AGRICULTURE AND FOOD AUTHORITY

NUTS AND OIL CROPS DIRECTORATE

ANNUAL MARKET RESEARCH REPORT

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(iii) Abbreviations and acronyms

FOB - Free on Board

NOCD - Nuts and Oil Crops

NUTPAK -Nuts Growers Association of Kenya

(iv) Executive Summary

Timely and accurate market intelligence is one of the major challenges facing the Nuts and Oil crops subsector in Kenya. This is mainly as a result of lack of a reliable data collection infrastructure. To bridge this gap the market research section of NOCD conducts regular market surveys so as to address this challenge by providing an overview of the industry based on representative samples taken from the industry population. This survey's overall objective was to establish estimates of the prevailing market condition in terms of demand and supply while at the same time documenting the challenges in production. These factors eventually have a bearing in price fluctuations for various nuts and oil crop products across different markets in the region. Various parameters were used to gauge product performance such as product popularity, production levels, the marketing channels used , product satisfaction levels and their prices among others.

The survey fundings recorded that on average 1,760 nuts are realized per acre for coconut while in Macadamia average production per acre was recorded as 5,740 kg. This produce is mainly marketed through middlemen as the most common marketing channel in the subsector. In terms of product awareness, mature coconuts are the most known among nuts and oil crop products while coconut honey is the least known product. A majority of the respondents indicated that family and friends are their major source of information in relation to prevailing market conditions.

Product performance was gauged using satisfaction levels on a linkert scale and coconut oil recorded the highest satisfaction level. Further, the survey sought to document the different factors that influence the purchase of the nuts and oil crops products; herein price asnd product uses were recorded as the most important factors that influence the purchase of nuts and crops.

To get insights on specific marketing challenges a majority of the players felt that high bulking costs was the major marketing challenge coupled with high transport costs. Both macadamia and coconut/cashew nuts farmers indicated that pests and diseases were a major challenge in the production. The second major challenge was limited land size for the macadamia farmers by 28.8% and irregular rainfall patterns for coconut/cashew nuts production by 21.2%. In conclusions its recommended that points of leverage be sought to build capacity at farmer and market association level in order to provide easy access to market and price information to all the industry p

CHAPTER ONE: INTRODUCTION

1.1 Foreword

Nuts and Oil Crops including coconut, cashew nut, macadamia nut, sunflower, rapeseed, peanuts, sim sim among many are spread across the country from the coast, to central regional all the way to western Kenya. These are major cash crops in these regions as they are estimated to support livelihoods of more than 300,000 households. While it's estimated that the sub-sector has the potential of generating an excess of Ksh 30 billion in revenue, productivity at farm level and marketing have been identified as major constraints facing the industry. These challenges are not insurmountable and can therefore be addressed at some point. To address these challenges, the Kenyan government established the nuts and oil crops Directorate to specifically be in charge of the sub sector and address some of these challenges to a greater extent. One of the approaches to bridge the existing information gap is by undertaking a market research to generate information for decision making, strategy formulation and implementation. To operationalize part of this commitment, a market research was carried out targeting the following products:

- Coconut and its major derivatives (Mature & tender nuts Palm wine and Oil)
- Macadamia nuts
- Cashewnuts

The selection of the above named products was guided by their relative economic significance, monetary value and production quantities across the region.

1.2 Overview

This report presents findings of a survey on coconut and cashew nuts as the major nuts and oil crops in the Coastal region commissioned in November 2015 by the Nuts and Oil Crops Directorate of Agriculture and Food Authority (AFA) The work was carried out over a three month period using the administrative structures of the Ministries of Agriculture in the respective counties. Data collection was carried out in the months of November and December 2015 using a team of 6 enumerators and supervised on a daily basis by two AFA staff members. Four counties in the Coast region with significant coconut farming were covered i.e. Kwale, Kilifi, Lamu and Mombasa. Taita Taveta and Tana River were left

out all together since the counties do not have significant coconut and cashew nut farming activities. The second phase was carried out in May 2016 targeting the major Macadamia producing counties of Embu, Kirinyaga, Murang'a, Nyeri and Kiambu counties It is information generated through this approach that is the basis of this report.

1.3 Background

1.3.1 Cashewnuts (*Anacardium occidentale*)

The cashew nut is an important crop in Kenya as it is among its crops traded worldwide. It originated from Brazil and was introduced in India and Africa in the 16th century by Portuguese who aimed to protect soil from erosion. In 2013, the amount of cashew nut produced globally was lower compared to its demand. A study conducted by Agricultural Non state Actors Forum (ANSAF) on demands of processed cashew nuts, revealed that North America and Europe accounted for 40% of the world demand (Rukonge, 2013). Other major buyers are Middle East and Asian countries, Mexico, China and India.

The countries that are leading in production of cashew nut are India, Brazil, Vietnam, Nigeria, Ivory Coast, Guinea Bissau, Tanzania, Mozambique, Kenya and Malawi. Globally, by 2010 the area that was under cashew cultivation was approximately four million hectares. This was manifold increase when compared to half million reported in 1961 (Kilama 2010)

1.3.2 Coconut (cocos nucifera)

The growing of coconut was introduced in Kenya in the 16th century by the Portuguese and since then, the coconut palm has grown to become one of the key sources of livelihood for many households in the coastal region. The coconut palm is traditionally known for many uses ranging from the leaves, fruit and the trunk. There are hardly any parts of the coconut that are left unused. The coconut palm produces food and drink for people, copra for oil, copra cake/meal, palm wine, building materials in the form of poles for construction and leaves (makuti) for roofing as well as timber for furniture; fibre for ropes, mats, brushes, and brooms; and shells for the manufacture of utensils and ornaments. The list goes on and on. In general terms, the coconut sub-sector demonstrates an immense potential to drive economic development in the main coastal

belt. This potential is however far from exploited and coconut farmers remain among the poorest in Kenya.

1.3.4 Macadamia (*Macadamia integrifolia*)

Macadamia nuts is one of the cash crops grown mainly by small-scale farmers who are organized into quasi-private and supervised co-operatives or companies for farm input distribution, basic processing and marketing purpose. The leading macadamia producing counties in Kenya are Kirinyaga, Nyeri, Embu, Meru, Kiambu, Murang'a and Taita Taveta. The crop is also being introduced in other counties such as Makueni, Trans Nzoia, Tharaka Nithi, Busia, Uasin Gishu, Nandi, Kisii, Nyamira and Baringo.

McConacchie (1995) postulated that macadamia is a wood tree that belongs to protacease and is classified as a nut tree with about 1000 species spread and grown around the world but only three are grown commercially. International Nut and dried fruits Council (2002) states that macadamia nut tree is grown and processed by more than 40 developed and less developed countries in the world with millions of hectares of land devoted to growing tree nuts which provides economic livelihoods to hundreds of thousands of producers both small and large scale farmers. According to Wasilwa, Wasike and Kirigua (2012) macadamia is the most popular nut today because its oil is unsaturated at 84% compared to olive oil at 74%, free from cholesterol and is recommended for consumption by diabetics.

Kenya had been ranked as one of the highest producers of macadamia nuts and was ranked 5th highest producer of macadamia in the world having dropped from 2nd position in early nineties (Wasilwa L, et al, 2004). According to Kiuru, Nyaga & Wasilwa (2004) the drop of Kenya's position can only be associated to lack of research on development technologies and innovations to add value in addition to weak marketing systems among many other challenges.

1.4 Rationale of the survey

Despite the Nuts and Oil Crops industry potential and existing contribution to the economy the sub-sector suffers several challenges when it comes to availability of reliable and current data. The data is especially useful by government agencies, potential investors, and other stakeholders for policy, planning and decision making. To overcome these

challenges the Market Research section exist to regularly undertake surveys on the prevailing market conditions in order to provide stakeholders with the necessary information.

1.5 General objective of survey

The overall objective of the Nuts and oil crops market survey exercise was to establish a reliable current estimate of the prevailing market conditions in terms of demand and supply while at the same time documenting the challenges in production which eventually have a bearing on price fluctuations for various nuts and oil crop products across different markets in the region.

1.6 Specific objectives of survey

a) To track and document the prevailing awareness levels of selected Nuts and oil crops products;
b) To define customer requirements in terms of price and quality;
c) To establish where and how Nuts and Oil crops customers' needs are being met by processors and other players along the value chain;
d) To identify the prevailing market potential for selected products;
e) Evaluate weaknesses of processors of selected Nuts and Oil crops products;
f) To collect any other data on production and marketing of the selected nuts and oil crops;

1.7 Study location and justification

The study was conducted in the coastal Counties of Kwale, Mombasa, Kilifi and Lamu during the first phase and in the second phase Embu, Kirinyaga, Murang'a, Nyeri and Kiambu; these counties were selected because of their high production of cashew nut, macadamia nut and coconut. The coastal belt and the central Kenya region are the highest producers of the aforementioned crops. The research assistants were chosen on the basis that they were more familiar with the target area and could communicate in the local languages.

CHAPTER TWO: RESEARCH METHODOLOGY

2.1 Research strategy and design

This survey used combination of strategies where both qualitative and quantitative strategies were adopted. Qualitative research strategy was used to get opinions from members and officials concerning the role of agricultural policies in nuts and oil crops production and marketing. Survey and secondary data provided useful quantitative data that helped to widen the understanding about the research topic. The survey used cross sectional survey design to collect data. Application of the cross sectional survey in this study was for collection of data on variables such as type of services delivered by value chain enablers, sources of credit, price determinants, regulation, production and marketing cost, and lastly the profit margins realized by industry players. On these variables data were collected at a single point of a time in late 2015 and mid-2016.

2.2 Sampling design

The target population for this study included value chain players of cashew nut, coconut and macadamia nut in the four leading producing counties along the Kenyan Coast and also from the central Kenya region for macadamia nuts. It was from this population that researchers chose respondents that formed the sample size to represent the entire population of value chain players and small scale farmers. Sampling units were farmer groups and traders of the various players within the value chain found within the study area. The respondents were individual farmers and selected officials from ministry of Agriculture and providers of different farm inputs relating to the major crops under study. This study used cluster random sampling whereby respondents were randomly selected from the list of members available in the Ministry of Agriculture, Livestock and Fisheries offices at the sub-county level. This study used purposive sampling procedure also to select respondents among Ministry of Agriculture officials, processors, marketing agents, retailers and other key informants in the value chain within the study area. The reason for selection of these was due to their responsibility toward supervision and implementation of policy guided agricultural activities in the area.

2.3 Data collection design

The study obtained data from both primary and secondary sources. Secondary data for this study were from records; reports published and unpublished documents of the Nuts and Oil Crops Directorate and Ministry of Agriculture. The tools to collect data from Ministry staff were interview guides while the questionnaires were used to collect data from farmers and other value chain players. There were questionnaires for farmers, value chain players, consumers, processors and retailers. The questionnaires contained both open ended and closed ended questions. Interview was used to collect data from officials who were the major stakeholders on the subject.

The interview guide was used to complement the questionnaire whereby in- depth and descriptive information from key stakeholders of Nuts and Oil crops were collected. During the data collection process actual questions were framed in Kiswahili language before being translated back into English in addition to this Kikuyu language was also used in the central Kenya region as the primary language for some respondents. The Pilot study for this research was done at Msambweni Sub-county in Kwale County. The responses given enabled the researcher to make some improvements to the questionnaires. This resulted in asking questions that collected data on the relevant variables appropriately.

2.4 Data analysis design.

Data were examined to detect errors and unreliable information was omitted before editing to ensure that the data were accurate. Field data editing was done daily by passing through every questionnaire to ensure better and legible responses. Coding was done, after data editing where numerals were assigned to items of questionnaire and responses were entered into the computer. Data were consistently being entered in the computer program known as Statistical Package for Social Scientists (SPSS) and were well arranged to facilitate the analysis. After data coding, editing and entry, analysis followed by using the SPSS. Descriptive statistics such as frequencies, and percentages for studied variables were computed to investigate the various challenges in the nuts subsector in terms of production and marketing of cashew nuts/ Coconuts. Qualitative data collected through interview were edited, summarized, recorded and presented depending on the theme and specific objectives of the research.

CHAPTER THREE: STUDY RESULTS

3.1 Demographic Information of the Respondents

3.1.1 Gender of the Respondents

The gender of the respondents was an important component of this study as it revealed the categories of people involved in the nuts and oil crops industry. The table below shows the gender of the respondents alongside their designation. Out of the 52 macadamia farmers who took part in this study, 29 (55.6%) were male while 23 (44.4%) were female. Among the 64 retailers, 36 (56.7%) were male while 28 (43%) were female. Out of the 105 coconut farmers sampled, 63 (60%) were male and 42 (40%) were female.

3.1.2 Age of the Respondents

The age of the respondents was also considered a crucial element in this study. The findings indicated that 35.8% of the farmers growing the three crops (Cashewnuts, macadamia and coconut) were over 50 years, 42.9% of the middlemen were 30 – 39 years old, 71.4% of processors were 30 – 39 years of age, and 32.1% of retailers were 21 – 29 years while 40% of the consumers were 21 – 29 years of age. None of the middlemen, processors and the retailers were below 20 years of age. These findings indicated that the respondents were well experienced in farming and marketing of nuts and oil crops hence suitable for this survey.

