AGRICULTURE AND FOOD AUTHORITY

NUTS AND OIL CROPS DIRECTORATE

Busia County Production and Market Research

February 2017

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Abbreviations and acronyms

ADRA-Adventist Development and Relief Agency

AEZ- Agro Ecological Zone

CBO - Community Based Organization

FAO -Food and Agriculture Organization

ICRISAT -International Crops Research Institute for the Semi-Arid Tropics

KALRO - Kenya Agricultural and Livestock Research Organization

LM- Lower Midlands

NGO - Non-Governmental Organization

NOCD - Nuts and Oil Crops Directorate

PALUWECO -Programme for Agriculture & Livelihoods in Western Communities

TSA-Ten senses Africa ()

EXECUTIVE SUMMARY

Agriculture statistics support decision-making, planning and policy making by both government and industry. To inform the nuts and oil crops industry performance in Busia County, NOCD conducted a survey on the production and marketing status of selected crops. The County is divided into seven administrative Sub-counties namely Teso North, Teso South, Nambale, Samia, Bunyala, Butula and Matayos and the survey covered all the sub-counties. There are different players who are involved in different interventions along the Nuts and oil crops value chain within Busia County. The specific interventions include the ground nuts (peanut) Community seed multiplication Project and the ADRA Kenya Sesame project.

The overall objective of the survey was to establish the existing potential of nuts and oil crops under study within the County; Survey results indicate that a larger proportion of the nuts and oil crops farmers are above 50 years represented by 47% of the total sampled population, farmers aged between 40-49account for 31%, 17% between 30-39 and 5% of the farmers aged are between 21-29. In terms of production the survey recorded 0.36 MT/acre of groundnuts as the average production realized, 0.4MT/acre for sesame and 0.5MT/acre for macadamia. The produce is mainly sold at farm gate and to middlemen as the most common marketing outlets in the subsector.

According to the findings rainfall is the most pronounced production related challenge being faced by a significant number of the farmers in Busia County. Bambara nuts fetch the highest price in comparison to other nuts in a similar category. As per the findings, groundnuts yield 360kgs/acre on average. The main marketing challenge for the nuts and oil crops in the county is the unstable prices. In relation to policy, capital investment incentives and farmer to buyer linkage feature prominently as part of government interventions to be rolled out in order to address agricultural producers' challenges. In the macadamia subsector the planting material also remains a major challenge which requires urgent attention to enable us realize the goal of expanding the area under the crop.

OVERVIEW

This report presents findings of a survey on Groundnuts, Oil palm, Sesame, Bambara nuts, Macadamia nuts, coconut and cashew nuts as the major nuts and oil crops in the Busia county commissioned in February by the Nuts and Oil Crops Directorate using the administrative structures of the Ministries of Agriculture in the respective sub counties in Busia county. Data collection was carried out using a team of 34 officers and supervised on a daily basis by two AFA staff members. The study targeted the seven sub counties in Busia County namely: Nambale, Butula, Samia, Teso North, Teso South, Bunyala and Matayos.

CHAPTER ONE: INTRODUCTION

1.1 Background

Busia County is the former Western Province of Kenya. It borders Kakamega County to the east, Bungoma County to the north, Lake Victoria and Siaya County to the south, Uganda to the west. According to the 2009 Kenya National Population Census it has a population of about 743,946. About 60 per cent of its population is living below poverty line and covers an area of 196.2Km^2 The arable part of the county covers an area of 164ha with a total cultivated area of 141ha. This means 86% of the arable land is cultivated. There exists irrigation potential of 124km^2 out of which only 12% is irrigated. The low irrigation recorded is due to expenses involved in purchase of the irrigation equipment coupled by the high labor requirement. The county has a poverty index of 68% and the rate of technological adoption is very low. The County is mainly an agricultural area with a vibrant trade with Uganda. Majority of youth practice boda boda transport as a livelihood strategy. Away from Busia Town, the county's economy is heavily reliant on fishing and agriculture. In addition to subsistence crops, sugar cane is grown as a commercial crop. The town is also a commercial hub with boarder trade where goods are transported from Kenya to Uganda, Democratic Republic of the Congo and Rwanda.

1.1.1 Food Security Trends

The County is generally food secure with a deficit of about 2 months for the maize grain. The last six months have been particularly unfavorable for rain fed farming due to the ravaging drought which has threatened to cut off the community's source of livelihood. This is so based on maize but farmers are able to supplement with other produce like cassava and sorghum.

Busia County is mainly a fish farming area but with major fish markets since it a border town. Fish products from Uganda transit this town on their way to international markets and local Kenyan markets. Kenyan fish also transit this town on its way to DR Congo where the market for dry Tilapia is very huge.

Current Factors Affecting Food security

- Incidences of striga affecting cereals
- High Cost of inputs Seed Acquisition and land preparation
- Cross border trade which has led to Busia farmers being heavily reliant on produce from Uganda
- Weather variability
- Cost of inputs and land preparation
- Incidences of Hailstones
- Birds and other pests
- Diseases like Cassava Brown streak and Cassava mosaic diseases
- Lack of milling equipment for rice and other cereals
- Inadequate technical knowledge by farmers
- Prolonged dry spell leading to loss of planting materials

1.1.2 Rainfall

The county is considered a low rainfall area although it occasionally gets some floods

The County experiences a bimodal rainfall pattern with an annual rainfall of 1200-1800mm. With emerging unreliable rainfall patterns due to climate change, there is need to aggressively promote use of irrigation facilities especially in horticultural crop production.

1.1.3 Agro-ecological zone

Busia is a major groundnut-growing region in western Kenya and is characterized by small altitudinal variations between 1140m and 1350 m a.s.l. It has four major agro - ecological zones (AEZs), namely, low midland zones 1 and 2 (LM1 and LM2) and upper midland zones 1 and 2 (UM1 and UM2). Temperatures range between 21º-23º. Relative humidity is fairly high due to the site proximity to Lake Victoria and soils are predominantly nitisols and ferralsols (Jaetzold and Schimdt, 1983).

1.1.4 Administrative Units

Busia County is divided into seven administrative Sub-counties namely Teso North, Teso South, Nambale, Samia, Bunyala, Butula, Matayos and These Sub-counties are further divided into 35 Wards as shown below

Table 1: Busia County Administrative Units

SUB- COUNTY	WARDS
Teso North	Angurai North, Angurai South, Malaba South, Malaba Central, Malaba North
Teso South	ChacolNorth,ChacolSouth, Amukura central, Amukura West,Amukura East, and Angorom
Nambale	Bukhayo township, Bukhayo North, Bukhayo East, Bukhayo Central
Butula:	Marachi North, Marachi West, MarachiCentral,MarachiEast,Elugulu,Kingandole
Samia	Nangina North, Funyula/Bwiri, AngengaNanguba,Namboboto/Nambuku
Bunyala	Bunyala West, Bunyala North, Bunyala Central, Bunyala South
Matayos	Matayo South, Burumba, Mayenje,Bukhayo West, Basibwabu

1.1.5 Market operations

There were no market disruptions in the County and the markets operate normally, however most of the produce is from Uganda imported mainly informally through the porous border. Groundnuts are one of the major products traded across the border and its price has been on an upward trend due to depressed rains.

Market Supply and Traded Volumes

1. Sources of the food Stocks

a) Smallholder Farmers

Major food stuff is grown by the smallholder farmers for their subsistence requirements.

