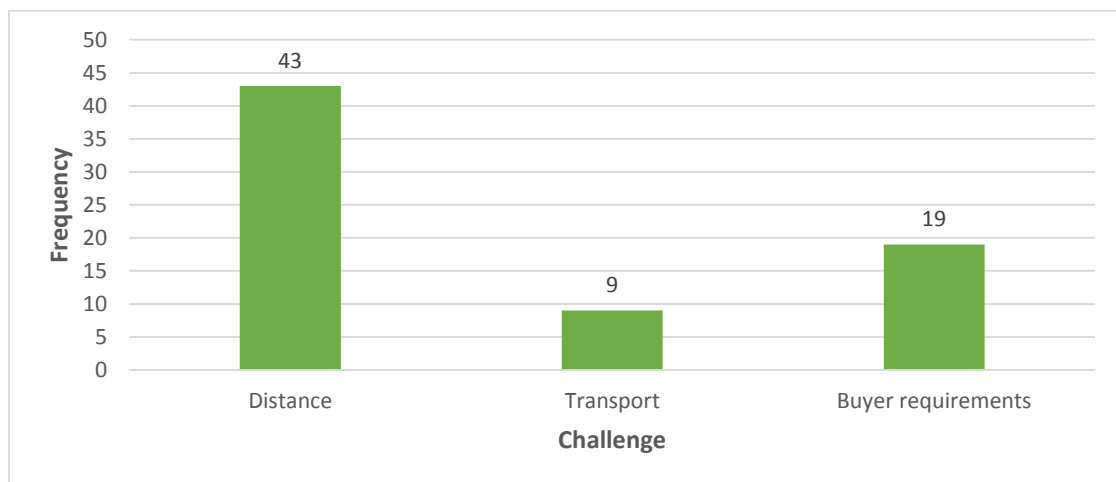
Figure 29: Main market difficulties faced

43

6. Discussion

The study revealed that 65% of the households were male headed despite the majority of the respondents (73%) being female. Most households traditionally have been male-headed in the Zimbabwean setup and even though women have increasingly being empowered, their husbands still yield considerable power in household decision making. Most of the household heads (73%) were in the ages between 20 and 60 years. The implication of the result is that most of the respondents were within the economically active age. These findings are synonymous with observations from Adinya (2009) that people in age groups of 41-60 are more economically active and independent than those in the age group of less than 20 years and above 60 years.

Literacy rate amongst the household heads was very high at 91%. This is as a result of formal education as indicated by 50% of the household heads having attained secondary education and 38% with primary education. Education level is used to measure the ability of a household to utilize available information. More educated people tend to be able to comprehend and utilize information that is helpful in making marketing decisions and according to Eterline (2013), this capability may make more educated people more likely to participate in markets. Mangisoni (1989) posits that education compliments extension advice in that educated people can understand agricultural instructions quite well and be able to apply technical skills imparted to them better than uneducated ones. Educated farmers are believed to be in a better position to understand agricultural instructions, extension services, and technology adoption procedures than uneducated farmers and are therefore likely to be the first to utilize new technologies (Minde et al., 2008). Also literacy levels set a limit to the farmer's managerial ability which indicates that most farmers in the study area have been able to fully exploit their managerial potential due to high level of education.

According to Edriss and Simtowe (2003), the average household size has a bearing on availability of labour, especially considering that most smallholder farmers depend on family labour. The more the number of people in a household, the more the family labour supply is, all other things being constant. The average household size in the study area was 5 persons with a minimum of 1 person and a maximum of 11 persons per

household and this is above the national average of 4.2 persons per household according to ZIMSTAT (2012). Family size is more linked to family labour supply as most of the smallholder farming activities are not highly mechanized. Also, household size can be positively related to technical efficiency as smaller household sizes experience labour bottlenecks and thereby being inefficient (Wang et al., 1996). However, the average man equivalent unit (MEU) for each household was 3.88 as calculated following Runge-Metzger (1988) and Langyintuo et al., 2005. Each household member was converted to a man equivalent unit with the postulation that individuals in different age groups could not perform normal farm operations at similar rates of efficiency.

Farming was indicated as the major source of household income by 85% of the households. Groundnuts provide about 25% of household's agricultural income (Minde et al., 2008). However, the majority of the farmers are growing groundnuts on a subsistence basis with a very low degree of market concentration. According to Tilman Brück (2007), engaging in more subsistence activities has a negative effect on household income. Maxwell et al., (1992) postulated that most families earn income by selling what they produce in the growing season and others earn income from their harvest time sales or from off farm work.