Table 1: Respondents Gender Distribution

Value chain player	**Gender**				**Percent (%) Distribution by Age group**					
	Male		**Female**							
	Freq.	Perc.	Freq	Perc	≤20 Yrs	21-29	30-39	40-49	>50 Yrs	Freq
Farmers	92	55.6	65	44.4	2.5	9.9	27.2	24.7	35.8	157
Middlemen/Retailers	36	75	28	25	0	32.1	42.9	17.9	7.1	64
Processors	4	57.1	3	42.9	0	14.3	71.4	14.3	0	7
Consumers	34	52.3	31	47.7	12.3	40.10	21.5	16.9	9.2	65

*the data for consumers was considered incomplete as some of them did not complete the questionnaires hence information herein may not be a true representation of the population sampled.

3.1.3 Education Level of the Respondents

Education affects the level of participation and implementation of extension, post-harvest handling, marketing services and technicalities in the use of agricultural technologies. The findings across the three crops (macadamia, Cashewnuts and coconuts) indicate that 45.7% of the farmers, 57.1% of the middlemen and 29.2% of the consumers had secondary level education while 10.7% of the retailers and 5.8% of processors had college level education. On further interrogation, the findings show that macadamia marketing agents are fairly well educated and therefore understand the marketing system of macadamia nuts.

Table 2: Respondents' Education Levels

	Respondent							
Level of Education	**Farmers**		**Middlemen/Retailers**		**Processors**		**Consumers**	
	Freq	%	Frequency	%	Freq	%	Freq	%
None	-	-	-	-	-	-	-	-
Primary	55	35.1	16	21.4	4	11.8	21	32.3
Secondary	74	47.1	44	57.1	24	70.6	19	29.2
College	23	14.6	2	10.7	2	5.8	17	26.2
University	5	3.2	2	7.1	4	11.8	8	12.3
Total	157	100.0	64	100.0	34	100.0	65	100.0

3.2 Average Land sizes

The average sizes of land owned by the respondents differ with the locality. It was hard to distinguish between the sizes of land used for cashew production and that used for coconut production in coastal counties. This especially because the crops are not grown in a pure stand and even when its uniform the spacing is haphazard and irregular The two crops are also intercropped in the same parcels of land and with other crops. Despite this difficulty the following was deduced from the study.

Table 3: Respondents Land sizes

Crop	Cashew nuts and Coconut	Macadamia
land size in Ha	5.72	1.24

Generally, the land sizes in macadamia producing areas are smaller compared to that of coconut and cashew nuts production mainly because of population pressure. The production per ha also differed with the crop grown. Macadamia yielded the highest per ha followed by cashew nuts. Coconut farmers didn't give their production in terms of kilograms but in terms of pieces harvested, pausing a comparison challenge.

3.3 Average Production of Nuts per ha

On average the survey recorded 1,760 pieces as the average production per acre for coconut while in Macadamia average production per acre was recorded as 5,740 kg. Cashew productivity is the least due to lack of field maintenance practices such as spraying to control powdery mildew which is common in the region resulting in major losses. It is Instructive to note that as much as macadamia reported high production quantities per acre, the crop is rarely grown as pure stand among smallholder farmers. The figures obtained have been arrived at using the recommended plant population per acre from the figures given by farmers in terms of production per tree. On the flip side this positive outlook is diminished by poor quality as a result of premature harvesting.

Table 4: Production of Nuts per Acre

Crop	**Average production per Acre**
Coconut	1,760 Pieces
Macadamia Nuts	5,740 Kgs
Cashew nut	1,280 Kgs

3.4 Farm ownership

The results obtained indicate that most land on which the nuts and oil crops grow is either individually owned or family owned. In a few instances within the macadamia production areas, female farmers owned the parcels of land where the crop grow especially in the Central Kenya region. The overall land size is directly proportional to the quantity produce obtained.

3.5 Marketing channels

While trying to access the market for various products, there are different avenues that are used in the nuts and oil crops subsector. The survey sought to understand the different product flow routes from the farmer to consumers. Out of 52 macadamia farmers who responded, 39 (75%) sell their macadamia nuts through the agents (middlemen- *(here it is used to refer to agents and brokers)*). 12 (23%) sell their products to cooperative societies and the rest sell their products directly to processors. In the coconut industry, out of the 105 farmers sampled, 60 (57%) sell their products through cooperatives, 15(14.28%) through farmer groups and 25(23.8%) sell through the marketing agents. The rest sell their products to retailers. Cashew nuts farmers in most instances are the coconut farmers hence cannot be separated as such. In macadamia growing regions, the prices offered ranged widely depending on the locality. According to the farmers, the prices offered are very dynamic at different times of the growing season.
In summary the model below shows the main market structure for the nuts and oil crops from the farms all the way to consumption points.

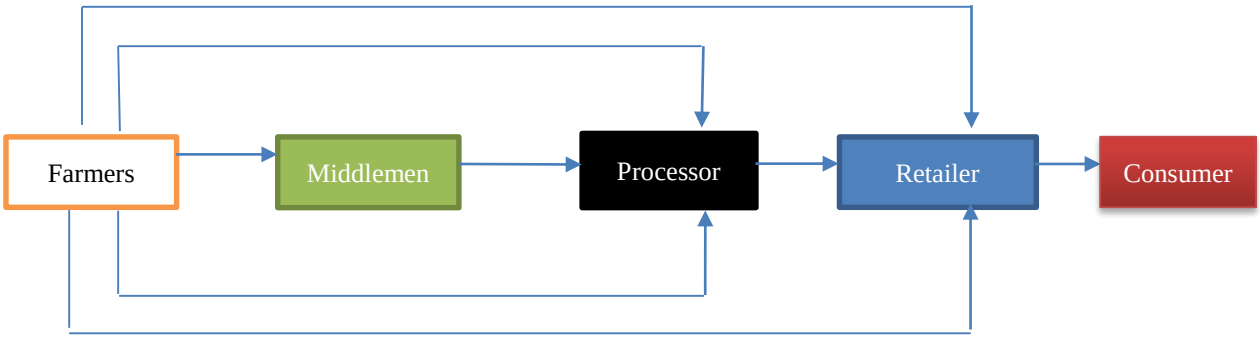

Figure 1: Marketing channels

3.6 Awareness about nuts and oil crops products

The level of awareness by the consumers for nuts and oil crops products was categorized into three levels. The first level was based on establishing the proportion of the respondents who had heard of the nuts and oil crops products .The second level was to establish the respondents who had seen the products and the third level was to establish the level of usage of the nuts and oil crops products. The findings for various coconut products and cashew nuts are as shown in the Table 6 below.

Table 5: Awareness about nuts and oil crops products

Awareness of nuts and oil crops products			Awareness			Total
			Heard	Seen	Used	
Product	Coconut Oil	Count	48	46	41	135
		% within product	35.6%	34.1%	30.4%	100.0%
		% within awareness	13.9%	14.0%	13.5%	13.8%
	Tender Coconut water (Madafu)	Count	67	68	65	200
		% within product	33.5%	34.0%	32.5%	100.0%
		% within awareness	19.4%	20.7%	21.4%	20.4%
	Coco syrup/ Honey	Count	35	29	23	87
		% within product	40.2%	33.3%	26.4%	100.0%
		% within awareness	10.1%	8.8%	7.6%	8.9%
	Coconut milk	Count	58	55	50	163
		% within product	35.6%	33.7%	30.7%	100.0%
		% within awareness	16.8%	16.7%	16.4%	16.6%
	Mature nuts	Count	70	67	66	203
		% within product	34.5%	33.0%	32.5%	100.0%
		% within awareness	20.2%	20.4%	21.7%	20.7%
	Cashew nuts	Count	68	64	59	191
		% within product	35.6%	33.5%	30.9%	100.0%
		% within awareness	19.7%	19.5%	19.4%	19.5%
	Total	Count	346	329	304	979

3.6.1 Awareness about coconut oil

The findings indicate that 35.6% of the respondents had heard of the coconut oil .34.1% of the respondents had seen the product and 30.5% of the sampled respondents had used the coconut oil.

3.6.2 Awareness about tender coconut water (Madafu)

Respondents who heard about the product were represented by 33.5%. While 34.0% of the sampled respondents reported to have seen the product, 32.5% of the respondents had used tender coconut water**.**

3.6.3 Awareness about coco syrup/honey

Awareness of coco syrup was reported at different levels whereby 26.4%of the respondents indicated that they had used the product. On the other hand 33.3% had seen the coco syrup while 40.2% of the respondent had only heard of the product.

3.6.4 Awareness about the coconut milk

The finding indicates that 35.6% of the respondents had heard of the coconut milk and 33.7% of the sampled respondents had seen the product while 30.7% of the respondents indicated that they had used the coconut milk.

3.6.5 Awareness about mature nuts

Awareness of mature nuts was reported at three different levels 32.5% of the respondents indicated that they had used the product. On the other hand 33.0% had seen the mature nuts while 34.5% of the respondent had heard of the product.

3.6.6 Awareness about cashew nuts

Respondents who had heard of cashew nuts were represented by 35.6% of the sample. 33.5% of the sampled respondents had seen the product while 30.9% represented the respondents who had used tender coconut water**.**

3.6.7 Awareness about nuts and oil crops

The findings established that the level of awareness varied among the nuts and oil crops. Coconut syrup/honey recorded the lowest awareness level of 8.9%. This was an indication that effort have not been taken to create awareness about the product while mature coconuts recorded the highest awareness level of 20.7%.Only 7.6% of the respondents indicated that they had used the coco syrup. Coconut oil had been used by 13.5% of the

respondents and mature coconut recorded the highest usage rate at 21.7%. Cashew nuts had been seen by 19.5% of the respondents; and 16.7% coconut milk; Coco syrup recorded the lowest at 8.8% while tender coconut water recorded the highest at 20.7%. Cashew nuts recorded the highest level of the respondents who had heard of the products. Figure 1 below shows the summary of the nuts and oil crops within the levels of awareness

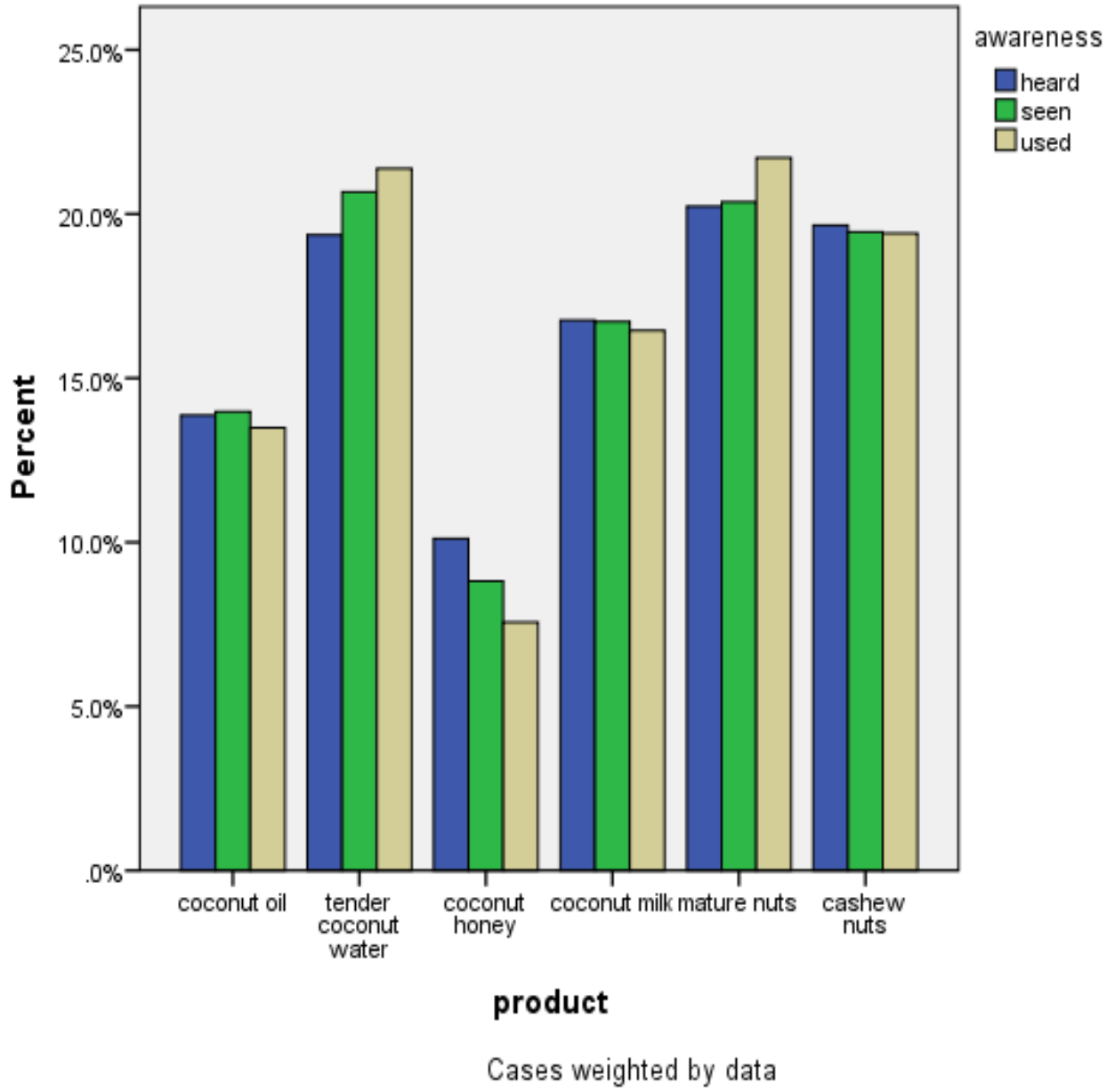

Figure 2: Awareness about nuts and oil crops

3.7 Sources of market information

The study sought to know different sources of market information for the purposes of recommending interventions marketing and distribution of nuts and oil crops. Some of the sources include friends, family posters and the mass media. The findings are as shown in Table 7 below.