There has been fluctuating market price of food crops such Maize, and Beans as a result of the general food scarcity countrywide. Consequently, the food prices have been rising steadily towards the tail the end of February signifying high demand countrywide.

b) Cross-border Trade

Busia County is a cross-border county with some food commodities coming across from Uganda. These commodities are mainly foodstuffs that are ferried to distant markets such as Kisumu, and Nairobi. For example, Cereals and Pulses such as Maize, Sorghum and Beans taken to major urban centers where there is demand. Due to prolonged drought in most parts of the country, there was an increased influx of food commodities from Uganda as evidenced by the Cross-border trade.

1.2 An overview of the Nuts and Oil Crops Sub sector

Nuts and Oil Crops including coconut, cashew nut, macadamia nut, sunflower, rapeseed, peanuts, and *simsim* 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:

- Groundnuts
- Macadamia nuts
- Oil Palm
- Simsim
- Sunflower
- Coconut

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

1.2.1 Groundnut *(Arachishypogaea)*

Peanut production in Kenya is common in Western and Nyanza provinces. It is however produced in smaller amounts in other parts of the country such as Eastern, Rift valley and pockets of Coast province. Common varieties grown include ICGV 99568, ICGV 90704, Homa bay local, Valencia Red, ICGV 12988, ICGV 12991, JL24 and CG7, the latter four being improved varieties introduced by ICRISAT (Mutegi etal.,2013;Okoko et al., 2009). According to Rachier et al. (2010),the crop is used for subsistence, cash-income and provides raw materials for agro-based industries. As food, peanut is used for human 6consumption in the form of raw, boiled or roasted nuts. It is also pounded and used as vegetable oil for cooking or made into paste and eaten with sweet potatoes, cassava and bananas. As a cashcrop, peanutis sold in the local market as boiled unshelled, raw unshelled, raw shelledand shelled roasted nuts while some is sold in the confectionery trade as peanut butter, peanut sugar,peanut candy and peanut brittles among other products (Mutegi et al., 2013)

The leading commercial producing continent is Asia while China, India, Nigeria and the United States are the largest producing countries

Kenya has been dependent largely on imports of groundnut from countries such as Malawi and Zambia in spite of many regions of the country having the potential to produce more groundnuts.

1.2.2 Oil palm*(Elaeisguineensis)*

Oil palm is a typical crop of the rainy tropical lowlands. The tree requires a deep soil, a relatively stable high temperature and continuous moisture throughout the year. Soil fertility is less important than physical soil properties. Dry periods of more than 2-3 months do not specifically damage vegetative growth, but affect seriously the production and quality of the fruit bunches. Oil palm yield is not only determined by vegetative growth and production, but also by the way and pests and diseases can be controlled or eradicated. Almost every part of the palm tree has economic value the oil can be processed into soap, animal feeds among other products, whereas the leaves of the trees could be used in making brooms, roofing material or fuel.

The fiber and husks could be used to make pillows and even mattress, besides being a raw material for the manufacture of animal feeds. Palm trees were introduced in Busia County by the Government in the year 2000.

1.2.3 Simsim/Sesame *(sesamumindicum)*

Sesame which is commonly known as sim sim is the oldest oil crop believed to have originated in East Africa. It is a rich source of food, nutrition, edible oil, health care and bio-medicine.

In Kenya, sesame is grown on small scale in Coastal, Western, North eastern and Eastern region. Counties that grow sesame are:-

Coastal region- Kwale, Kilifi and Lamu County
Western region- Busia, Bungoma and Kakamega County
Eastern region-Meru County

Ten senses Africa (TSA) Limited founded in 2010 is currently partnering with ADRA (Adventist Development and Relief Agency) through the support of Slovak Aid to

economically empower smallholder farmers in Busia County. The project aimed at training 500 farmers on organic farming for sesame targeting to produce 300 tones.

1.2.4 Coconut *(Cocosnucifera)*

The coconut palm has many uses both as a cash crop and a food crop. All parts of a coconut are commercially exploitable. The roots, stem, leaves, flowers and fruits have a multiplicity of applications. The roots can be used for dye stuff and medicinal purposes, the stem/trunk for timber used for fuel, construction and furniture. Coconut inflorescence is used to produce toddy which when fermented is used as an alcoholic drink. The fruit is used as food and is also processed into many products such as copra, copra oil, virgin coconut oil, desiccated coconut, coconut milk, coconut cream and many more.

The coconut husk part of the fruit produces fibre which is used for making ropes, door mats and rugs. The palm contributes tremendously to the economic through its many products which are widely commercialized.

In Kenya coconut it is almost found in the coastal areas. In Busia county coconut is mainly grown in Bunyala Sub County.

1.2.5 Bambara nuts *(Vigna subterranean)*

Bambaranut is a crop originating from Africa and it is eaten in almost all parts of Malawi. It makes a complete food as it contains sufficient quantities of protein, carbohydrate and fat and its gross energy exceeds that of other common pulses such as cowpea, lentils and pigeon pea (FAO, 1982).In addition to the food it provides, bambara nut is beneficial to the farming system because of its potential to fix nitrogen in the soil. Bambara nut is reported to be tolerant to drought, poor soils and extreme heat, hence making it a suitable crop to the low-input production systems. It is also reported that under severe drought conditions where groundnuts did not have any kernels, Bambara nut produces small filled pods. Yield potential of Bambara nut rangesbetween 497kg/ha and 799 kg/ha

1.2.6 Cashew nuts(*Anacardiumoccidentale, L)*

Cashew is locally known as Mkorosho / mkanju (Swahili Cashew trees are grown along the coastal plains of Kenya and Tanzania. Cashews are evergreen trees with deep taproots. The crop originated from the northern part of South America. The countries that are leading in production of cashew nut are India, Brazil, Vietnam, Nigeria, Ivory Coast, Guinea Bissau, Tanzania, Mozambique, Kenya and Malawi.

1.2.7 Macadamia

Common names: English (Macadamia nut, Australian nut), Swahili (Mkadamia) Species: "Smooth-shelled Macadamia" (*Macadamiaintegrifolia*Maiden &Betche), "Rough-shelled Macadamia" (*M. tetraphylla*L. Johnson). Hybrid forms exist between the two species. The macadamia nut tree is indigenous to Australia but introduced in Kenya in 1945 to 1948. In Kenya it grows roughly in the same climate suitable for growing coffee. The macadamia nut trees remained almost totally unknown in Kenya until after independence in 1964 when a Kenya farming family, Bob Harries and Peter Harries started multiplying the trees in a seedling nursery, planting them on their farms and selling some to other interested farmers. The leading macadamia producing counties in Kenya are Embu, Meru, Kiambu, TharakaNithi, Murang'a,Kirinyaga, Nyeri,andTaitaTaveta. Other countieswhich have a promising potential are Makueni, TransNzoia,Bungoma, Baringo and Busia County.

1.3 Rationale of the Survey

Through secondary reports and testimonies from the extension officers based on the ground, Busia County has been reported to have potential for all the scheduled nuts and oil crops. Though scattered, the crops are available across the county's different agro ecological zones in varying quantities. In addition the Busia county government has been on the fore front in promoting macadamia as the cash crop of choice for the county's farming community. For this reason the Nuts and Oil Crop Directorate embarked in a baseline survey to establish the existing crops' current status, its potential and the various challenges being experienced. The survey was designed and implemented to meet the following objectives.

1.4 Objectives of the Market Survey

The specific objectives of the survey were:

i. To establish the existing potential of nuts and oil crops under study in Busia County;

ii. To document the prevailing nuts and oil crops farm gate prices and their determinants;

iii. To identify the challenges faced in production and marketing of nuts and crops within Busia County;

iv. To identify the policy interventions required to increase the quantities produced and boost prices;

v. To identify possible partners and referral organizations for both direct and indirect intervention.