Most of the households (98%) indicated that they own at least one hectare of land and the average land holding size was 2.61 hectares. Furthermore, 70% of the farmers indicated that they allocate between 1-3 hectares of their cropped land to groundnut cultivation. The amount of land dedicated to groundnut production seems to be a crucial factor in household marketing decisions and according to Eterline (2013), increased production leads to sizable increases in marketing of groundnuts. Therefore, households cultivating more land are more able produce beyond their own consumption needs and are more likely to sell their groundnuts and also sell greater quantities. Yield also plays a significant role in determining the productivity per unit of land cultivated. 51% of the households indicated that their average yield was less than 0.5 tonnes/hectare which is less than the break-even yield of 0.673 tonnes/hectare calculated by SNV (2012). This means more than half the farmers are growing groundnuts at a loss assuming they do not engage in value addition. A household with a small harvest would most likely not have a surplus to

sell and may need to become a buyer in order to meet its consumption needs (Key et al., 2000).

In 92% of the households, the responsibility of growing and marketing groundnuts rested on the women with men playing a minor role in these processes. According to Ngulube et al., (2001), groundnut is mostly grown by resource-poor farmers, particularly women farmers. These studies confirm the reason why groundnut is commonly referred to as a woman's crop. For this reason, groundnut is not given high priority when making cropping decisions in the household thus it receives little investment and attention as compared to other cash crops like tobacco. As a result of poor investment into groundnut production, the women are left with no option but to reduce the quantities of inputs they put into production. About 86% of the households used retained seed whilst only 16% of the farmers used fertilisers in the growing of groundnuts. In addition, 99% of the farmers did not use any chemicals in the growing season. Similar findings were reported by De Clerk and Ross 2012 who cited that farmers did not use any fertiliser, manure, pesticides or herbicides on their groundnuts, largely as other crops, such as maize and cotton, with more stable markets take priority.

Availability of seed is another major drawback because seed supply is seasonal and production is dependent on weather and price fluctuations. The private sector does not readily invest in seed production for a number of reasons −low multiplication factor, the recycling of seed planted by farmers as well as issuance of free seed by some institutions from time to time. Seed production is mainly in the hands of smallholder farmers. When a crisis arises, farmers often sell or consume what they would have originally put aside as seed (Minde et al., 2008). All of these plus the low adoption of improved varieties explain the low yields per hectare (Evenson and Gollin, 2003; Minde et al., 2008). Quantity of groundnuts seed, extension-farmer contact and volume of groundnuts sold in the previous year positively and significantly influence groundnuts production. This implies that a unit percent increase in each of the aforementioned variables will lead to an increase in groundnuts production by their percent parameter estimates (size of their coefficients) and vice-versa (Nzima et al., 2014).

Most of the harvesting was done in April and May with 58% of the households indicating that they harvested in April and 29% harvested in May. In their study in Zambia, De Clerk

and Ross (2012) gathered that marketing commences in April/May, peaks in August and is largely finished by the end of October. 94% of the farmers marketed their groundnuts individually and the other 6% were part of group arranged marketing through cooperatives/associations. Most buyers (52.9%) were sole proprietors, whereas 41.2% were in a partnership, and only 2.9% each were corporations or associations (Minde et al., 2008)

The majority of the households sold their groundnuts from June and August with a combined 81% of the respondents having done that. The remainder chose to sell in the off-season from October to December, a period synonymous with better prices since supply will be declining on the market. As the groundnut marketing season is a long one spanning more than six months, the crop is sold as and when a family requires cash. With the exception of extremely robust households, most often households will sell a few bags early in the season to generate urgent cash in May/June and then store what they can until prices increase and a further cash requirement induces them to sell (De Clerk and Ross, 2012).

The study showed that the lowest price in the time series was USD 0.91/kg recorded in January 2010 and the highest was USD 1.398 in March 2015. Seasonal indices for the period 2010 to 2015 revealed that the month of April had the highest prices on the market with an average of USD 1.14/Kg whilst July had the lowest prices at USD 0.91/Kg. These prices were all significantly higher than the government minimum producer price of USD 0.60 per kg cited by SNV (2012) and this is because the analysis was done using prices from AMA which reflect the average from private buyers in the market.

In the study, 60% of the farmers indicated that they faced difficulties when marketing their groundnuts and the other 40% did not face major obstacles. Distance was cited as the main   constraint when marketing groundnuts as was the case with 43% of the farmers. Buyer requirements were the second main challenge and 19% of the farmers indicated that buyers had specifications which made it difficult to market their produce. Transport was cited by 9% of the farmers as a major constraint. In a similar study, Nzima et al. (2014) reported that major constraints included: lack of markets, low producer prices, labour demanding, lack of improved seeds, pests and diseases, low supply of produce, lack of technology for value addition and high market fees. De Clerk and Ross (2012) cited the constraints faced by farmers when marketing their groundnuts to be low

prices, distance to market, transport to market and lack of an organised and consistent market. The result of the study agrees with the findings of Hamidu et al. (2006) and Adinya (2009) which revealed similar constraints militating against the efficient marketing of groundnut.