Table 6: Sources of market information

			Information Sources						Total
			Radio	Television	Newspaper	Posters	Family	Friends	
Product	Coconut products	Count	1	3	1	2	46	12	65
		% within product	1.5%	4.6%	1.5%	3.1%	70.8%	18.5%	100.0%
		% within information sources	16.7%	37.5%	25.0%	40.0%	27.4%	17.4%	25.0%
	Tender coconut water	Count	1	2	1	1	40	20	65
		% within product	1.5%	3.1%	1.5%	1.5%	61.5%	30.8%	100.0%
		% within information sources	16.7%	25.0%	25.0%	20.0%	23.8%	29.0%	25.0%
	Mature coconut	Count	1	1	1	1	38	23	65
		% within product	1.5%	1.5%	1.5%	1.5%	58.5%	35.4%	100.0%
		% within information sources	16.7%	12.5%	25.0%	20.0%	22.6%	33.3%	25.0%
	Cashew nuts	Count	3	2	1	1	44	14	65
		% within product	4.6%	3.1%	1.5%	1.5%	67.7%	21.5%	100.0%
		% within information sources	50.0%	25.0%	25.0%	20.0%	26.2%	20.3%	25.0%
Total		Count	6	8	4	5	168	69	260

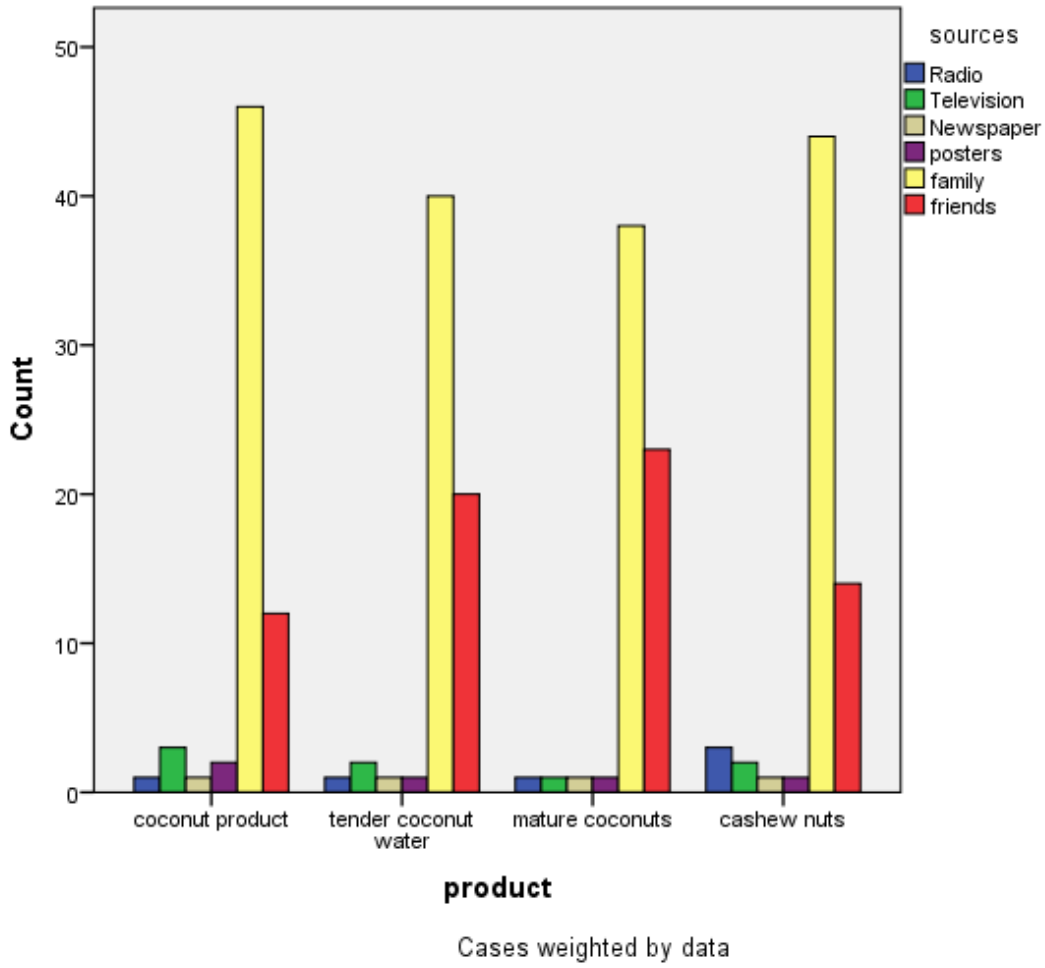

Figure 3: Sources of market information

According to the findings majority of the respondents indicated that family was their major source of information with the coconut product recording the highest at 70.8%.The contribution of friends as a source of market information was indicated the second among the nuts and oil crops with mature coconut recording the highest at 35.4% of the respondents. Radio, television, newspaper and posters recorded the lowest sources of market information it was therefore an indication that very low effort has been put in to create awareness through mass media as illustrated by figure 4 below:

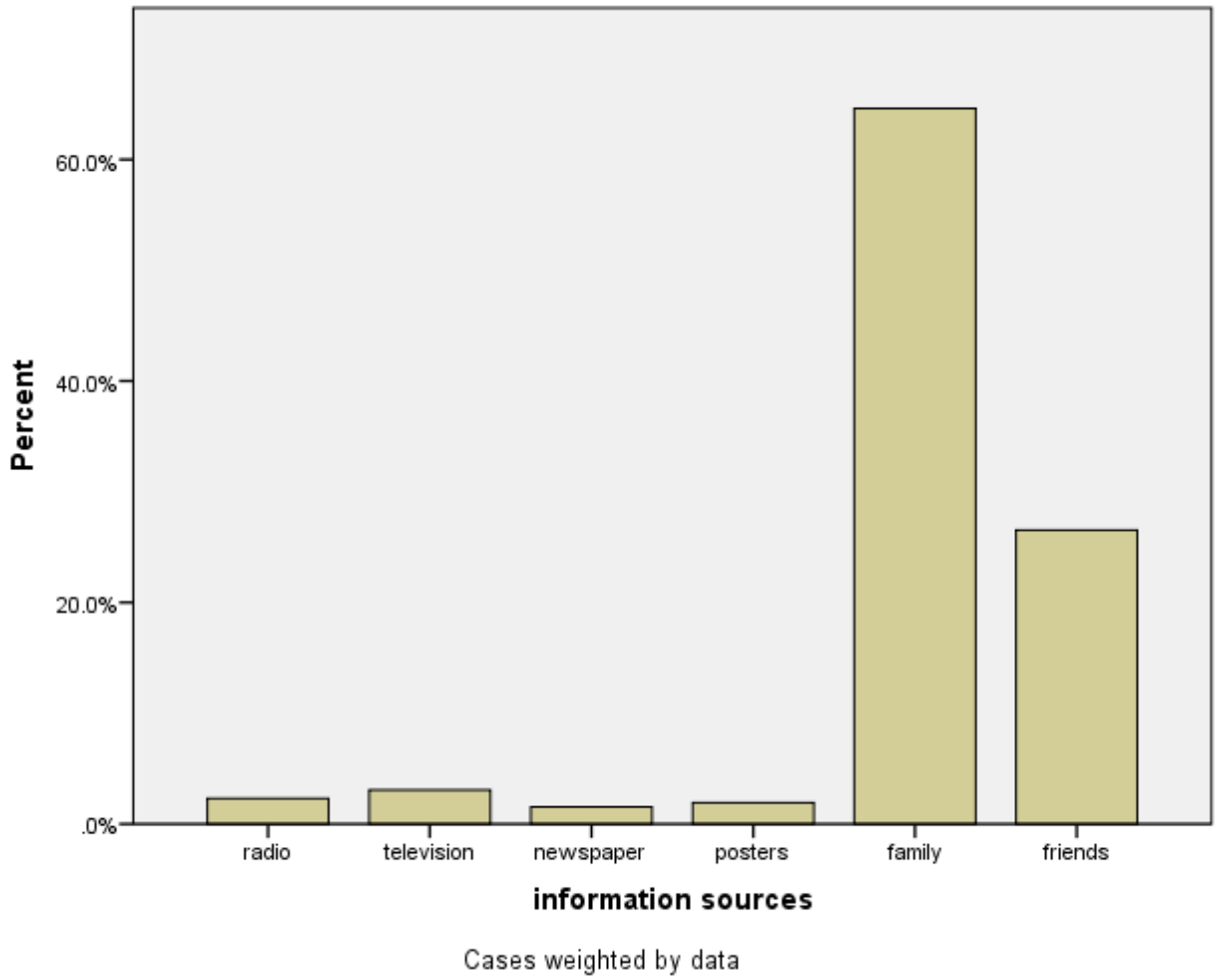

Figure 4: Information Sources

3.8 Products popularity

The level of popularity of nuts and oil crops by consumers was evaluated in three levels of usage. The first level was to rate the number of respondents who had never used the products. The second level represented the number of respondents who were moderate in their usage of the products while the third level indicated the number of sampled respondents who frequently used the nuts and oil products. The findings are as shown in table 8 below.

Table 7: Products popularity

			Usage			Total
			Never used	Moderately used	frequently used	
Product	coconut oil	Count	4	44	17	65
		% within products	6.2%	67.7%	26.2%	100.0%
		% within usage	6.7%	20.4%	14.9%	16.7%
	tender coconut water	Count	2	40	23	65
		% within products	3.1%	61.5%	35.4%	100.0%
		% within usage	3.3%	18.5%	20.2%	16.7%
	coco syrup/honey	Count	40	24	1	65
		% within products	61.5%	36.9%	1.5%	100.0%
		% within usage	66.7%	11.1%	0.9%	16.7%
	coconut milk	Count	5	39	21	65
		% within products	7.7%	60.0%	32.3%	100.0%
		% within usage	8.3%	18.1%	18.4%	16.7%
	mature coconut	Count	2	30	33	65
		% within products	3.1%	46.2%	50.8%	100.0%
		% within usage	3.3%	13.9%	28.9%	16.7%
	cashew nuts	Count	7	39	19	65
		% within products	10.8%	60.0%	29.2%	100.0%
		% within usage	11.7%	18.1%	16.7%	16.7%
Total		Count	60	216	114	390

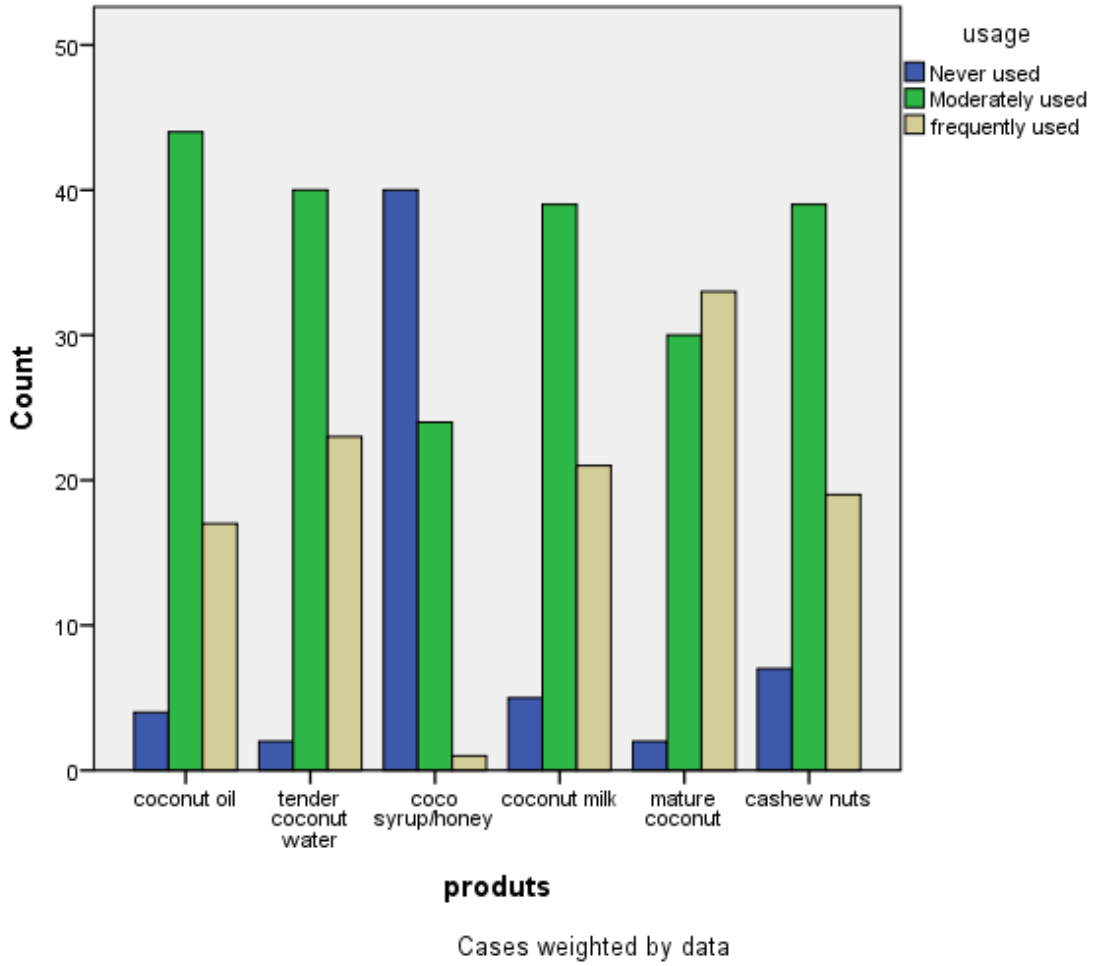

Figure 5: Products popularity

The findings show that the level of popularity varies widely among various nuts and oil crops products. Only 36.9% of the respondents indicated that they had moderate usage of coco syrup and frequently usage was recorded at 1.5%. The number of respondents who had frequent usage of the products was represented by 50.8% Vis-a- vis mature nuts which recorded the highest. 35.4% of the respondents indicated tender coconut water and coconut milk by 32.5%. Coconut oil was rated average in the product popularity.