CHAPTER TWO: RESEARCH METHODOLOGY

2.1Targeted population

This survey targeted was the farmers, traders, value chain enablers and development partners in Busia County. The respondents were individual farmers and selected officials from ministry of Agriculture and Programmes in support of the nuts and oil crops in the region namely: PALWECO (Programme for Agriculture & Livelihoods in Western Communities), ADRA (Adventist Development and Relief Agency) the International Crops Research Institute for the Semi-Arid Tropics(ICRISAT) and KALRO Alupe

2.2 Data collection

The study employed both secondary and primary data collection methods. The former entailed extensive literature review on the subject matter especially focusing on relevant documents to help in highlighting policy/regulatory issues that exist in support of the Agricultural sector in Busia County

Primary data collection entailed mainly in-depth interviews with key informants as well as focused group discussions with selected County Government staff, NGOs and CBO staff. Field visits were made to all the Sub-counties within Busia County in addition to selected wards, during the visits, questionnaires were administered to key stakeholders in the County.

2.3 Data analysis

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 system. Data were consistently being entered in the computer program known as Statistical Package for Social Scientists (SPSS) version 21 and were well arranged to facilitate the analysis. After data coding, editing and entry, the analysis was undertaken. Descriptive statistics such as

frequencies, and percentages for studied variables were computed to understand how various factors interact to influence production and marketing in the County.

2.4 Sample size

A total of 816 nuts and oil crops farmers sampled from the seven sub counties of Busia County namely: Butula, Nambale, Samia, Teso South, Teso North, Bunyala and Matayos were interviewed. Purposive sampling was used to identify specific farmers who produce and trade in nuts and oil crops.

The distribution of the farmers interviewed in the seven sub counties is as shown in the table below. Farmers interviewed from each county were picked from administrative locations, which were also the sampling unit used for the statistical data section of this report. The interview was carried out through a questionnaire. However, additional information was obtained from the extension officers at both ward and sub-county level.

Table 2: Sample size distribution

SUB COUNTY	Number of respondents
Nambale	96
Bunyala	96
Samia	96
Teso North	144
Teso South	144
Matayos	120
Butula	144
Total	**816**

CHAPTER THREE: STUDY RESULTS

3.1 Demographic information.

Busia is to a large extent a farming community although there is significant trading activity as a source of livelihood for the local community. As per the County ministry of Agriculture reports, the table below shows the county population distribution and the proportion engaged in agriculture as source of livelihood

Table 3: Busia County Population Distribution Summary

Sub-County	Total population	No of farm households	Farmer as % of the population
Teso North	135,669	23,323	20
Teso South	137,934	96,554	70
Matayos	75,682	52,977	70
Nambale	94,637	31,537	30
Samia	93,500	10,086	10
Butula	141,830	64,287	50
Bunyala	66,723	8,668	10
Total	**745,975**	**287,346**	

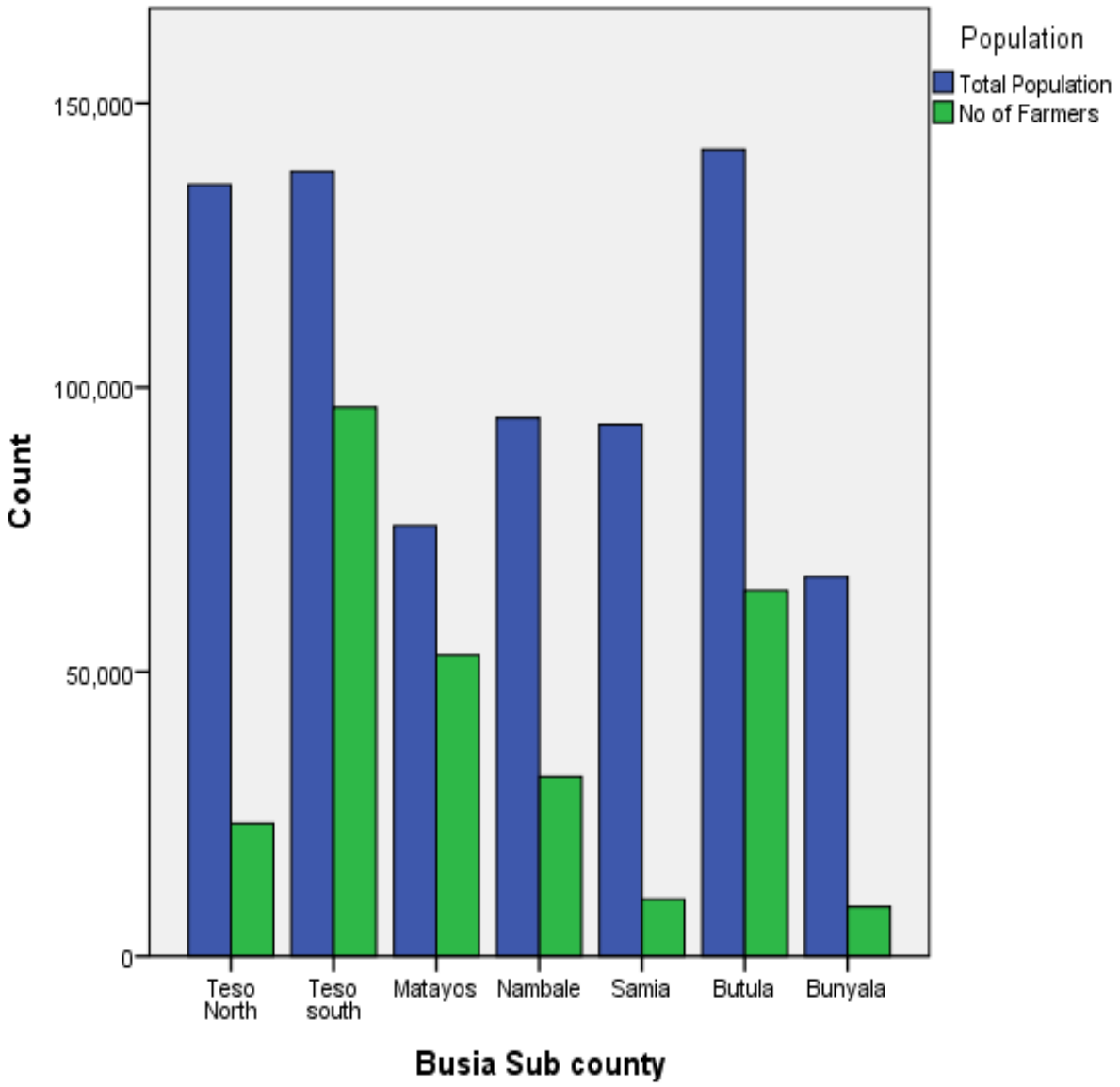

Figure 1: Population Distribution

3.1.1Gender of the respondents

A gender-sensitive approach to livelihoods in Promoting nuts and oil crops should involve understanding the different roles, and aspirations of women and men. During the survey, gender disaggregation of households was therefore incorporated to better understand the different priorities, livelihood constraints and opportunities of women and men. This disaggregation was also important in understanding the division of labor in productive and reproductive work within the household, the community and wider society; access and control over resources and services ; involvement in

decision-making structures and processes. The table below shows the gender distribution of the respondents across the sub counties in Busia.