Access to market information is very important in setting up and running a successful business (Minde et al., 2008). In the study, Agritex was cited as the most used source of market information with 90% of the farmers indicating as one of their main sources of information. About 25% of the farmers also depend on information from other farmers and 14% of the farmers use the parastatal GMB as a source of market information. The high Agritex extension worker to farmer ratio in Mazowe district makes it an important source of market information. GMB was cited as the second most frequently used institutional source and this is because it has unmatched comparative advantage and better infrastructure across the country (SNV, 2012). Additionally, contacting an extension service seems to have a positive effect on household marketing (Eterline, 2013).

Distance was cited as a major factor to consider when marketing groundnuts. Sampled farmers indicated a range of 0 to 92km travelled in pursuit of more lucrative markets. 52% of the farmers travelled less than 10km to market their produce and the other 48% of the travelled more than 10km to market their groundnuts and this distance significantly contributes to marketing costs. The distance between a household and the market is a measure used to specify one aspect of transportation costs (Alene et al., 2000; Key et al., 2000). Households that are closer to a market spend less time and money getting their crops to market. Thus distance would tend to correlate with higher transportation costs and create barriers to market participation as attested in a study by Alene et al. (2000).

7. Conclusion

The study found out that farmers grow and sell groundnuts as a means of increasing their income from their agricultural activities. In most of the households, women are entrusted with the responsibility of overseeing both the cultivation and marketing of groundnuts. Lack of sufficient investment into production due to high inputs cost and lack of capital negatively affect groundnut production in the study area. As a direct result of competition for inputs with other cash crops, many groundnut farmers obtained below average yields hence small quantities were marketed after meeting household consumption needs. Local varieties of groundnuts were highly preferred by farmers since they could recycle the seed due to inaccessibility of improved seed due to costs.

Groundnut farmers in the study area ae not organised into cooperatives and they market their produce individually. The study has shown that there are three main groundnuts marketing channels namely the on-farm, middlemen and urban marketing channels. Most of the groundnuts were shelled before selling. There is a lot value addition in all the channels in a bid to increase the income from groundnut production and the main product sold is peanut butter. Market types available in the study area are individuals, processors and schools. In as much as markets are available and to a greater extent accessible, the groundnut farmers are not satisfied with the performance of the markets.

Most of the farmers prefer to market their produce from June to August. The highest prices were observed in the lean period between February and April when supply on the market is low. Farmers can predict future trends in prices using historical data. Market information was obtained from Agritex and the farmers acknowledged its accessibility and usefulness. The major constraints to groundnut marketing as identified by the study were distance and buyer requirements which act as barriers to maximising profits from groundnut cultivation.

8. References

Adinya IB .2009. Analysis of costs-returns profitability in groundnut marketing in Bekwarra Local Government area Cross River State, Nigeria. The Journal of Animal and Plant Sciences 19: 212-216.

Alene AD. 2008. Smallholder Market Participation under Transactions Costs: Maize Supply and Fertilizer Demand in Kenya. Food Policy 33: 318-328.

AMA. 2015. Weekly Market Commodity Bulletins. Available at http://www.ama.co.zw/?cat=4 : Accessed 2016-01-15.

Appleton S. 1996. Women-Headed Households and Household Welfare: An Empirical Deconstruction for Uganda. World Development 24: 1811-1827.

Awoke MU. 2003. Production analysis of groundnut (*Arachis hypogaea*) in Ezeagu Local Government Area of Enugu State, Nigeria. Global Journal of Agricultural Sciences 2: 138-142.

Bell J. 2014. Doing Your Research Project: A Guide for First-time researchers. New York: McGraw-Hill, 297p.

Best JW, Kahn MV. 2013. Research in Education. Boston: Prentice Hall Education, 408p.

Blackden M. 1999. Gender, Growth, and Poverty Reduction. Findings: 129. Washington D.C. World Bank Publications, 105p.

Bogdan RC, Biklen SK. 2006. Qualitative Research for Education – An Introduction to Theory and Methods. Boston: Allyn and Bacon, 315p.

Borg WR, Gall MD. 1996. Educational Research. London: Longman, p256.

Chiyembekeza AJC, Subrahmanyam P, Kisyombe CT, Nyirenda NE. 1998. Groundnut: A package of recommendations for production in Malawi. Lilongwe. Ministry of Agriculture and Irrigation, 20 p.

Clark G. 1994. Onions Are My Husband: Survival and Accumulation by West African Market Women. Chicago. University of Chicago Press, 186p.