3.9 Product satisfaction levels

In order to understand the effectiveness of various nuts and oil crops products; The survey sought the respondents views in terms of product performance in relation to the purpose for which they are bought .i.e. being fit for the purpose and the utility derived therein. Further the satisfaction was gauged in terms of contents, packaging and quality. The findings are as shown in table 9 below

Table 8: Product satisfaction levels

Product satisfaction levels			Satisfaction level			Total
			Dissatisfied	Neutral	Satisfied	
Products	Coconut Oil	Count	1	14	50	65
		% within products	1.5%	21.5%	76.9%	100.0%
		% within satisfaction level	16.7%	14.3%	17.6%	16.8%
	Coconut Milk	Count	1	15	48	64
		% within products	1.6%	23.4%	75.0%	100.0%
		% within satisfaction level	16.7%	15.3%	16.9%	16.5%
	Coco syrup/Honey	Count	1	22	42	65
		% within products	1.5%	33.8%	64.6%	100.0%
		% within satisfaction level	16.7%	22.4%	14.8%	16.8%
	Mature nuts	Count	1	16	48	65
		% within products	1.5%	24.6%	73.8%	100.0%
		% within satisfaction level	16.7%	16.3%	16.9%	16.8%
	Tender Coconut water	Count	1	15	48	64
		% within products	1.6%	23.4%	75.0%	100.0%
		% within satisfaction level	16.7%	15.3%	16.9%	16.5%
	Cashew nuts	Count	1	16	48	65
		% within products	1.5%	24.6%	73.8%	100.0%
		% within satisfaction level	16.7%	16.3%	16.9%	16.8%
Total		Count	6	98	284	388

3.9.1 Coconut oil Satisfaction

The findings indicate that 76.9% of the respondents were satisfied with the coconut oil 1.5% of the respondents were dissatisfied with coconut oil while those who could not judge their satisfaction level with coconut oil were represented by 21.5%

3.9.2 Tender coconut water Satisfaction

A large number of respondents (75%) indicated that they were satisfied with tender coconut water. Only 1.6 % of the sampled respondents were dissatisfied with the product. 23.5% of the respondents maintained a neutral position in their satisfaction with the tender coconut water.

3.9.3 Coco syrup Satisfaction

The level of satisfaction of coco syrup was represented at different levels whereby 64.4% of the respondents indicated that they were satisfied with the product having used it. On the other hand 1.5% of the respondents were dissatisfied with the product. 33.8 % of the respondents were neutral in terms of their satisfaction with coco syrup.

3.9.4 Coconut milk Satisfaction

The findings indicate that 75% of the respondents were satisfied with coconut milk. 1.6% of the respondents pointed out that they were dissatisfied with the product. While 23.4% of the sampled respondents maintained a neutral level of satisfaction.

3.9.5 Mature nuts Satisfaction.

Satisfaction with the mature nuts was approved by 73.8%. Only 1.5% of the respondents were dissatisfied with the product while those who could not judge their satisfaction level with mature nuts were represented by 24.6%.

3.9.5 Cashew nuts Satisfaction

The findings indicate that 73.8% of the respondents were satisfied with coconut milk.1.5% of the respondents pointed out that they were dissatisfied with the product. 24.6% of the sampled respondents maintained a neutral level of satisfaction.

3.9.6 Satisfaction levels within nuts and oil crops

The findings established that the level of satisfaction varied among the nuts and oil crops products. Coconut oil recorded the highest satisfaction level of 17.6%. Mature coconuts

and coconut milk were rated average and satisfaction with coco syrup recorded the highest number of respondents who could not judge their level of satisfaction at 22.4% as shown in figure 6

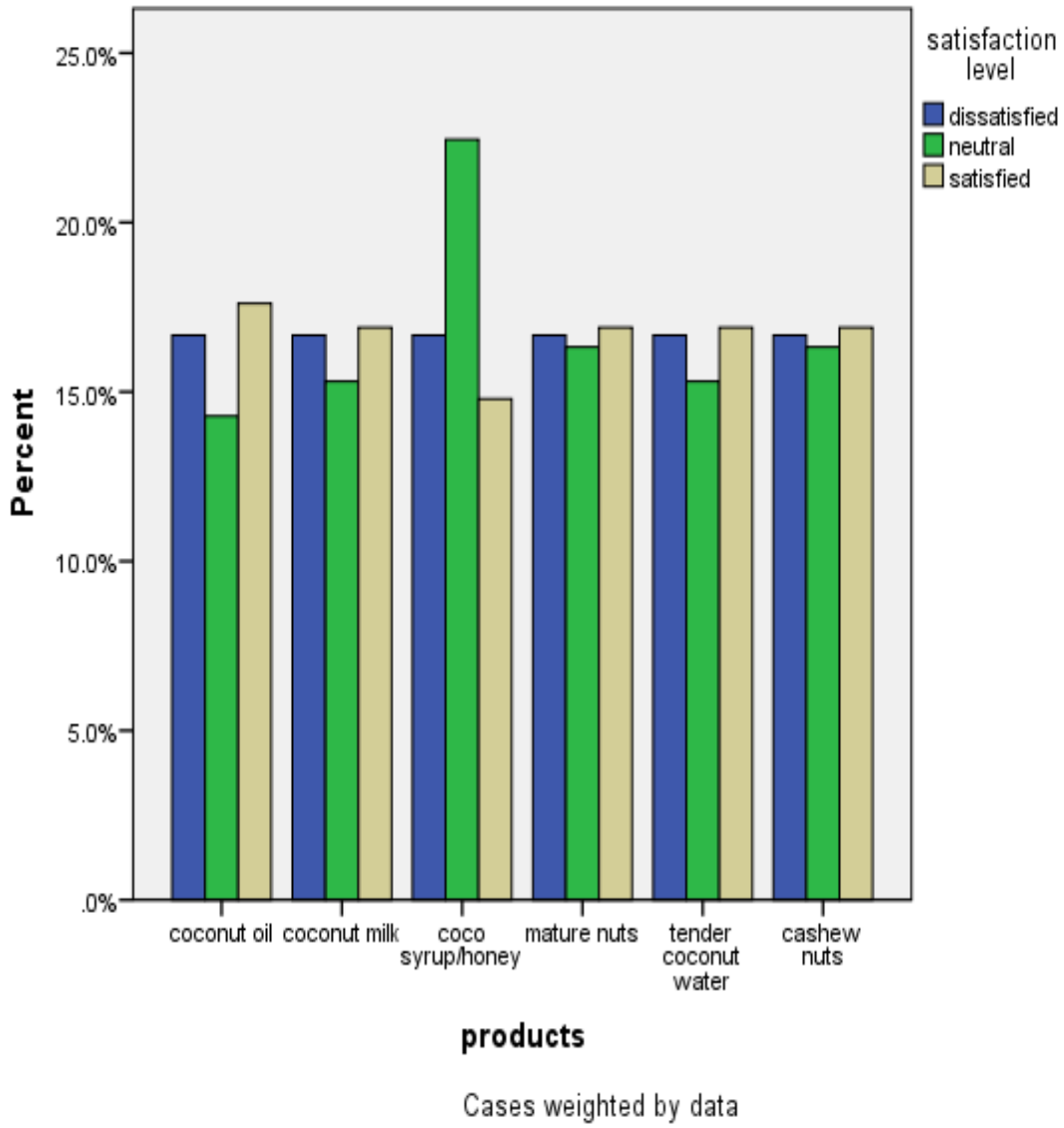

Figure 6: Products' satisfaction levels

A large number of the respondents were satisfied with the quality of nuts and oil crops products. Only a few of the respondents were dissatisfied with the products. The number

of respondents who could not judge their level of satisfaction and therefore indicated neutral were rated average as show in the figure 7.

Figure 7

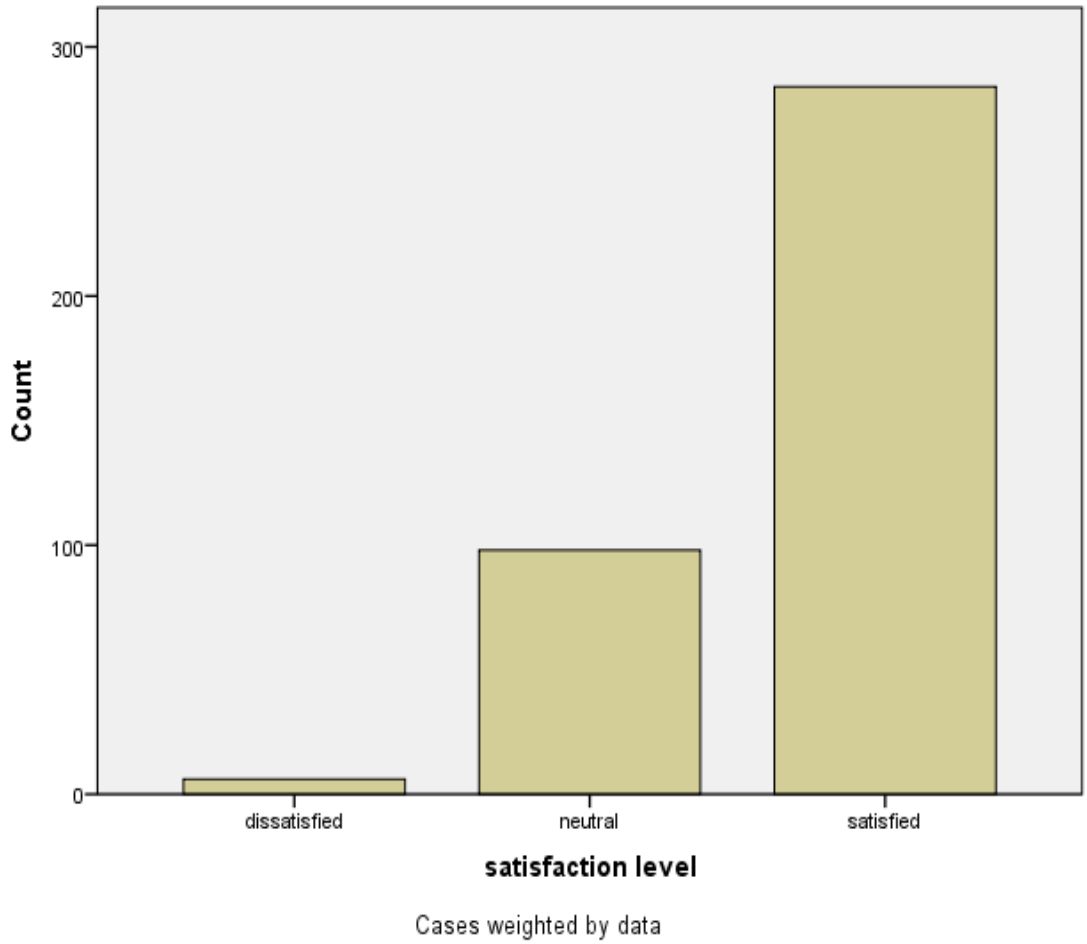

Figure 7: General Satisfaction levels

3.10 Price rating

Prices are a major factor in gauging the performance of different products in the market both from the production point of view and also from consumption side. Very low/ high price could point out the market inefficiencies which need to be addressed by different players to make it a fair consideration for the producer's effort. The finding on price rating are as shown in Table 10 below.