Table 4: Gender distribution of the farmers across the county

		Teso North	Teso South	Matayos	Nambale	Samia	Butula	Bunyala	Total
Male	No	70	78	41	57	54	79	53	**432**
	%	58.3	54.2	34.2	59.4	56.3	54.9	55.2	**53**
Female	No	50	66	79	39	42	65	43	**382**
	%	41.7	45.8	65.8	40.6	43.8	45.1	44.8	**47**

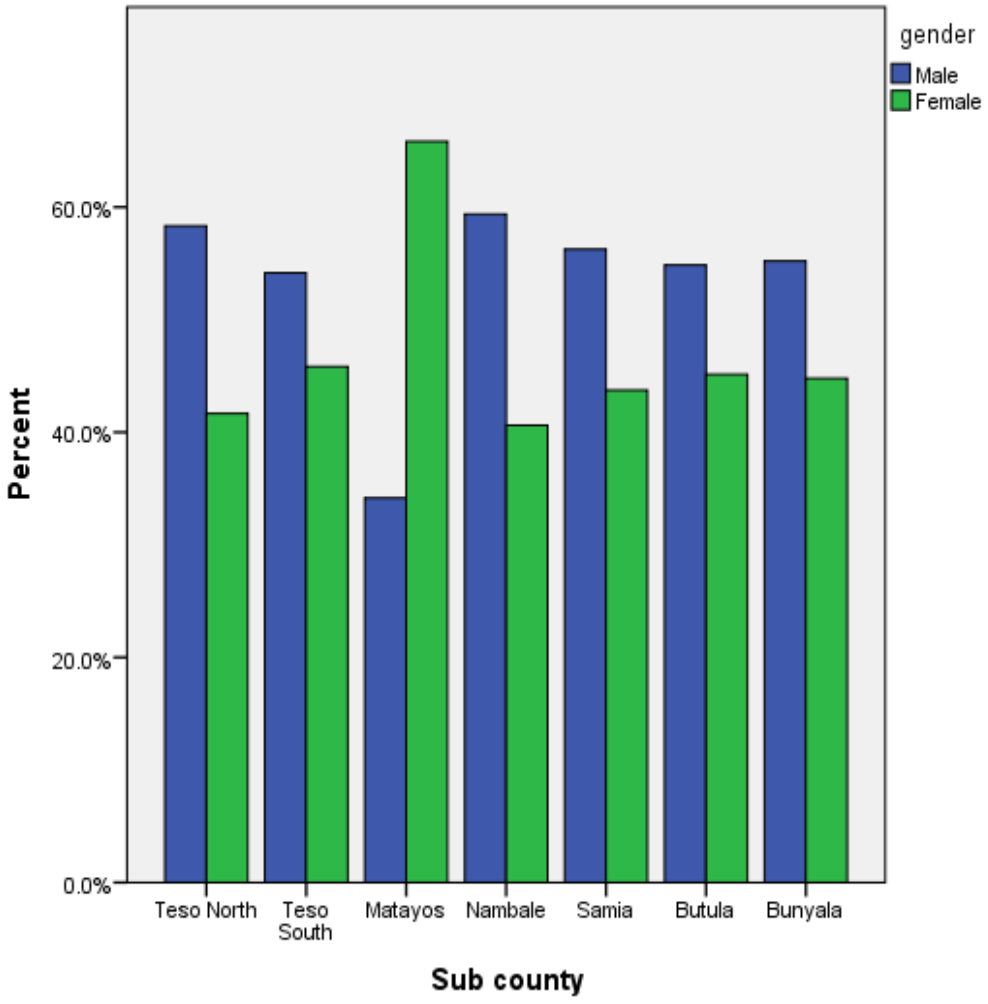

Figure 2: Gender distribution

The findings indicate that the cultivation of nuts and oil crops is dominated by men across the sub counties with exception of Matayos sub-county where 65.8% of the sampled respondents are female against 34.2% who are women. On average men account for 535

% of the farming community in Busia county with the rest (47%) being women. The findings reinforce widely held convictions on gender inequality in many African societies; that women and men often do not have equal access to the assets they need to pursue or sustain their livelihoods and those of their families. Policies, institutions and processes, both formal and informal, reinforce these gender inequalities. Land, for example, is frequently owned by men who determine women's access to it, and limited access to land means little collateral for obtaining credit.

3.1.2. Age of the respondents

Generational renewal in agriculture is a precondition for maintaining viable food production and improving the competitiveness of the sector. New entrants are needed to take over from retiring farmers, to invest and to modernize their agricultural holdings. However, in a situation where good agricultural land is scarce, they depend on the transfer of land from already existing farms. If their farms are to become more modern and competitive, they also need support for initial investments, access to loans, business advice and training. It is for the above reasons that the survey sought to establish the age of the farmers involved in the nuts and oil crops sub sector. The findings are as shown in the table below.

Table 5: Share of farm holders by age group

		Sub county Name							
Age Group	**Freq**	**Teso North**	**Teso South**	**Matayos**	**Nambale**	**Samia**	**Butula**	**Bunyala**	**Total**
≤20	No	-	-	-	-	-	-	1	**2**
	%	-	-	-	-	-	-	1%	**0.2%**
21-29	No	5	4	10	3	1	7	7	**37**
	%	4.2%	2.8%	8.3%	2.5%	0.8%	4.9%	7.3%	**4.5%**
30-39	No	18	32	22	17	16	33	8	**146**
	%	15%	22.2%	18.3%	14.2%	13.3%	22.9%	8.3%	**17.9%**
40-49	No	31	44	39	31	32	39	33	**249**
	%	25.8%	30.6%	32.5%	25.8%	26.7%	27.1%	34.4%	**30.5 %**
≥50	No	65	64	49	45	47	65	47	**382**
	%	54.2%	44.4%	40.8%	37.5%	39.2%	45.1%	49%	**46.8 %**