Cohen L, Manion, L, Morrison K. 2011. Research Methods in Education. London: Routledge, 756p.

DAFF. 2012. Groundnut Market Value Chain Profile. Available at http://www.nda.agric.za/docs/AMCP/Groun2012.pdf : Accessed 2015-05-16.

De Klerk M, Ross S. 2012. Groundnut Value Chain and Marketing Assessment in Eastern Province, Zambia. Available at: http://conservationagriculture.org/uploads/pdf/Eastern-Province-Groundnut-Production-and-Marketing-Chains-April-2012.pdf: Accessed 2015-01-10.

Derlagen C, Phiri H. 2012. Analysis of incentives and disincentives for groundnuts in Malawi. Rome. Technical notes series, MAFAP, FAO, p14.

Dhewa C. 2014. Analysis: What has gone wrong with the groundnut market in Zimbabwe? Available at http://www.bh24.co.zw/analysiswhat-has-gone-wrong-with-the-groundnut-market-in-zimbabwe/: Accessed 2014-12-29.

Edriss AK, Simtowe F. 2003: The dynamics of groundnut production, efficiency, profitability and adoption of technology in Sub-Saharan Africa: The Malawi Case. Las Vegas. International Publishers and Press, 144p.

Eterline DJ. 2013. The Impact of Groundnut Production and Marketing Decisions upon Household Food Security among Smallholder Farmers in Sub-Saharan Africa: Does Gender Matter? [MSc]. Blackburg. Virginia Polytechnic Institute and State University, 126p.

Evenson RE, Gollin D. 2003. Crop Variety Improvement and its effect on productivity: the impact of international agricultural research. Technology & Engineering. Wallingford. CABI Publishing, p 473-497.

FAO.1997. Socio-economic impact of smallholder irrigation development in Zimbabwe. Available at www.fao.org/docrep : Accessed 2015-10-08.

FAO. 2005. FAOSTAT: Trade - Crops. Available at http://faostat3.fao.org/browse/T/*/E : Accessed 2015-11-21.

FAO. 2011. FAOSTAT: Inputs - Land. Available at http://faostat3.fao.org/search/*/E : Accessed 2015-11-21.

FAO. 2015. FAOSTAT: Production - Crops. Available at http://faostat3.fao.org/: Accessed 2015-12-22.

Goetz SJ. 1992. A Selectivity Model of Household Food Marketing Behaviour in Sub-Saharan Africa. American Journal of Agricultural Economics 74: 444-452.

Hamidu HM, Kuli SG, Mohammed I. 2006. Profitability analysis of groundnut (*Arachis Hypogae* L) processing among women entrepreneurs in Bauchi Metropolis. A paper presented at the Farm Management Association of Nigeria Proceedings of 20th Annual National Conference, p 387-391.

Hartdegen P. 2011. Peanuts may boost Zimbabwe's poor farmers. Available at http://www.bizcommunity.com/Article/196/472/64341.html: Accessed 2014-12-29.

IMF. 2014. GDP-Zimbabwe. Available at http://www.imf.org/external/country/zwe/ : Accessed 2016-01-24.

Key N, Sadoulet E, de Janvry. 2000. Transactions Costs and Agricultural Household Supply Response. American Journal of Agricultural Economics 82: 245-259.

Hilderbrand GL. 1995. The status of technologies used in achieving high Groundnut Yields in Zimbabwe. Andhra Pradesh. International Crops Research Institute for the Semi-Arid Tropics, p1-114.

Kuboja NM, Temu AE. 2013. A Comparative Economic Analysis of Tobacco and Groundnut Farming in Urambo District, Tabora Region, Tanzania. Journal of Economics and Sustainable Development Vol.4, No.19: 104-111.

Kumwenda I, Madola M. 2005. The status of contract farming in Malawi. FANRPAN South Africa. Available at: http://www.fanrpan.org/documents/d00096/ : Accessed 2015-07-28.

Langyintuo AS. 2008. Modelling agricultural technology adoption: Principles and Concepts. Harare. CIMMYT, 27p.

Leedy PD. 2014. Practical Research: Planning and Design. London: Pearson Education Limited, 381p.

Makopa F. 2014. Zimbabwe's groundnut production falls. Available at http://www.newsofthesouth.com/zimbabwes-groundnut-production-falls/:   Accessed 2014-12-29.

MAMID. 2012. Second Round Crop and Livestock Assessment Report 2011/12 Season. Available at http://www.acifzimbabwe.org/index.php/2014-04-26-04-14-02/2014-04-26-04-17-49/95-second-round-crop-and-livestock-assessment-2012 : Accessed 2015-05-27.

MAMID. 2014. Second Round Crop and Livestock Assessment Report 2013/14 Season. Available at http://documents.wfp.org/stellent/groups/public/documents/pdf : Accessed 2015-05-22.