Table 9: Price rating

			prices				Total
			low	Fair	high	not sure	
product	coconut oil	Count	3	24	11	27	65
		% within product	4.6%	36.9%	16.9%	41.5%	100.0%
		% within prices	12.0%	12.8%	20.8%	21.6%	16.7%
	coconut milk	Count	5	33	8	19	65
		% within product	7.7%	50.8%	12.3%	29.2%	100.0%
		% within prices	20.0%	17.6%	15.1%	15.2%	16.7%
	coco syrup/honey	Count	4	22	10	29	65
		% within product	6.2%	33.8%	15.4%	44.6%	100.0%
		% within prices	16.0%	11.8%	18.9%	23.2%	16.7%
	Tender coconut water	Count	5	36	7	17	65
		% within product	7.7%	55.4%	10.8%	26.2%	100.0%
		% within prices	20.0%	19.3%	13.2%	13.6%	16.7%
	mature nuts	Count	5	40	6	14	65
		% within product	7.7%	61.5%	9.2%	21.5%	100.0%
		% within prices	20.0%	21.4%	11.3%	11.2%	16.7%
	cashew nuts	Count	3	32	11	19	65
		% within product	4.6%	49.2%	16.9%	29.2%	100.0%
		% within prices	12.0%	17.1%	20.8%	15.2%	16.7%
Total		Count	25	187	53	125	390

3.10.1 Price rating on the products

23.2% of the respondents were not sure whether the prices of coco syrup/honey were low, fair or high and coconut oil by 21.6%. 20.8% of the sampled respondents were of the opinion that prices of cashew nuts and coconut oil were high recording the highest in that level. The prices of mature nuts were considered fair by 21.4% of the respondents. Tender coconut water and coconut milk were rated average in the four levels of price rating. The findings are shown in the figure 8 below.

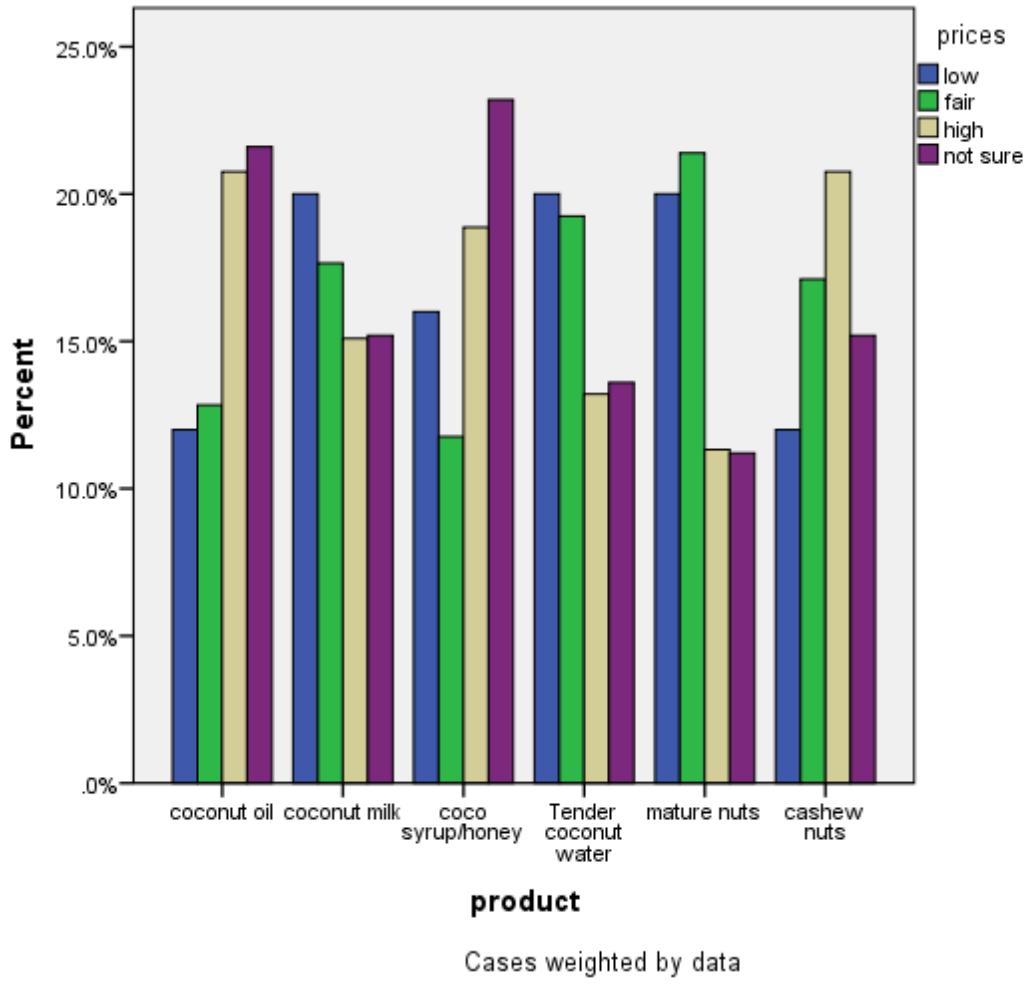

Figure 8: Price rating

3.11 product purchase triggers

Product acceptance was evaluated by measuring the extent of different influencers on the purchase of the nuts and oil crops products. The level of importance was divided into three categories important, moderate and least important. The findings are as shown below

Table 10: Product purchase triggers

			level of importance			Total
			Important	moderate	least important	
purchase influencers	Price	Count	49	13	3	65
		% within influencers	75.4%	20.0%	4.6%	100.0%
	Size	Count	40	20	5	65
		% within influencers	61.5%	30.8%	7.7%	100.0%
	knowledge on usage	Count	38	22	5	65
		% within influencers	58.5%	33.8%	7.7%	100.0%
	health benefits	Count	48	16	1	65
		% within influencers	73.8%	24.6%	1.5%	100.0%
	level of income	Count	35	26	4	65
		% within influencers	53.8%	40.0%	6.2%	100.0%
	Smell	Count	31	30	4	65
		% within influencers	47.7%	46.2%	6.2%	100.0%
	Quality	Count	32	30	3	65
		% within influencers	49.2%	46.2%	4.6%	100.0%
	ease of availability	Count	31	29	5	65
		% within influencers	47.7%	44.6%	7.7%	100.0%
Total		Count	304	186	30	520

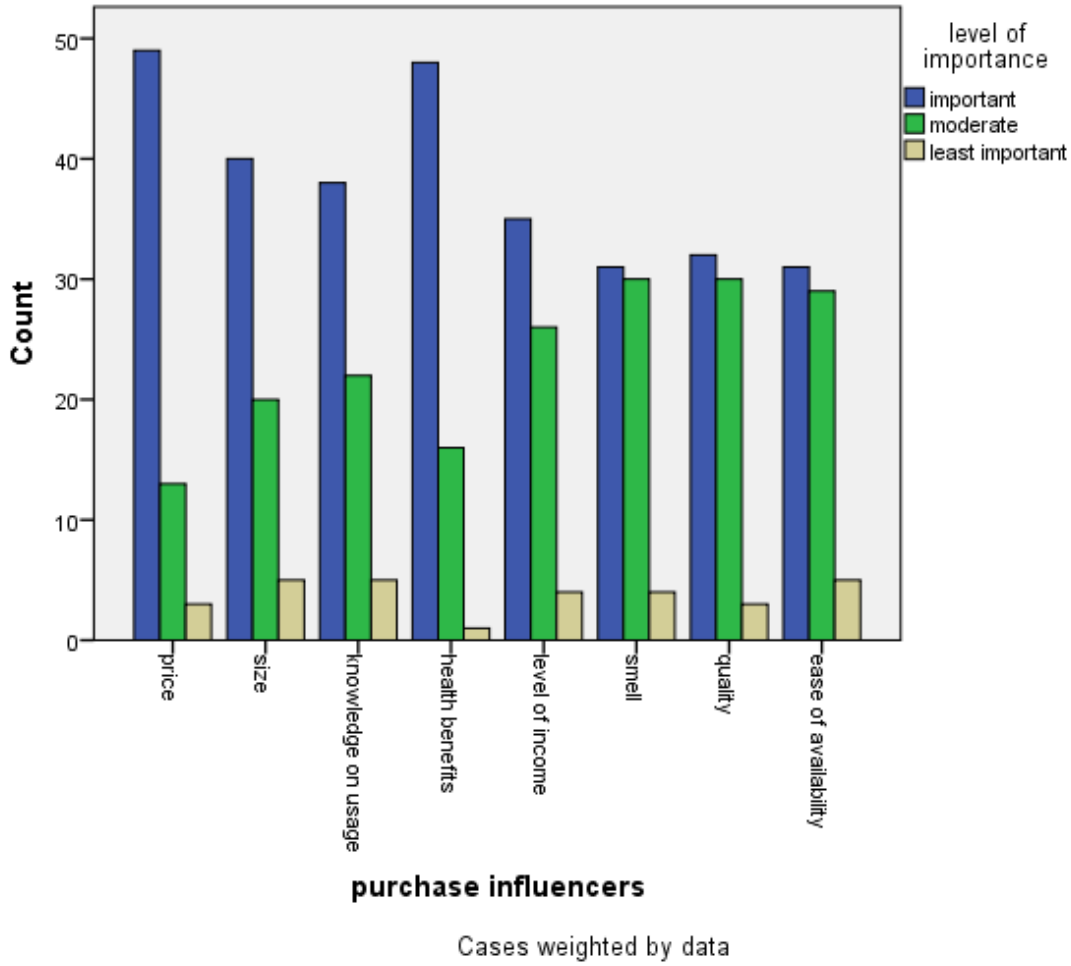

Figure 9: Purchase Influencers

Health benefits had an influence on purchase of 73.8% as indicated by consumers.

Most of the respondents indicated that health benefits were an important trigger for the purchasing of coconut oil, coconut milk and tender coconut milk. Size of the products was represented by 61.5% with most of the sampled respondents indicating that size had a great influence on the purchasing of mature coconuts. Level of income and quality of the nuts and oil crops products were rated average as important triggers for purchasing the products. Ease of availability had the lowest influence on purchase decision of the consumers.

3.12 Product distribution channels

Marketing channels included; market, grocery, supermarket, farm gate, hawkers and the roadside vendors were used to assess the number of consumers using these channels to obtain the nuts and oil crops products. The findings are as shown in Table 11.

Table 11: Marketing Channels

Outlet	No of respondents using the channel	Percentage
Market	22	33.8
Grocery	4	6.2
Supermarket	5	7.7
At Farm gate	14	21.5
Hawkers	7	10.8
Roadside vendors	13	20.0
Total	65	100.0

Market was identified as a major channel. This was demonstrated by a representation of 33.8% of the respondents who obtained the nuts and oil crops products from the market. 21.5% obtained the products at the farm gate, 20% from roadside vendors and 10.8% from hawkers. 7.7% of the sampled respondents indicated that they obtained their products from the supermarket. Grocery was the least used channel by only 6.2%.

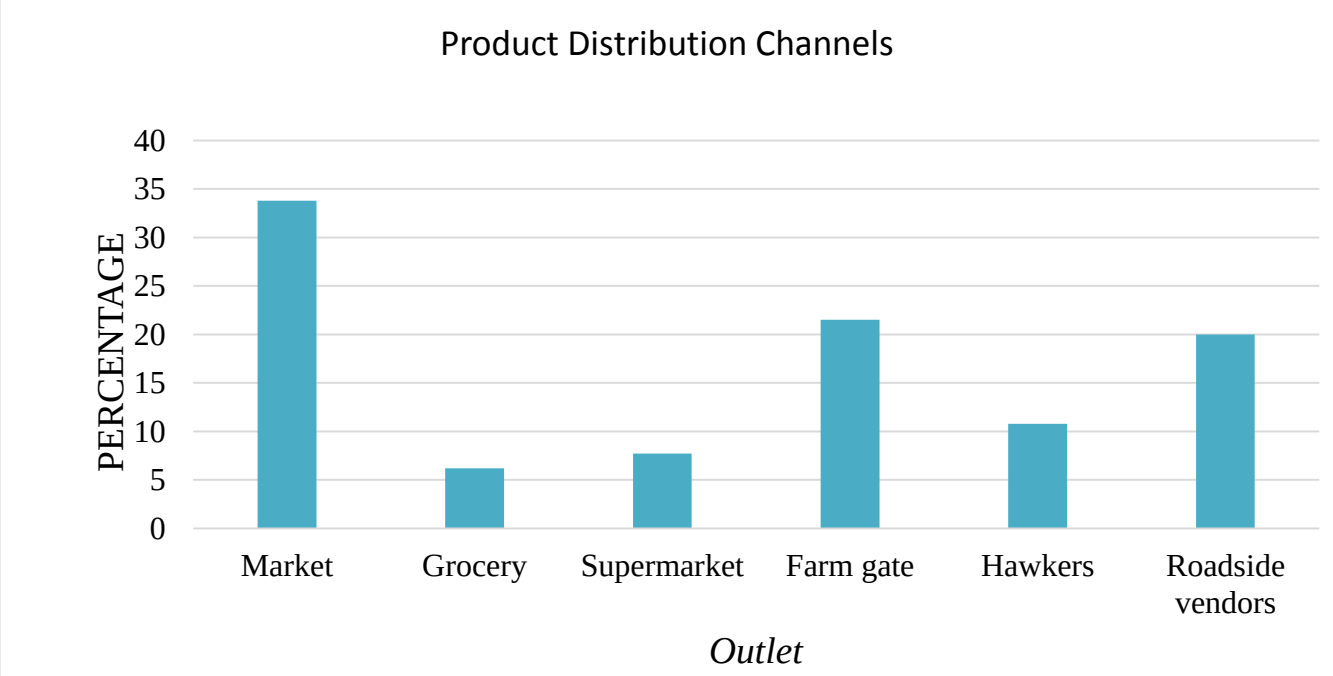

Figure 10: Product Distribution Channels

Table 12: Market access challenges

			status of marketing challenge			Total
			moderate	large	very large	
marketing challenges	Long distance to the market	Count	11	7	3	21
		% within marketing challenges	52.4%	33.3%	14.3%	100.0 %
	Inconsistence supply of raw materials	Count	3	6	12	21
		% within marketing challenges	13.6%	28.6%	54.5%	100.0 %
	Cost of transport	Count	7	5	9	21
		% within marketing challenges	31.8%	23.8%	40.9%	100.0 %
	Cost of raw materials	Count	6	10	5	21
		% within marketing challenges	28.6%	47.6%	23.8%	100.0 %
	Storage	Count	13	6	2	21
		% within marketing challenges	61.9%	28.6%	9.5%	100.0 %
	Taxation and levies	Count	8	9	4	21
		% within marketing challenges	38.1%	42.9 %	19.0%	100.0 %
	Overhead costs	Count	9	7	5	21
		% within marketing challenges	42.9%	33.3%	23.8%	100.0 %
	Stringent License requirements	Count	13	7	1	21
		% within marketing challenges	61.9%	33.3%	4.8%	100.0 %
Total		Count	72	59	39	170