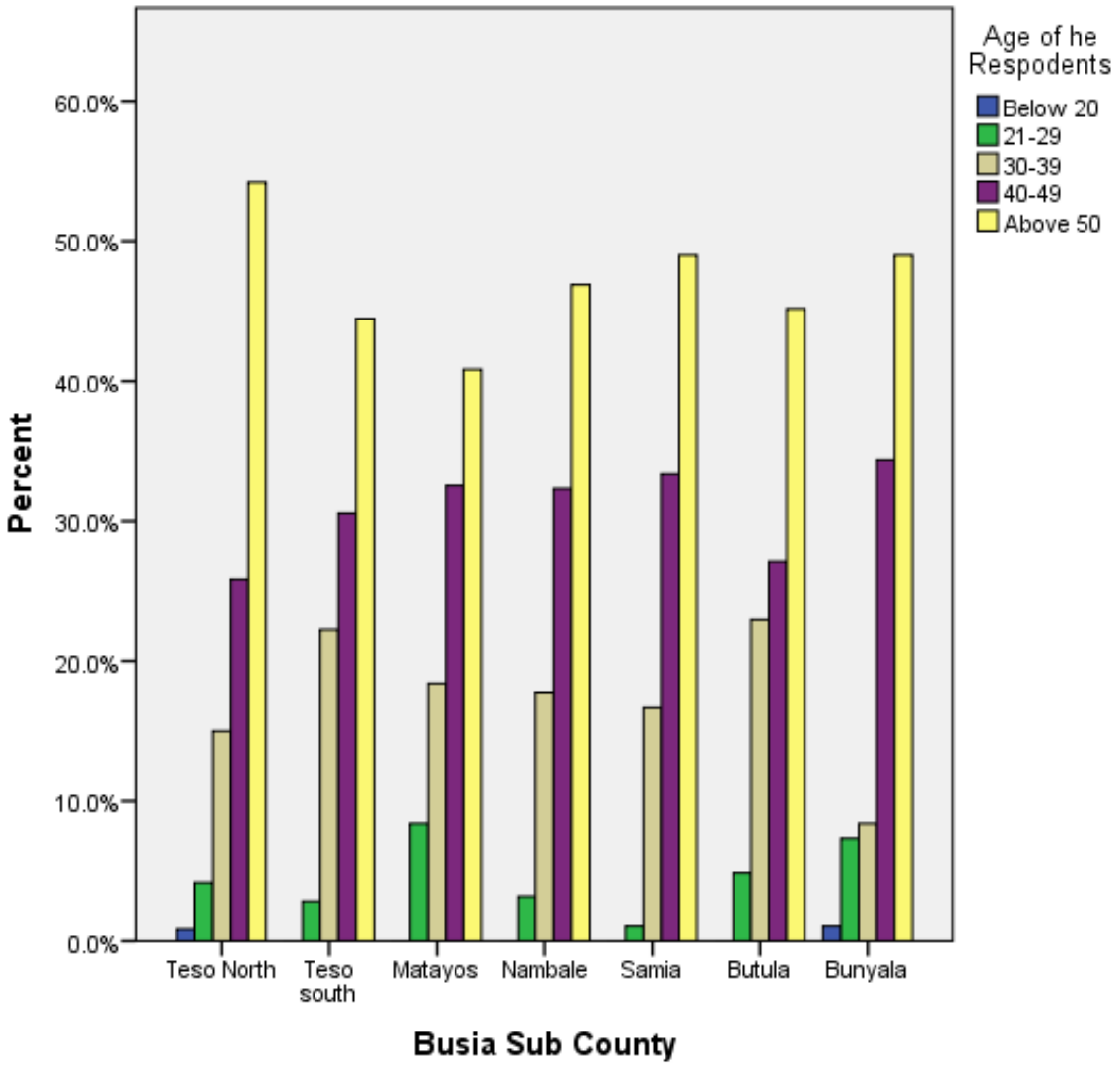

Figure 3: Farmers age distribution in Busia County

A larger proportion of the nuts and oil crops farmers are above 50 years represented by 47% of the total sampled population, farmers aged between 40-49account for31%, 17% between 30-39 and 5% of the farmers aged are between21-29. The farmers aged below 20 accounts for only 0.2% of the sampled population. Generally the farming population in the county is rapidly getting older. For each farm holder younger than 30 years ("young farmers"), there were 9 farmers older than 50years ("elderly farmers") this situation is slightly more pronounced in Teso North where farmers aged above 50 accounts for over 54% of the nuts and oil crops farming community On average, young farmers(≤30) make up 5% of all farm holders in Busia County

3.1.3 Level of education

Extension delivery studies have over time shown that the relationship between level of farmers' education and level of productivity is positive, continuous and significant. A similar relationship also exists between level of education and other agricultural inputs. The implication therefore is that education is an important factor in understanding farm dynamics as it affects the level of participation, communication and implementation of technologies delivered through extension or self learnt. The survey results in relation to extension are as shown below:

Table 6: Farmer Education levels

Education levels	Freq	Sub county							
		Teso North	Teso South	Matayos	Nambale	Samia	Butula	Bunyala	Total
None	No	5	2	10	3	2	4	8	34
	%	4.2	1.4	8.3	3.1	2.1	2.8	8.3	4.2
Primary	No	45	57	54	40	48	73	36	353
	%	37.5	39.6	45.0	41.7	50	50.7	37.5	43.3
Secondary	No	46	59	34	40	40	51	37	307
	%	38.3	41.0	28.3	41.7	41.2	35.4	38.5	37.6
College	No	24	26	22	13	6	16	15	122
	%	20.0	18.1	18.3	13.5	6.2	11.1	15.6	14.9

Most of the sampled farmers have only the basic level (primary) education (43%). Those with formal education account for 15% while those with at least secondary education account for 38% across the county. Matayos and Bunyala have the highest proportion of farmers without any form of education whileTeso North has the highest proportion of farmers with college level education at 20%.

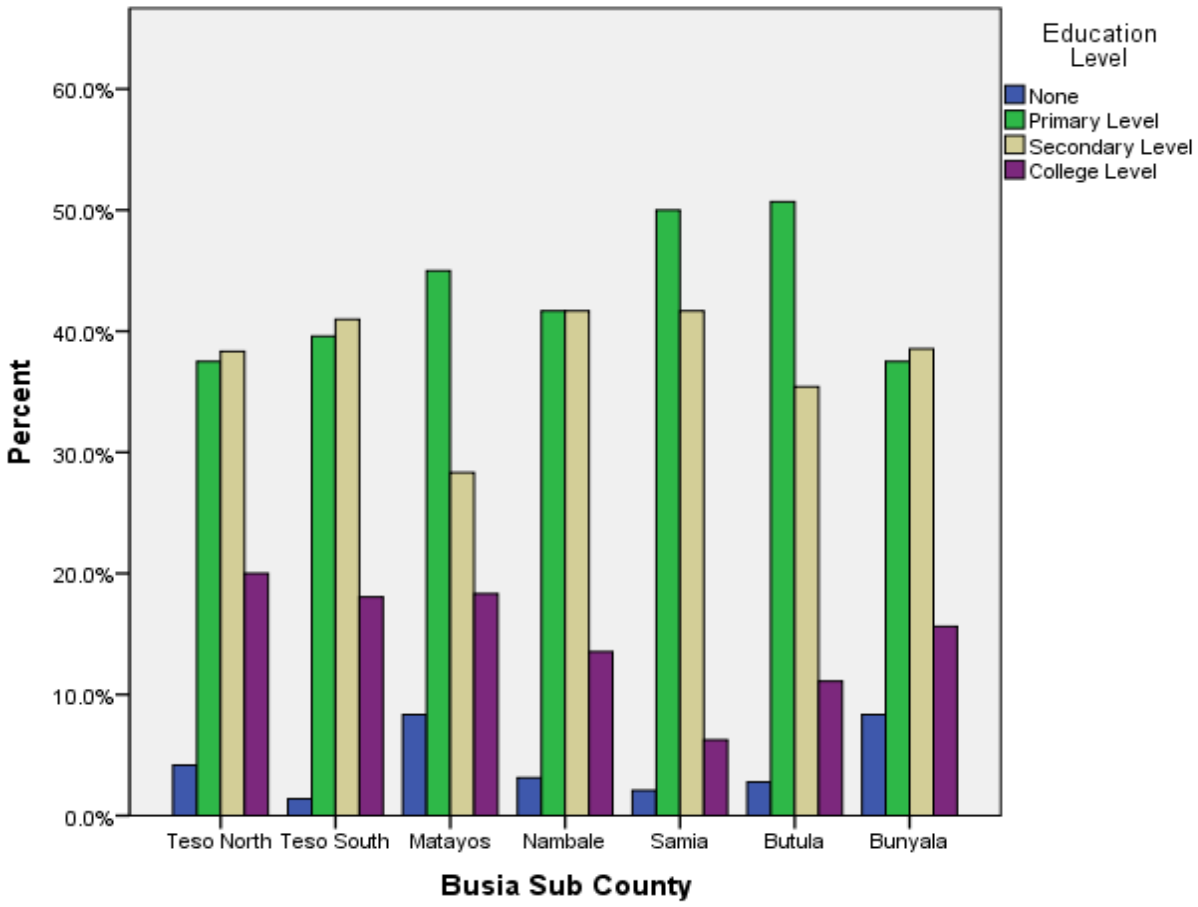

Figure 4: Level of education

3.2 Land sizes

The sizes of land owned by farmers in Busia County differ with the locality. Of interest in this survey was the proportion of land dedicated to nuts and oil crops as a percentage of to their total amount of land. There difficulties in distinguishing land sizes dedicated to the cultivation of tree crops such as cashew, coconut and oil palm. This is due to the fact that these crops are not grown in a pure stand. To address challenge the survey sought to document the number of trees owned by each farm household. The table below shows in summary the land amount of land dedicated to nuts and oil crops across sub-counties and the nuts and oil crops tree distribution.