Mangisoni JH. 1989. A survey of the socio-economic constraints to smallholder dairy production in the Lilongwe milk shed area in Malawi: Implications for dairy production policy. Bunda. University of Malawi, 235p.

Maxwell D. 1996. Measuring food insecurity: The frequency and severity of coping strategies. Food Policy 21, p 291–303.

Minde M, Madzonga O, Kanthiti G, Phiri K, Pedzisa T. 2008. Constraints, Challenges and Opportunities in Groundnuts Production and Marketing in Malawi. Report No 4, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), p 1-53.

Moyo S. 2000. Zimbabwe environmental dilemma: balancing resource inequities. Harare. Zimbabwe Environmental Research Organization, 16p.

Nyamapfene, K. 1981. Soils of Zimbabwe. Harare: Nehanda Publishers, 179p.

Nzima WM, Dzanja J, Kamwana B. 2014. Structure, Conduct and Performance of Groundnuts Markets in Northern and Central Malawi: Case Studies of Mzimba and Kasungu Districts. International Journal of Business and Social Science 5: 130-139.

Omamo SW. 1998.Transport costs and smallholder cropping choices: an application to Siaya District, Kenya. American Journal of Agricultural Economics 80: 116–123.

Renkow M, Hallstrom, DG, Karanja DD. 2004. Rural infrastructure, transactions costs and market participation in Kenya. Journal of Development Economics73: 349–367.

SNV. 2012. Groundnuts Subsector Study. Available at www.aksharakriti.org/zimbabwegroundnutssub-sectorstudyreport : Accessed 2015-02-07.

Tuckman BW. 1994. Conducting Educational Research. New York. Harcourt Brace, 427p.

World Bank. 2012. Zimbabwe Development Indicators. Available at http://data.worldbank.org/country/zimbabwe : Accessed 2015-12-03.

World Bank. 2014. Multi-Indicator Cluster Survey. Available at http://www.worldbank.org/en/country/zimbabwe/overview : Accessed 2015-01-03.

World Bank. 2015. Zimbabwe Development Indicators. Available at http://data.worldbank.org/country/zimbabwe: Accessed 2015-12-03.

USAID. 2010. Zimbabwe Agricultural Market Study. Washington D.C. Weidemann associates Inc, 156p.

Vincent V, Thomas RG. 1961. An agro-ecological survey of Southern Rhodesia: Part I agro-ecological survey. Salisbury: Government Printers, p139-14.

Waddington SR, Karigwindi J. 2001. Productivity and profitability of maize + groundnuts rotations compared with continuous maize on smallholder farms in Zimbabwe. Experimental Agriculture Vol. 37: 83-98.

Wang J, Cramer GL, Wailes EJ. 1996. Production efficiency of Chinese agriculture: evidence rural household survey data. Journal of Agricultural Economics 15: 17-28.

ZIMSTAT. 2012. Zimbabwe Population Census. Available at http://www.zimstat.co.zw/sites/default/files/img/National_Report.pdf : Accessed 2015-05-12.

Annexes

List of annexes

Annex 1: Questionnaire for groundnut farmers

Annex 2: Market prices for groundnuts

Annex 3: Ms Excel Output for time series analysis

Annex 1: Questionnaire for groundnut farmers

> **Introduction**
>
> This tool is for collecting market data for groundnuts in the district as part of data collection for a survey being conducted to fulfil the requirements for academic study. The researcher is **Donald Mbangani** an Agritex employee and currently studying for a Masters in International Development and Agricultural Economics at the Czech University of Life Sciences. Main objective of the study is to determine the availability and accessibility of groundnut markets as well as to a gain insight into factors influencing farmers' marketing decisions. Information provided will be treated with strict confidentiality and participation is voluntary. The interview will take approximately 30 minutes and the respondents are kindly requested to provide honest and authentic answers.

Section 1

Questionnaire Number			**Ward Name**	
Province			**Ward Number**	
District			**Village**	
Enumerator Name				
Respondent Name				
Date			**Time**	

Section 2: Household Demographics

a) Adult members responsible for decision making *(Use number codes given below)*

	Codes	Household Head	Spouse
Sex	1-Male 2-Female		
Age			
Marital Status	1-Married 2-Divorced 3-Seperated 4-Widow/er 5-Single		
Level of Education	1-no formal schooling 2-primary school 3-secondary school 4-post-secondary/tertiary		
Literacy	1-Literate 2-Illiterate		
Chronically ill	1-Yes 2-No		
Disability Status	1-Fully able 2- Partially disabled 3-Fully disabled		
Main Income source	1- Farming 2- Vegetable gardening 3-Livestock rearing 4-Fishing 5- Pension 6- Remittance 7- Formal employment 8-Casual employment 9- Business 10- Other (Specify)		

b) Household Composition

	Male	Female
HH members aged below 5 years		
HH members aged between 5-17 years		
HH members aged between 18-59 years		
HH members aged 60+ years		
HH members chronically ill (Children)		

HH members chronically ill (Adults)		
HH members disabled (Children)		
HH members disabled (Adults)		

How many family members are involved in groundnut production?