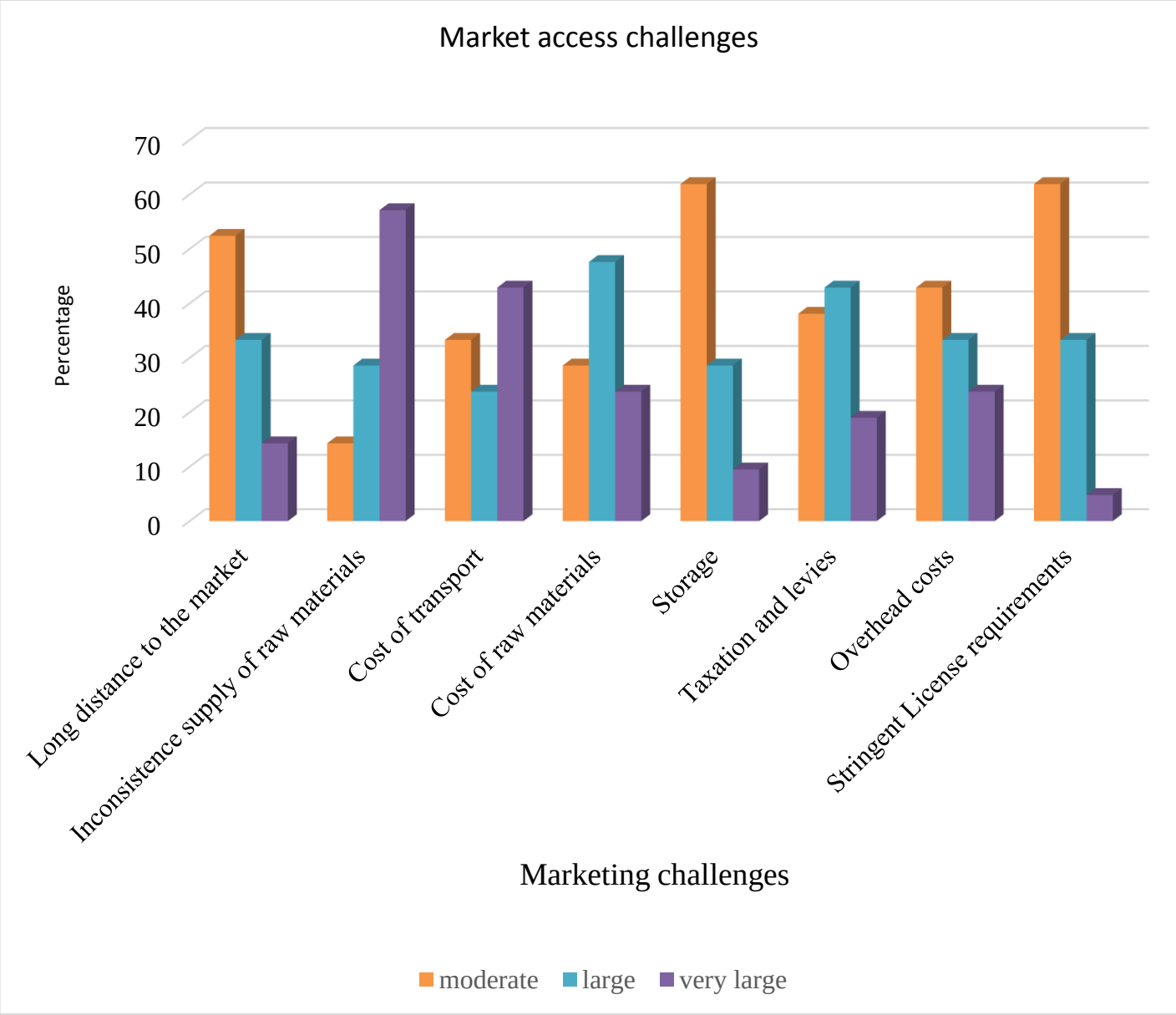

Figure 11: Marketing Challenges

Majority of the processors pointed out that inconsistent supply of raw materials was the major marketing challenge in the production of the nuts and oil crops products at 57.1%. Cost of transport was the other major challenge and was represented by 42.9% of the sampled respondents.

3.13 Production challenges

Marketing can be affected by production quantities which impact on supply and demand dynamics. The survey therefore sought information relating to production in recognition that such production challenges have a bearing on the products available in the market. Poor soils/ steep slopes, irregular rainfall patterns, pests and diseases among others were some of the challenges that were listed in the production of nuts and oil crops by the coconut/cashew nuts and macadamia farmers. The findings are as tabulated and discussed below:

Table 13: Production challenges

Challenge	**Coconut/cashew nuts Farmers**	**%**	**Macadamia farmers**	**%**
Poor soils ragged / steep terrain	8	7.6	7	13.5
Irregular rainfall patterns	22	21.0	3	5.8
Pests and diseases	35	33.3	20	38.5
Limited land size	7	6.7	15	28.8
Poor quality of inputs	17	16.2	5	9.6
Expensive/Lack of labor	16	15.2	2	3.8
Total	**105**	**100.0**	**52**	**100.0**

3.13.1 Production challenges for coconut/cashew nuts

Pests and diseases and irregular rainfall patterns were the major challenges for production of cashew nuts and coconuts in the coastal region. Pests and diseases were represented by 33.3% of the sampled respondents and irregular rainfall by 21%. Poor quality and expensive/lack of labor were rated average on their impact in production of coconut and cashew nuts by 16.2% and 15.2% respectively.

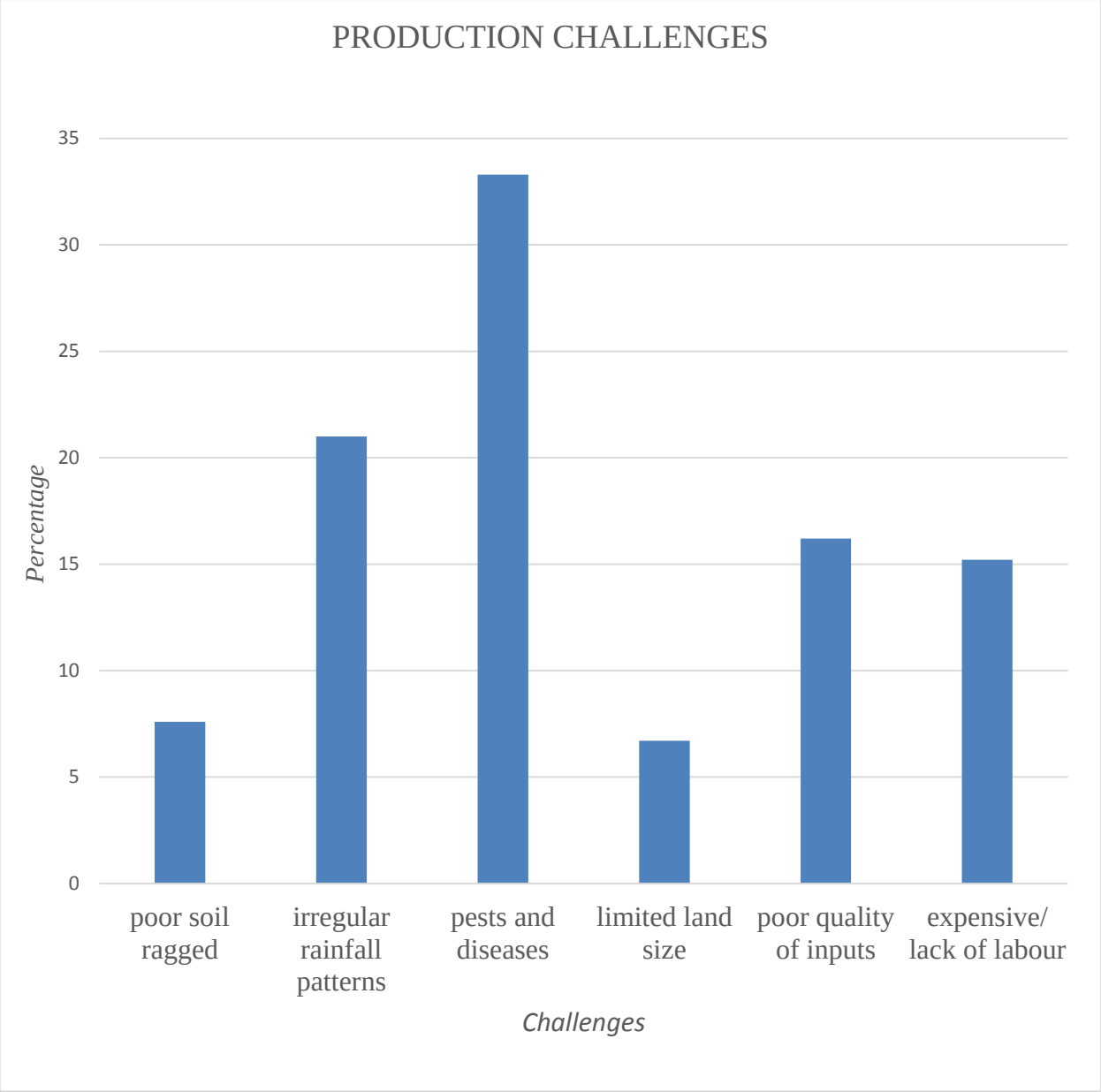

Figure 12: Production challenges for coconut/cashew nuts

3.13.2 Production challenges for Macadamia

Pests and diseases and limited land size were the major challenges for production of Macadamia. Pests and diseases were represented by 38.5% of the sampled respondents and limited land size by 28.8%. Poor soil ragged and Poor quality of inputs were rated average on their impact on production of macadamia by 13.5% and 9.6% respectively. Irregular rainfall patterns and expensive/ lack of labor had the least impact on the production by 5.8% and 3.8% respectively as illustrated in the figure below