Table 7: Land utilization for nuts and oil crops

Sub county	Area under nuts and oil crops			Total No of trees		
	Ground nuts(Ha)	Bambara nuts(Ha)	Sesame (Ha)	Oil palm	Coconut	Cashew nuts
Teso North	150	5	40	581	16	14
Teso South	950	50	600	4505	32	5
Matayos	516	12	5	922	12	2
Nambale	250	50	2	1200	-	-
Samia	200	1	1	50	1	-
Butula	250	150	100	10	1	3
Bunyala	350	0	0	300	1300	-
Total	**2666**	**268**	**748**	**7568**	**1302**	**12552**

3.3 Ongoing interventions

There are different players who are involved in different interventions along the Nuts and oil crops value chain within Busia County. Some of these interventions include:

a) Ground nuts(peanut) Community seed multiplication Project

This is a four year project which began being implemented in the year 2015 short rains season. The implementing agent is the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) working together with researchers from Egerton University, KALRO and Ministry of Agriculture staff Busia County. The Project is aimed at making available quality seeds to farmers while at the same time promoting improved varieties that meet end user demand. In addition the project works to provide linkages between the farmers and the market. A number of varieties that were developed by the ICRISAT breeding program in Malawi were sent to Kenya for evaluation. These were evaluated by Egerton University through a collaborative research process and about five varieties were selected and evaluated on farmers' fields. Three varieties were further selected by farmers and officially released, as they met the farmer requirements.The two major varieties being distributed to farmers in BusiaCounty include:ICGV83708 and ICGV92704 while variety ICGV12991 is being promoted in Makueni County.

The project works by providing free seed to identified reliable farmers at the beginning of the season together with extension support services to enable the farmer realize optimal yields. Upon harvest the farmer is compelled to give back to ICRISAT a similar quantity of seed given at the beginning of the season and also sell to them the surplus. Other notable buyers include: green forest, equatorial nuts and Kenya nut. The arrangement has the following benefits to the farming community:

- Farmers contracted by ICRISAT are assured of a ready market for their produce
- The prices offered for seed are always higher than prevailing market prices. This is part of the project design and it can also be attributed to a higher demand which always outstrips supply. During the last cropping season, the project obtained approximately 5 Metric tonnes of the produce from the County against a demand of 20 metric tonnes.
- The other direct benefit being realized from the project is that farmers in the surrounding community are able to access quality planting material from the quantities bought by ICRISAT.

Some of the challenges cited by both the implementing agency and the farming community include in relation to the crop include:

- Pests and disease affecting the crop while in the field.
- High incidences of aflatoxin attack due to poor post-harvest storage conditions and failure to dry the produce to the recommended moisture content level

Overall several constraints have been identified through various studies as limitations to optimal groundnut production in Western Kenya.

Amongst them are the small farm sizes 2.5 ha per family and the very small proportions (0.01 to 0.12 ha per household) under groundnuts. Besides, farmers were also observed to grow several crops simultaneously leading to low production levels of

690Kg/ha of groundnut yield. These factors, singly or collectively therefore affected groundnut production. While farm sizes and crop enterprises may be difficult to change, at least in the short term, adoption of intercropping groundnut with other cereals in the grass family remains a viable option.

b) ADRA Kenya Sesame project

The project seeks to contribute towards decreasing poverty and strengthening food security through the support of economic and production growth in the agriculture sector. The goal of the project is a permanent improvement of the socio-economic situation of 500 sesame-growing farmers and their households in Busia, Kenya. The uniqueness of this project lies in its potential to make connections between small holder farmers producing sesame on one side and an access to international markets on the other side. Farmers are not only to be trained or provided with some tools but they are to get a real place where to sell their products for a reasonable and fair price. The Project has so far worked with over 500 farmers and its estimated value is US $ 282,447 and affects approximately2500 persons either directly and indirectly.

ADRA's choice of sesame over other enterprises was influenced by the following factors

- The crop is drought tolerant and can therefore be cultivated with minimal amount of rainfall
- The crop requires small parcels of land for its cultivation facing minimal competition from other enterprises.

Some of the challenges cited by both the implementing agency and the farming community include:

- Lower prices below the agreed amount; this has discouraged the farmers from venturing into the enterprise; the low price offered was attributed to international price fluctuations.

- Low produce quality due to poor agronomic practices and unreliable rainfall

c) Macadamia Seedlings distribution

The low returns being experienced in the sugar sector has brought about new challenges in realizing a steady and reliable source of income. These challenges pushed the Busia county government and other development partners to seek alternative cash crops which can be relied upon by the farmers as a source of livelihood. In collaboration with PALWECO (Programme for Agriculture & Livelihoods in Western Communities) macadamia was identified as the enterprise for promotion due to its rapid growth and relatively higher returns per unit area.

The partnership was such that PALWECO procures the seedlings for distribution to farmers while the county government identifies beneficiary farmers and later on providing extension support.

Below is a summary of the number of seedlings distributed to farmers. The table also provides insights on the approximate survival rate as reported by the farmers and extension service providers.

Table 8: Macadamia seedlings distributed

Sub county	No of seedlings distributed	Survival Rate	Approx. No of seedlings Established
Butula	6,500	20%	1,300
Teso North	30,000	50%	15,000
Teso South	37,000	10%	3,700
Bunyala	2,500	20%	500
Samia	4,000	5%	200
Nambale	2,920	25%	751
Total	**82,920**	**25%**	**21,451**

As evidenced from the above table, the survival rate is very low. This occurrence can be accredited to various factors as provided by extension staff and the farmer's interviewed. Some of the reasons cited for the low survival rate include:

a) Unsuitable methods of beneficiary farmers' identification. In most instances this process was carried out by extension staff. The staffs were either not facilitated to undertake farmer mobilization and sensitization. In some instances the beneficiaries were identified by other administrators without technical know-how on the crops' requirements.
b) Lack of extension support to beneficiary farmers to help in managing the crop while in the field. This is because some extension staff had not been trained on the crop's management, lacked facilitation to reach the farmers or did not know who the beneficiaries where. As a result the crop's recommended spacing had not been followed and even the actual planting was improver in terms of hole size and manure application.
c) The seedling distribution period coincided with a dry spell dealing a blow to the seedlings survival. The short rains expected during planting failed and were way below optimal. As a result, some farmers did not plant the seedlings provided at all. It was anticipated that farmers would artificially water the seedlings, this was however not the case as the drought was severe and farmers prioritized their domestic water needs over irrigation to bolster survival rates.

3.4Farm Gate price

Good prices can stimulate the farmer's interest in a specific enterprise and consequently act as an incentive to increased production and productivity. Similarly, low prices can reverse the trend a deal a blow to an otherwise a thriving enterprise. This survey therefore sought to document the prices prevailing for nuts and oil crops across the county. The prices obtained were as recorded below:

Table 9: Farm Gate prices

Nuts and oil crops	Farm gate price	Market Price
Bambara nuts	300/Kg(in shell)	350/Kg(shelled)
Sesame	125/Kg	130/Kg
Oil palm	200/liter	250/liter

Coconut	20/piece	40/piece
Cashew nuts	70/Kg(in shell)	500/kg(shelled)
Groundnuts	125/Kg(in shell)	175/Kg

Bambara nuts fetch the highest price in comparison to other nuts in a similar category such as peanut. This scenario can be attributed to the fact that only a few farmers produce the crop despite its high demand which in most cases outstrips supply pushing up farm gate prices. Bambara nuts also popular among the locals due to the perceived richer nutritional value accrued from its consumption. The price spread of KES 50 per kg between the farm gate and the make is enough to compensate middlemen and other traders involved along the value chain.