………………………………………………

Who is responsible for **growing** groundnuts?   1-HH head   2-Spouse   Gender   1-Male 2-Female

Who is responsible for **marketing** groundnuts? 1-HH head   2-Spouse   Gender   1-Male 2-Female

Does any member of the household belong to a cooperative or any association membership? 1-Yes   2- No

If yes, what is the name of the cooperative or association?

....

Section 3: Groundnut Production

What size of land do you own?	
What size of land do you cultivate for all crops?	
Land size allocated to groundnuts production in the 2014/15 cropping season	
Average yield	
Varieties grown	
How long have been growing groundnuts?	
Why do you **grow** groundnuts? *Rank in order of importance; 1=Most important*	Why do you **sell** groundnuts? *Rank in order of importance; 1=Most important*
Reason Rank 1-Source of income [ ] 2- Social status [ ] 3-Food security [ ] 4-Ceremonial/Socio-cultural [ ] 5-Crop rotation [ ] 6- Other (specify) ……………………… [ ]	Reason Rank 1-Source of income [ ] 2- Social status [ ] 3-Food security [ ] 4-Ceremonial/Socio-cultural [ ] 5- Other (specify) ……………………… [ ]

Try to estimate your annual expenditure on groundnut production for the past season using the following guide

Inputs	Source (Use codes)	Quantity	Unit cost (USD)	Total Cost (USD)
Seeds				
Fertilizer e.g Gypsum				

Other fert ……………………				
Other fert ……………………				
Chemicals (Specify)				
………………………				
………………………				
……………………..				
Labour		……… Labour days		
Other Costs (specify)				
…………………….....				
………………………				
………………………				
………………………				

Source Codes
1- Government   6- Gifts and remittances
2- NGOs   7- Carry over
3- Farmer Unions   8- Contract farming
4- Purchases (open market)   9- Other Specify
5- Retained

Section 4: Groundnuts marketing

a) Post Harvest processes

Which processes do you conduct prior to marketing (*circle applicable*)	1- Grading and sorting 2- Shelling 3-Packaging 4-Other (specify) ……………………………………… ………………………………………………………
What type of packaging do you normally use? (*circle applicable*)	1-50kg grain bag 2-Bulk 3-Other (specify) ………………………………………..
Do you add value to your groundnuts before selling?	1-Yes 2-No
If yes, which product do you sell?	1-Peanut butter 2-Roasted nuts 3-Other………………..
When do you normally harvest your groundnuts? (*months*)	
When do you normally sell your groundnuts? (*months*)	

Give main reasons for marketing in the above mentioned months

…………………………………………………………………………………………………
…………………………………………………………………………………………………

……
………………………………………………………………………

b) Markets

Which market channels do you have in your area?	
What types of markets are available for you in your area?	
Which ones do you normally use?	
Reason for choice of markets	
Do you face any difficulty accessing the markets?	1-Yes 2-No
If yes, what are the difficulties	1-Distance 2-Transport 3-Buyer requirements 4-Other (specify)
Estimate distance to main market used	………………. Km
Rank your level of satisfaction with markets you have access to (1-4) (*1-Most satisfied 4-Least satisfied*)	
How do you market your groundnuts	1-Individually 2- Groups(cooperatives) 3-Contract 4-Other(specify)

Codes

Market channel;   1-On-farm 2-Middlemen 3-Urban market 4-Other (*specify)*

Market type;   1-Individuals 2-Processessors 3-Schools 4-Supermarkets 5-Other (*specify*)

Reason for choice; 1- Near 2- High prices 3-Cheap transport 4-Variety of customers 5- Other (s*pecify*)

What are the main constraints faced during marketing of groundnuts? Rank in order of severity (1-3) (1= Most severe)

……
……
……
……

c) Market Information

What type of market information do you need?		
What type of market information do you receive?		
Main sources of market information	1- Agritex 2-GMB 3-AMA 4- NGOs 5- Farmer Unions 6- Other Farmers 7- Buyers 8-Other (Specify)	
What type of market information does the above sources provide		
Source(Use codes)	Type of information	Rank usefulness 1-5 (1=Not useful 5=Very useful)

d) Groundnut prices

Name of market	Product description (use codes) 1-Shelled 2-Unshelled	Last year's Average Price (USD)	Current Average Price (USD)

	What price do farmers prefer? *Give a range*	USD………….. to USD ……………..	