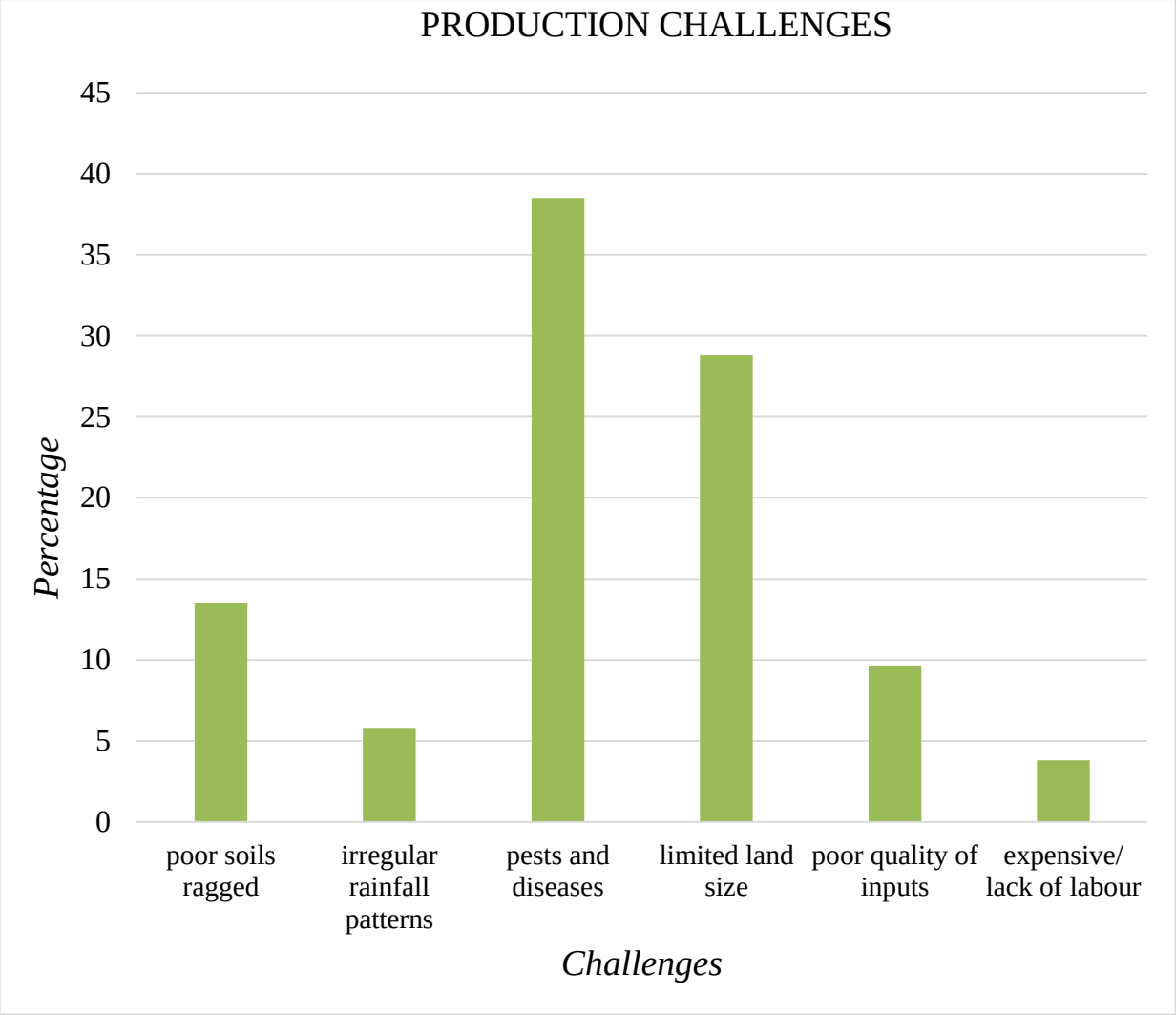

Figure 13: Production Challenges

Both macadamia and coconut/cashew nuts farmers indicated that pests and diseases were a major challenge in the production. The second major challenge was limited land size for the macadamia farmers by 28.8% and irregular rainfall patterns for coconut/cashew nuts production by 21.2% as illustrated in the graph below.

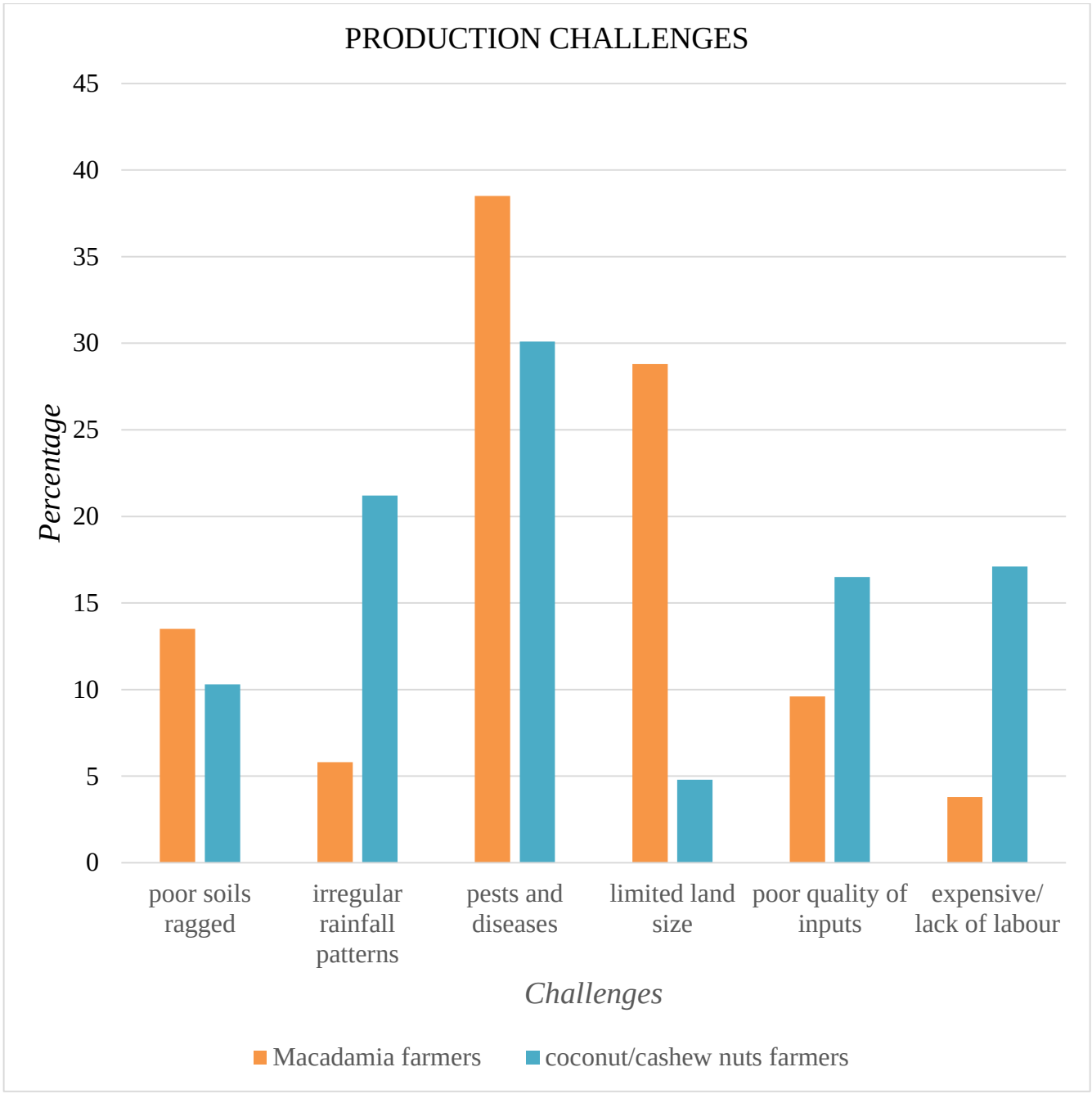

Figure 14: Production challenges for macadamia and coconut/cashew nuts

CHAPTER FOUR: DICUSSIONS

4.1 Sub-sector Dynamics

Overall, it is clear that Nuts and Oil Crops industry especially Coconut and Cashewnuts in Kenya has faced major challenges in the recent past. Liberalization effected through structural adjustment programmes resulted in the collapse of farmer owned cooperative societies and their processing facilities. This coupled with very low investment in the sector has brought about the low productivity being experienced. These may eventually lead to total collapse of particularly the Cashewnuts subsector if well thought out interventions are not put in place. Besides the policy challenges aforementioned, farmer apathy real in the subsector and this pauses a major challenge in implementing progarmmes geared towards addressing the existing gaps.

From the survey results obtained indicate that some marketing channels are growing, while others are losing importance. For instance the processed nuts (kernels) market has experienced tremendous growth especially so with exports. The industry's processing capacity has similarly grown at a much faster rate than the buildup of raw materials. It is also important to note that the export of cashew nuts is quite volatile and it is to a large extent controlled by large integrated exporters. The more sporadic and speculative traders are being squeezed out of the market over time.

4.2 Deregulation

There is increased private sector activity since liberalization in 1992. Before liberalization, most of the raw nuts were bought and marketed by government factories such as Kenya nut Company and farmer owned factories such as Kilifi Cashewnuts factory. Under this arrangement, farmers got prices which were at best only 30-40 percent of the f.o.b. price. With liberalization, the country has seen an influx of private sector buyers which brought about healthy competition and farmers started obtaining better prices as experienced in 2015 season where prices rose to Ksh 120 per Kg of Macadamia at farm gate, however farmers are yet to realize better pricing when it comes to Cashewnuts .There have been a more than 20 buyers operating in the industry largely represented by various marketing agents on the ground.

4.3 Profitability of Processing

Small and medium scale processing: the Kenyan cashew industry is growing in terms of processing and there are good growth prospects in the event that the right policy environment is fostered. The world market for kernels is sufficient to clear all of Kenya's raw nut production when converted into kernels. The world price of raw nuts when compared to that of the processed nuts indicates that it is potentially profitable to process the nuts than to sell them in raw form. Under the present conditions the incentive for private capital investment in processing is the existing total ban on export of raw nuts.

4.4 Regulatory Framework

An important consideration on the taxes is that many of them are being charged up front, so they add costs to the exporters well before they get paid by their ultimate buyers. In a market where the cost of capital is in excess of 20 percent on one hand, this adds a substantial cost to doing business and may have to be looked at afresh to make the business environment conducive for new investments. On the other hand industry levies seem very low thus not providing the muscle required to effectively deal with industry players in case of non-compliance and industry development. It is however expected that this challenge maybe addressed through the gazzetment of the nuts and oil crops industry rules and regulations.

4.5 Production technologies

Supply/access to inputs affects productivity: The smallholder farmers, accounting for 95 percent of the country's total nuts output, have serious limitations in accessing production inputs (fertilizer, spray chemicals and improved nuts seedlings). Despite the efforts to produce grafted Cashewnuts seedlings by KLRO at the Mtwapa Research station and Macadamia nuts seedlings at the Kandara Research station, poor farmers in remote areas still have problems accessing improved seedlings supply and end up planting home grown seedlings which give very low yields.

4.6 Processing technology

Kenya is producing good nuts and has superior processing capacity when compared to other East African countries like Tanzania and Mozambique for Cashewnuts but is heavily threatened by upcoming countries such as Guinea Bissau, Ghana and Ivory Coast who are also targeting the same cashew nut markets of Asia, America and Europe.

Since reviving government factories is seemingly not going to happen, the burden for processing has been on the private sector which has heavily invested in new technologies. Having invested in a domestic processing industry similar, investments in terms of skills, systems and marketing capacity will need to be put in place especially by the private sector. But developing a strategic and all-encompassing plan to encourage the development of the local raw material base should be a priority. The lack of competitive readily available raw material puts the entire cashew sector in Kenya at risk of being displaced by other nut producers, moreover a change in policy in the destination markets is also likely to affect Kenya's Cashewnuts subsector.

Value added from processing appears to be high and there are large employment opportunities from manual processing. According to the World Bank: 2002 " the price of processed cashew kernels exported from India during 1996-98 averaged $5106/ton compared to $1063/ton paid for raw nuts imported". According to Behrens (1996:25), an average worker can shell 21 kg of raw nuts per day and obtain 5kg of kernels. Using the Indian raw and processed nut prices as an example of the potential for processing, the value added from manual processing would be $3.21 per day (excluding other costs such as transport, packaging and handling). An experienced worker in Asia can shell twice as much with 90 percent whole kernels according to Behrens. If an average worker in Kenya shelled 21 kg of raw nuts per day and worked 250 days per year, more than 1000 workers would be needed to shell the 8,000 tons Kenya produced in the 2014/15 season. Thus the employment opportunities from manual processing are significant. The value added per day from manual processing is about 3 times the average wage in Kenya. Given this scenario, there is need to promote community based processing of cashews in conjunction with the private sector. India's competitiveness in processing is not in sophisticated technology but high labor intensive home based technologies. The local industry can also adapt in that direction. There are already examples of home based processing with good

results. A mechanism to expand that kind of low cost technology can be promoted by linking these home based industries with exporters so that all processed products meet the required quality so as to be exported in a manner that ensures maximum return.

4.7 Financing

The rural financial systems are underperforming and yet the farmers require a lot of support to finance their operations. The resultant effect is that they under perform in their operations and end up realizing correspondingly low returns. These returns put them in a double dilemma of poor reinvestment in agricultural production on which their livelihoods depend and triggers off the poverty cycle. The SACCOS model can be expanded and linkages can be brokered with commercial banks, AFC and the commodities fund to address financing challenges.

4.8 Points of leverage

Points of leverage are those points where working with a few individuals or organizations will provide outreach to a much larger number of smaller actors. Traditionally points of leverage are nodes in the value chain. In this case, we are looking for points of leverage that will enable the majority of small and medium farmers in the cashews, coconut and macadamia nut growing areas of Kenya to improve the quality and quantity of their production, in addition leverage is sought to build capacity at farmer and market association level; and to provide easy access to market and price information to all the participants in the different identified marketing channels. These can either be focused entry points in terms of provision of technical advice and research services; geographic concentration; input suppliers; farmer and market associations; and private sector partners.