Palm oil has the potential to realize even better prices but its constrained by lack of modern processing equipment. Access to efficient oil extraction technologies and a reliable market will go a long way in reducing the wastage being experienced as the crop rots away in the farms.

The prices being offered for ground nuts are on an upward trajectory as a result of the ongoing drought which has diminished the yields being realized. Even with the normal weather conditions the local supply is always higher than the quantities available necessitating importation from neighboring countries to bridge the gap. Prices will also rice as the local community shifts consumption from staple cereals to other substitutes including groundnuts.

3.5Production/per Unit Area

Table 10: Average production per Acre

Crop	Average production /Acre	Optimal yield/Acre	Yield realized as % of optimal
Ground nuts(peanuts	0.36MT	0.6 MT	60%
Ground nuts(bambara)	0.36MT	0.6 MT	60%
Oil palm	6.2MT(bunches)	8 MT (bunches)	80%
Sesame	0.4MT	1MT	40%
Macadamia	0.5MT	5 MT	10%

As per the survey findings groundnuts yield 360kgs/acre on average in Busia County against 600Kgs/acre which considered as optimal with adequate rainfall. The figure would even be higher if farmers receive extension services on time. Lack of certified seed is also another reason for the depressed yields being realized. Farmers plant seed recycled from the previous season and in some instances they sell and consume their harvest only to end up with inadequate amounts as seed.

In the case of macadamia, cashew nuts and coconut it was difficult to estimate the production per acre since the nuts produced were not grown in a pure stand and therefore the figures provided are from estimates from production per tree.

3.6Marketing Outlets

The channels used by farmers to market their produce have a significant effect on the price realized. In the same the vein channel these channels also determines if the farmers have access to other benefits that accrue from collective marketing or not. The survey sought to document the outlet channels in use within Busia County in order to better understand the underlying dynamics in agricultural commodity marketing.

The findings were as shown in table 11 below

Table 11: Outlet channels used to market Produce

Channels	Frequency	Percentage (%)
Farm gate	314	40.7
Coop society	25	3.2
Local market	389	50.5
Marketing agents	43	5.6
Total	**771**	**100.0**

According to the survey findings majority of farmers (50.5%) in Busia County sell their produce in the local market, while 40.7% of the farmers their produce sell their produce at farm gate. These two marketing channels are used by over 90% of the farmers in the county. Regrettably however the two marketing channels have no formal or institutional framework to support efficient marketing for maximum benefits to the farmer. The result of continued use of these marketing channels has been a lack of a common selling strategy and coordination in marketing of nuts and other oil crops, farmers are treated to very unreasonable price undercuts ending up very low prices for their produce.

On the other hand without a bulking mechanism buyers and middlemen are faced with the burden of aggregating farm produce by moving from farmer to farmer thus incurring extra overheads. These additional costs are eventually transferred to the farmer, reducing the price offered. The farmer has been reduced to a spectator and many a times a price taker without a say in price determination

3.7Production 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 of the fact that these 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 farmers. The findings are as tabulated and discussed below

Table 12: Production challenges

	Butula	Matayos	Nambale	Samia	Teso North	Teso south	Bunyala
Poor soils	6.9%	13.3%	10.4%	9.4%	10%	8.3%	3.1%
Irregular rainfall	45.8%	43.3%	41.7%	58.%	25%	56.%	47.9%
Pests and diseases	24.3%	25.8%	27.1%	20.%	43%	22.%	21.9%
Small land size	9%	10%	8.3%	4.2%	6.7%	3.5%	14.6%
Poor inputs quality	10.5%	1.8%	9.4%	3.1%	11.7%	6.9%	7.3%
Expensive labor	3.5%	5.8%	3.1%	4.1%	4.2%	2.8%	8.3%

According to the findings rainfall is the most pronounced production related challenge being faced by a significant number of the farmers in Busia County, this challenge was more pronounced in Teso south Sub County where 56% of the respondents indicated that it is indeed the severe problem affecting their production.

Pests and diseaseattackis the second most severe challenge being experienced in the county and its even more prevalent in Teso North.

3.8Marketing challenges

The farmers were asked to indicate the challenges they faced in marketing their produce. Some of the challenges were Long distances to the market, unstable prices, high cost of transport, and lack of information on the prevailing market condition, unsuitable physical market condition and lack of storage. The findings were recorded in table 11 below and further illustrated as shown in figure 8

Table 13: Marketing challenges

Marketing Challenges	Frequency	Percentage
Long distances to the market	58	7.1
Unstable prices	326	40.0
High cost of transport	40	4.9
Lack of information on the prevailing market condition	311	38.1
Unsuitable physical market condition	58	7.1
Lack of storage	23	2.8
Total	**816**	**100.0**

According to the findings 40% of the sampled respondents indicated that their main marketing challenge for the nuts and oil crops was the unstable prices. 38% pointed out lack of information on the prevailing market condition. 7% were on the opinion that long distance to the market and unsuitable physical market conditions were the challenges. Only 3% indicated lack of storage as illustrated in the figure below.

3.9Policy interventions

Agricultural production and trade flows are significantly affected by government policies and regulations. Some of the government policies affecting the agricultural industry include: taxes, tariffs, duties, subsidies and import and export restrictions on agricultural commodities and commodity products. These policies have specific influence in the industry by

- Determining industry profitability.
- Influencing the planting of certain crops versus other uses of agricultural resources.
- Influencing the location and size of crop production enterprises.
  Determining the kind of products traded which can either be processed or unprocessed commodity and;
- Influencing the volume and types of imports and exports.

In addition, international trade disputes can adversely affect agricultural commodity trade flows by limiting or disrupting trade between countries or regions. Future government policies may adversely affect the supply, demand for and prices of our products restrict our ability to do business in our existing and target markets and could cause our financial results to suffer. The Busia county Market survey narrowed down to a few specific policies likely to affect the local farming community and the response was as tabulated below:

Table 14: Policy Interventions

Intervention	**Required**	**Not required**
Elimination of Middlemen/ Brokers	67.0%	33.0%
Farm inputs subsidies	97.7%	2.3%
Capital investments incentives	92.6%	7.4%
Farmers to buyers direct linkage	92.0%	8.0%
Infrastructure improvements	79.1%	20.9%
Contract farming	71.7%	28.3%

Collective marketing	86.1%	13.9%
Controlled marketing	41.4%	58.6%

Currently there exists various government input subsidies such as the fertilizer subsidy Programme through NCPB; there also exists county government sponsored seed subsidies programmes across the country. Even though the subsidies are in place the survey findings indicate that it's the one intervention the farmers require from government. This may imply inefficiencies in subsidy programmes implementation or they end up with different people away from the target group.

According to the findings only 2% indicate otherwise, capital investment incentives and farmer to buyer linkage also feature prominently as part of government interventions to be rolled out in order to address agricultural producers' challenges. In divergence to information analyzed from other counties producing the nuts and oil crops, exploitation by the middlemen and the brokers seemed not to be main challenge in Busia County .Controlled harvesting least feature as a policy intervention required with 41% of the respondents indicating that they required the intervention and 58.6% indicated otherwise.