In your opinion what are the effects of the following on groundnut price fetched

Grading and sorting	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Shelling	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Processing (eg roasting nuts)	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Distance to market	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Access to market information	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Quantity delivered	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Type of market	1-Very high 2-High 3-Moderate 4- Low 5- Very low
Training	1-Very high 2-High 3-Moderate 4- Low 5- Very low

e) Income from groundnuts and products
Please try to estimate your annual income from the following;

Product	Annual Income
Raw Groundnuts	
Roasted Groundnuts	
Peanut butter	
Other……………………..	
Other……………………..	
Other……………………..	
Total	

Rank your groundnut varieties in terms of profitability and give reasons for your answer

Variety name	Rank *1=Most profitable*	Main Buyers	Reasons

THE END

THANK YOU FOR YOUR PARTICIPATION

Annex 2: Market prices for groundnuts (USD/kg)

Month/Year	2010	2011	2012	2013	2014	2015
January	0.91	0.92	0.99	0.98	1.20	1.28
February	0.85	0.95	1.03	1.00	1.14	1.36
March	0.95	0.95	1.03	1.00	1.24	1.39
April	0.95	1.08	1.15	1.18	1.24	1.27
May	0.84	0.83	0.90	0.90	1.13	1.11
June	0.88	0.88	0.93	0.93	1.17	1.05
July	0.78	0.85	0.90	0.97	1.07	1.05
August	0.81	0.92	0.97	0.97	1.10	1.05
September	0.91	1.00	1.05	0.97	1.20	1.05
October	0.88	1.00	1.05	1.05	1.17	1.05
November	0.89	0.95	1.00	1.05	1.18	1.02
December	0.91	0.90	0.95	1.05	1.20	1.02

Source: AMA (2015)