4.9 Marketing associations

Farmers are too disaggregated in their marketing operations, a situation which is increasing marketing costs for buyers and resultantly the producer price obtained by the farmer. There is great scope to organize farmers into clusters that can mobilize their individual members to bring their produce to centralized places. This model is already in use in Kamwangi coffee society in Kirinyaga county. Here farmers deliver there

macadamia nuts to the coffee society under an arrangement between the society's management and Afrimac processors. The Processors deposit money at the society for prompt payments to the society's members upon delivery of nuts. The arrangement enables farmers to access inputs in advance and the society recovers its monies from the sales of macadamia nuts. With this arrangement, farmers can enforce grading standards and establish common prices which they can negotiate with the private sector buyers. The buyer who offers the best price can then buys the produce. This can either be an auction arrangement of the nuts or just a spot market conducted at the go downs, collection centers or in farmer's cooperatives society's premises as is the case in Kamwangi. At the moment there is little grading taking place which creates problems for processors and exporters as well as farmers alike as low prices are offered.

4.10 Privately owned nurseries

The access of improved nuts varieties is still problematic. As NOCD we should aspire to create more links with nursery operators which are effectively private enterprises. Existing commercial nurseries which are producing local nuts varieties can be supported to promote the improved varieties. These can then be used as demonstration plots where the recommended husbandry practices are practiced. This can facilitate the education of a large number of farmers on the positive aspects of planting good quality trees from the most suitable varieties. Given the low extension worker to farmer ratios this mechanism can have tremendous leverage in terms of outreach especially if the hosts of the nurseries can be given training of trainers' course. However, it is also crucial to note that regular inspections must be in place to ensure quality seedlings are being distributed to the farmers. The operator's incentives will be in the higher prices they will fetch from improved variety seedlings as compared to those produced from traditional low yielding trees. In addition the nurseries will benefit from promotion from the directorate through recommendation after certification

4.11 Marketing agents

The business of purchasing nuts is concentrated in the traders who buy on behalf of the processors and exporters. This is a useful link which creates the right competition in the marketing of the farmers' produce as well as the link between the Kenya producers and the external export market as some of them access finance offshore and purchase raw

nuts which are later being resold to processors; however the agents as they currently operate are unregulated pausing major challenges with regards to quality and price controls.

Attempts to register these agents for the current season was a step in the right direction however many more are operating without the NOCD license. During the field visits we also came across a good number of unregistered agents having been subcontracted by the registered agents to buy nuts on their behalf. This scenario creates a chaotic environment where a majority of the marketing agents cannot be held accountable as they are unregulated. To a large extent the unregistered marketing agents are to blame for the many problems bedeviling the nuts industry. Some of the effects of their operations can be summed up as below:

- Premature harvesting of nuts especially outside the recommended seasons to exploit farmer vulnerability;
- Low exploitive prices offered to farmers which discourage further investments in production of quality nuts;
- Poor transportation methods on motorbikes and in rudimentary bags and containers against recommended guidelines on transportation further compromising quality;
- Poor storage conditions where nuts are stored in poorly ventilated stores and stacked up while still damp. The nuts are also stored for lengthy periods of time for price speculations compromising their quality;
- Quality degradation as a result of immature harvest and poor storage conditions. The nuts harvested and stored during the closed season are later mixed with fresh and sold to processors when the harvesting window is open;

4.12 Geographic concentration

Cashew and coconut production is concentrated in the coastal areas, as earlier noted while macadamia nuts are predominantly a central Kenya preserve. However the price of cashews is very low, despite the ease of access and proximity to the ports. In fact most processing is being carried out in Thika and Athi River hundreds of Kilometers from the source. This works against farmers who are offered very low prices to compensate for the transport costs to the factories

CHAPTER FIVE: CONSTRAINTS, OPPORTUNITIES AND RECOMMENDATIONS

5.1 Overview

As has been seen, the major overall constraint revolves around the future strategic vision for the development of the industry. Given the relatively small role that NOCD plays in the overall sector, the Directorate needs to assert itself in order to play a central role and organize the subsector better. As is the case currently we might as well be considered secondary actors to the overall industry as our impact is yet to be felt. In terms of regulating the sub-sector better we need to establish offices in the growing regions and deploy staff to safeguard the industry's interest from a regulator's perspective. However, should the strategic vision be addressed, there are a number of other areas where NOCD could intervene to assist small scale farmers and traders directly.

5.2 General Constraints

From the information collected from various industry players during the survey, the following is a summary constraint which requires attention in addressing gaps existing in the nuts and oil crops sub-sector in order to improve performance.

a) Limited extension services at farmer level, largely due to lack of facilitation, their limited skills and low number of staff;
b) Poor crop husbandry practices such as manuring, weeding and manuring;
c) Limited supply and high cost of good quality planting material;
d) Poor quality grades of nuts delivered to factories which have low kernel recovery hence low prices offered to farmers;
e) Lack of quality sensitivity in domestic markets resulting in lack of incentives teo deliver high quality;
f) Poor distribution of price and market information; information asymmetry can be blamed for the exploitive low prices offered to farmers;
g) Poor business skills and lack of management capacity of market association leaders. (Corporate governance structures are wanting and sometimes not existing at all);
h) Weak development of the raw material base especially for Cashewnuts and coconuts. This was a major concern from the processors who have made some efforts to address this by establishing nurseries and deploying some extension staff.

5.3 Marketing constraints

The existing marketing system which mainly involves middlemen is unsustainable due to the following reasons:

a) The quality of product is poor and continues to deteriorate over time. The crop has been abandoned and is rarely maintained resulting in the low quality. In addition, there are no mechanisms in place to enforce industry standards, rules or regulations;
b) The prices are very low due to low farmer bargaining power as they sell individually and lack of incentives for good quality. The prices offered are uniform disregarding better quality or grades;
c) Low prices discourage production. Most farmers have resorted to cutting down the trees to provide timber which fetch high prices. This is a threat to the future of the crop which now faces uncertainty.

5.4 Opportunities

As per the study findings, observations and existing secondary information, The following can be regarded as opportunities in improving income and employment opportunities for the nuts sub-sector:

- Export of processed kernels is an opportunity, if the exporters can improve quality to guarantee access to good markets;
- Linkages between farmer associations and processors to scale up production of nuts.
- Improvement of input e.g. agrochemicals for Cashewnuts distribution mechanisms from wholesalers to community retail outlets in nuts producing regions especially using farmer societies;
- Establishment of a nuts research institute for best practice and development of superior varieties and better processing technologies at the cottage level. The institute can be funded by a levy from industry players and development partners;
- Establishment of strong farmers associations right from the Village level , Ward, Sub county, County and National level with linkages to private sector players who have identified the nuts sub-sector as an important sub-sector for the development of MSEs within their regions;
- Developing information portals through internet, portals, notice boards and even

radio for accessing market information at grassroots level; the current scenario is such that most farmers are not aware of the recommended prices (information asymmetry). Buyers take advantage of farmers' ignorance to offer very low prices especially for macadamia and Cashewnuts;

- Stimulating the availability of small scale processing equipment especially for coconut and Cashewnuts.

5.5 Overall recommendation

Any steady growth in the sub-sector must be underpinned by a strategic vision for the sub-sector and aligning government policies to achieve that vision. The market and policy constraints identified in the sub-sector through this report suggest that there is need to have them resolved for any other interventions to have any meaningful impact on the production regions. This study has been a rapid overview of a very complex subsector with multiple players and therefore not exhaustive. We recommend use of greater and more in-depth analysis, particularly on the policy and market side. As such, the primary recommendation is that a focused and in depth study of the different nuts in the sub-sector be undertaken along with the development of a strategic action plan for the entire sub- sector This could begin with a baseline survey to produce reliable and accurate data which will inform future actions.

The policy study would have to encompass the review of the world cashew macadamia and cashew trade and the different policies in place in each country which has been used stimulate their development. This would then compare the impact those policies are having on the nuts and oil crops industry in that particular country. This will allow for a sound comparison between Kenya and its leading competitors and will help to create a clearer picture of what is needed for the development of the nuts and Oil crops industry in Kenya. A special focus should be on India, Brazil, Australia and the West African cluster being the largest producers and consumers of coconut, cashew nuts and Macadamia nuts as well as all the competing African countries producing similar nuts.

5.6 Secondary recommendations

The cashew nut, macadamia nuts and coconuts sub-sectors have significant opportunities which can be leveraged, if there is a vision for the overall sub-sector. We propose interventions targeted at the following areas but working with small and medium scale farmers, the private sector and government agencies in the Coastal and Central Kenya regions. Focus is recommended on the following areas:

a) Facilitation of the provision of appropriate extension services through direct training of farmers by trainers or by training extension officers. This could possibly be done in conjunction with county governments farmer association or private sector partners such as the ones already affiliated to *NUTPAK* and other processors. Extension services must be focused on nursery operations to provide quality planting material and appropriate husbandry at farm level in terms of weeding, pruning and manuring. Infact during our field visits, Macadamia farmers reported a total lack of knowledge as to whether their trees need pruning at all;
b) Facilitation of the establishment of commercial nurseries and marketing of good quality seedlings. Despite the existence of a high demand for quality planting material for grafted cashew and macadamia seedlings there are no reliable sources for the same. This has resulted in very high prices as much as Ksh 500 per seedling is being reported in some regions;
c) Facilitation of capacity building within market associations. This could take place through business skill training courses as well as visits to other markets to enable leaders to exchange ideas. The farmer associations will also benefit from capacity building to enhance their management and governance issues with their members.
d) Facilitation of access to market information can be enhanced by leveraging on ICT services, publications and local administration;
e) Pilot the establishment of small scale processing at cottage level for coconut subsector which is experiencing very low levels of processing. Discussions ought to be initiated with existing private sector players such as Kentaste and Kwale Coconut Processors to subcontract small cottage level processors to produce under their license to ensure that the necessary standards of production are met. This would need to have linkages with export market development so that Kenyan processed nuts can establish a niche in the world market and attain a specific competitive

edge;

f) Middlemen or rather agents in the macadamia production and marketing value chain are important. However, exploitation of the farmers by the same is rampant. Farmers do not have the information on the market prices for the crop. The farm gate prices offered by the agents are much lower resulting in farmer exploitation which may result in some abandoning the crop. To overcome these, the Directorate should disseminate market information to the farmers while at the same time ensuring all the agents are registered. The large scale marketing agents are the only ones registered by the Directorate. The small scale agents are not aligned to any processors. The important role played by the agents and farmers should be emphasized to the processors and encourage them to come up with a way to benefit both farmers and the agents;

g) Despite the high health benefits of the nuts and oil crop products, the products are not popular within the regions under the study. This may be attributed to poor distribution mechanism and few promotional activities. There is need to create awareness on the importance of the products so as to improve and increase the domestic market for these products.

5.7 Conclusion

The study which ordinarily sought to be conducted regularly was aimed at giving insight into the production and marketing activities in the subsector which explains the current state of affair while at the same time providing information on the issues which need to be addressed to remedy the subsector shortcoming especially in relation to marketing.

5.7.1 Coconut

The crop has no formal marketing channels and most instances it is sold at farm gate level to middlemen. The purchase process begins with the buyers engaging people to carry out harvesting and pile the produce under trees where dehusking is done and thereafter sorting according to size. Prices are negotiated depending on the size. The buyer therefore covers the cost of harvesting, dehusking and even bulking which diminishes the farmers negotiating power. The prices offered range from as low as KES 5.00 to KES 12.00 per nut during the peak seasons and gravitates upwards to a range of KES 15 to KES 30 during

the low season which mostly coincides with festivities such as Ramadhan. Farmers prefer middlemen due to the following reasons

a) The middlemen provide a ready market since the crops is in many instances informally traded at the farm gate or nearby market;
b) The middlemen cover harvesting costs which involves climbing of the tall coconut tree and felling of nuts which is risky affair and thus labor intensive. Harvesters are young men linked to the Middlemen who are engaged once the buyers agree with the farmer;
c) Middlemen pay in cash and in some instances they even pay in advance compared to other marketing channels like co-operatives which pauses uncertainty in terms of when payment will be done and at what price.

5.7.2 Cashewnuts

By the year 2009 it was approximated that the Coast Region of Kenya was home to approximately two million cashew nut trees grown by over 68,000 farmers. During this study as we traversed the region it was evident that only less than 50% of the cashew nuts sub-sector potential in the region is exploited. This is illustrated by the fact that over 20% of mature trees are not producing and these may be categorized as senile. As we moved around we also experienced massive logging of the trees presided over by timber traders. Furthermore only a handful of cashew nuts production in the region reaches the market where it is sold in raw form fetching meager returns to the farmers. The over 2 million cashew nuts trees population reported in the last ten years may have more than halved by now if the ongoing activities are anything to go by. A quick comparison with the other major tree crops in the region clearly shows the pathetic situation prevailing in the cashew nut sub-sector.

Marketing is one of the key challenges facing the cashew sub-sector. Distribution and marketing channels are generally dominated by traders and middlemen/brokers who play an important role in getting the farmers' produce to the markets. Generally the crop has no formal marketing channels in existence; the cooperative societies on which farmers relied have since collapsed.

The marketing process begins at household level where the crop is sold to the nearby shops which buy in small quantities of less than five kilograms. These shops therefore

act as bulking centers which are relied on by middlemen where they buy from and resell to processors. In some areas processors have established their own collection centers spread across the coastal region. In some instances the farmers sell directly to these centers but most of the farmers sell to brokers on bicycles and motorbikes who then resell to the processors collection centers.