Annex 3. Ms Excel output for time series analysis

Date	Observation	Groundnut price USD/kg	Moving average	centered moving average	seasonal factor	average seasonal index	Linear trend (CMAT)	CF	Irregularity component	Projected linear and seasonal trend
Jan-10	1	0.91								
Feb-10	2	0.85								
Mar-10	3	0.95								
Apr-10	4	0.95								
May-10	5	0.84								
Jun-10	6	0.88								
Jul-10	7	0.78	0.88	0.88	0.88	1.08	0.88	1.003	0.82	0.95
Aug-10	8	0.81	0.88	0.88	0.75	1.07	0.88	1.002	0.70	0.95
Sep-10	9	0.91	0.89	0.89	0.63	0.94	0.89	1.002	0.67	0.84
Oct-10	10	0.88	0.89	0.89	0.71	0.84	0.89	1.002	0.85	0.75
Nov-10	11	0.89	0.90	0.90	0.86	0.87	0.90	1.001	0.99	0.78
Dec-10	12	0.91	0.90	0.90	0.95	0.86	0.90	0.995	1.10	0.78
Jan-11	13	0.92	0.90	0.90	0.76	0.90	0.91	0.993	0.85	0.81
Feb-11	14	0.95	0.90	0.91	0.85	0.92	0.91	0.996	0.92	0.83
Mar-11	15	0.95	0.91	0.92	0.86	0.94	0.92	0.999	0.91	0.86
Apr-11	16	1.08	0.92	0.92	0.81	1.09	0.92	1.004	0.74	1.00
May-11	17	0.83	0.93	0.93	1.02	1.06	0.93	1.007	0.97	0.98
Jun-11	18	0.88	0.93	0.93	1.24	1.16	0.93	1.004	1.06	1.08
Jul-11	19	0.85	0.93	0.94	1.23	1.08	0.94	1.002	1.14	1.01
Aug-11	20	0.92	0.94	0.94	1.08	1.07	0.94	1.003	1.00	1.01
Sep-11	21	1.00	0.95	0.95	1.00	0.94	0.95	1.005	1.05	0.89
Oct-11	22	1.00	0.95	0.96	0.86	0.84	0.95	1.006	1.02	0.80
Nov-11	23	0.95	0.96	0.96	0.88	0.87	0.96	1.007	1.01	0.83
Dec-11	24	0.90	0.97	0.97	0.92	0.86	0.96	1.008	1.07	0.83
Jan-12	25	0.99	0.97	0.97	0.90	0.90	0.96	1.007	1.01	0.86
Feb-12	26	1.03	0.97	0.98	0.87	0.92	0.97	1.006	0.95	0.89
Mar-12	27	1.03	0.98	0.98	0.84	0.94	0.97	1.005	0.89	0.92
Apr-12	28	1.15	0.98	0.98	1.29	1.09	0.98	1.004	1.19	1.06
May-12	29	0.90	0.99	0.99	0.79	1.06	0.98	1.004	0.74	1.04
Jun-12	30	0.93	0.99	0.99	1.09	1.16	0.99	1.003	0.94	1.15
Jul-12	31	0.90	0.99	0.99	1.24	1.08	0.99	1.000	1.15	1.07
Aug-12	32	0.97	0.99	0.99	1.22	1.07	1.00	0.993	1.14	1.07
Sep-12	33	1.05	0.99	0.99	1.20	0.94	1.00	0.986	1.27	0.95
Oct-12	34	1.05	0.99	0.99	1.04	0.84	1.01	0.982	1.23	0.85
Nov-12	35	1.00	0.99	0.99	0.87	0.87	1.01	0.978	1.00	0.89
Dec-12	36	0.95	0.99	0.99	0.71	0.86	1.02	0.973	0.82	0.88
Jan-13	37	0.98	0.99	0.99	0.85	0.90	1.02	0.972	0.95	0.92
Feb-13	38	1.00	1.00	1.00	0.85	0.92	1.03	0.970	0.92	0.94
Mar-13	39	1.00	1.00	0.99	0.99	0.94	1.03	0.962	1.05	0.97
Apr-13	40	1.18	0.99	0.99	1.16	1.09	1.04	0.954	1.06	1.13
May-13	41	0.90	0.99	0.99	1.17	1.06	1.04	0.951	1.11	1.10
Jun-13	42	0.93	0.99	1.00	1.16	1.16	1.05	0.953	1.00	1.22
Jul-13	43	0.97	1.00	1.01	1.16	1.08	1.05	0.961	1.07	1.14
Aug-13	44	0.97	1.02	1.03	1.15	1.07	1.06	0.971	1.07	1.14
Sep-13	45	0.97	1.03	1.04	1.00	0.94	1.06	0.981	1.06	1.00
Oct-13	46	1.05	1.05	1.06	0.71	0.84	1.07	0.988	0.85	0.90
Nov-13	47	1.05	1.06	1.07	0.86	0.87	1.07	0.995	0.98	0.94
Dec-13	48	1.05	1.08	1.09	0.86	0.86	1.08	1.009	0.99	0.93
Jan-14	49	1.20	1.10	1.10	0.86	0.90	1.08	1.017	0.96	0.97
Feb-14	50	1.14	1.11	1.11	0.99	0.92	1.09	1.021	1.08	1.00
Mar-14	51	1.24	1.12	1.13	0.99	0.94	1.09	1.031	1.05	1.03
Apr-14	52	1.24	1.14	1.14	1.12	1.09	1.10	1.039	1.03	1.19
May-14	53	1.13	1.15	1.15	1.10	1.06	1.10	1.044	1.04	1.16
Jun-14	54	1.17	1.16	1.16	1.08	1.16	1.11	1.050	0.93	1.29
Jul-14	55	1.07	1.17	1.17	1.06	1.08	1.11	1.054	0.98	1.20
Aug-14	56	1.10	1.18	1.18	1.17	1.07	1.12	1.060	1.09	1.20
Sep-14	57	1.20	1.19	1.20	0.90	0.94	1.12	1.070	0.95	1.06
Oct-14	58	1.17	1.21	1.21	0.89	0.84	1.13	1.072	1.06	0.95
Nov-14	59	1.18	1.21	1.21	0.89	0.87	1.13	1.067	1.02	0.99
Dec-14	60	1.20	1.21	1.20	0.88	0.86	1.14	1.057	1.02	0.98
Jan-15	61	1.28	1.20	1.20	1.12	0.90	1.14	1.048	1.25	1.02
Feb-15	62	1.36	1.20	1.19	1.02	0.92	1.15	1.041	1.12	1.05
Mar-15	63	1.39	1.19	1.19	1.04	0.94	1.15	1.029	1.10	1.09
Apr-15	64	1.27	1.18	1.17	1.06	1.09	1.16	1.015	0.97	1.26
May-15	65	1.11	1.17	1.16	1.20	1.06	1.16	1.001	1.14	1.23
Jun-15	66	1.05	1.16	1.15	1.24	1.16	1.17	0.989	1.07	1.36
Jul-15	67	1.05	1.15	1.15	1.14	1.08	1.17	0.978	1.06	1.27
Aug-15	68	1.05	1.14	1.13	0.89	1.07	1.18	0.958	0.83	1.26
Sep-15	69	1.05	1.11	1.10	1.06	0.94	1.18	0.929	1.13	1.12
Oct-15	70	1.05	1.08	1.07	0.63	0.84	1.19	0.899	0.74	1.00
Nov-15	71	1.02	1.05	1.05	0.82	0.87	1.19	0.885	0.94	1.04
Dec-15					#N/A			#DIV/0!	#N/A	0.00

63