3.10Price Determinants

The general price level of an agricultural commodity is influenced by a variety of market forces that can alter the current or expected balance between supply and demand. Many of these forces emanate from domestic food, feed, and industrial-use markets and include consumer preferences and the changing needs of end users; factors affecting the production processes (e.g., weather, input costs, labor costs, pests, diseases, etc.); relative prices of crops that can substitute in either production or consumption; government policies; and factors affecting storage and transportation.

International market conditions are also important depending on the "openness" of a country's domestic market to international competition, and the degree to which a country engages in international trade.

The survey picked a few these few relevant price determining factors and asked the respondents to rate them in the order of importance

Table 15: Price Determinants for G-nuts, Sesame, oil palm

Price Determinant	Important	Moderately	Least important
Cost of production	80%	38%	3.5%
Market intelligence	74.3%	22.6%	3%
Knowledge about product use	42.2%	37%	20.9%
Grade /Quality	65.7%	24.3%	10%
Price of substitutes	25.2%	20.4%	54.3%

According to the findings (80%) of the respondents indicated that cost of production was the main factor determining the prices of their produce, 74% pointed out availability of market information, 66% indicated the grade of the produce and only 25% of the respondents indicated comparison with similar product in usage as the price determinate with 54% were for the opinion that it was least important.

Table 16: Price Determinant Coconut/ macadamia/ cashew nuts

Price Determinant	Important	Moderate	Least important
Cost of production	61%	26.8%	12.2%
Availability of market information	88.1%	11.9%	0%
Knowledge about product use	73%	27%	0%
Size /Quality	91.3%	6.5%	2.2%
Comparison with similar products in use	46.3%	26.8%	26.8%

Unlike in the case of groundnuts and Bambara nuts where majority of the respondents indicated cost of production as the main price determinant, most

farmers(91%) pointed out size in the case of coconut and quality and grade for cashew nuts and macadamia as the main price determinant among farmers. 88% were on the opinion that availability of the market information was an important factor in determining the prices of their produce. Cost of production was presented by 61% of the sampled farmers.

3.11Value addition Initiatives

Value-addition in agriculture entails changing a raw agricultural product into something new through packaging, processing, cooling, drying, extracting or any other type of process that differentiates the product from the original raw commodity. The whole process is geared to arriving at a form of characteristics that are more preferred in the market place while availing the additional benefits such as: better income, increased shelf life and brand Creation. To understand the ongoing value addition activities within the county the survey documented the ongoing value addition as indicated below

Table 17: Value addition Initiatives

Crop	Value addition activities/Products
Ground nuts	-Roasted nuts -Peanut butter -Boiled nuts -Ground nuts Flour
Oil palm	-Edible oil -Soaps -Roofing materials (Makuti) -Brooms from the leaves -Fuel
Coconut	-Coconut oil -Makuti
Cashew nuts	-Roasted nuts
Sesame	-Roasted seeds -Edible oil -Sesame paste

Table 18: Groups involved in the value addition

Product	Name of the group
Peanut butter	Njugu women group
	Chakol farmers women group
	Afrikam
	Atem women group
	Naako group
	Asopotoit women group Shambanimali women group
	Ikatilemu
Edible palm oil	AlupeKalro
	Busia oil crops farmers' co-operative limited
	Mundumbu youth group

CHAPTER FOUR: DISCUSSIONS AND RECOMMENDATIONS

4.1 Groundnuts

Busia County is predominantly a ground nut growing region with systemic challenges. The most salient problem which featured prominently across the farming community and other value chain enablers is the lack of quality planting material. No seed producer is in the business of producing certified seed for supplying to farmers be it Western seed co, Kenya Seed or any other major player in the seed business.

During the survey interactions with researchers from KALRO and Egerton University revealed that underdeveloped seed systems and poor accessibility to seeds has been blamed for the low adoption of improved varieties released over the years in eastern Africa.

Delving further into the seed supply chain, the survey made enquiries from the commercial seed companies as to why not much investment has gone into the production of certified groundnut seeds; although there was no general consensus the players argue that the seed business, for food crops, is generally low margin and high volume driven whereas transport and distribution costs are expensive. For food crops where there is limited varietal out-crossing or quality degeneration, the window for commercial opportunity is often short-lived because of the capacity of seed to quickly and effectively self-replicate in the hands of farmers, this more often the case in groundnuts where farmers are able to retain part of their produce to be used as seed in the next cropping cycle. Unless there is a market making a subsidy from a government, foundation, UN/Agency, or NGO it is unlikely possible to effectively address seed supply issues of food crops. Practically speaking there may be no pure business case to be made for commercializing seed where there are high operating costs and challenges to achieve scale in operation.

To increase production of high quality seed and ensure that farmers have access to seed of improved varieties, efforts must be made geared to empower farmers to engage more profitably in production and the entire value chains of groundnut the target farmers have to be introduced to improved varieties and agronomic practices using lead/model farms as field schools for training farmers.

However it is imperative high quality seed alone cannot improve productivity, high quality seed has to be accompanied with better crop management practices such as good seedbed preparation, timely planting, spacing, fertilizer application, weed control, integrated pest and disease management and improved postharvest handling techniques. Post-planting monitoring efforts must also be in place to ensure that good agricultural practices are followed by farmers. All these are extension delivery related services which in the recent past has been affect by a lack of clear policy direction and poor facilitation

4.2 Macadamia

In the macadamia subsector the planting material also remains a major challenge which requires urgent attention to enable us realize the goal of expanding the area under the crop. In a few selected instances, Busia farmers obtained their planting materials from processors and brokers but to a large extent the source of planting material are from extension staff and commercial nurseries. There is one major commercial nursery located at Amagoro within Teso North Sub-county. The nursery is being operated by the Nuts and Oil crops Company and it currently serves as the major source of planting material being distributed within the county. The company's main challenge has been obtaining quality vegetative material for use as root stock during the grafting process. The planting material being used is transported from the central Kenya region all the way to Amagoro. This works to increase overheads and production costs.

In the recent past there has been an increased demand for high quality seedlings; pushing up prices making them generally unaffordable to a majority of farmers.

To effectively develop the Busia county macadamia sub sector into a commercial viable enterprise the survey recommends a five step approach with the following components:

a) Nursery Development: Entailing the establishment of mother nurseries and community nurseries with facilities to produce enough macadamia seedlings for commercial ventures or subsidized to reach as many farmers as possible.
b) Crop Development this will involve opening up unutilized land and intercropping of macadamia trees with food and cash crops. It may also entail improvements in the marketing of macadamia nuts through formation of associations and farmer groups and credit provision to smallholder farmers trough county development fund use in the procurement of farm inputs and equipment.
c) Research and Extension Support: To enhance participatory research and extension programmes and establishment of farmer-managed demonstration-trials, and integrated pest management which can be used as training grounds for farmers and their organizations.
d) Capacity Building: This should involve training staff at all levels including subject matter specialists, project officers in NGOs and other agencies, Senior agricultural officers and frontline extension staff in all aspects related to macadamia production and marketing. The component also included training of farmers in group dynamism and management of farmers groups.
e) Infrastructure Development: This is to mainly address water supply for irrigation where applicable for farms and nurseries Provision of plant shades and input/harvest supply stores.

4.3 Oil palm

A s much as oil palm is a relatively a new crop in Kenya, the performance of the crop in terms of production at farm level has largely been impressive; some farms have recorded yields higher than those achieved in traditional producing regions of West Africa and Malaysia.

To realize this there have been both public and private sector initiatives to promote oil palm cultivation, notably the Anglican Church of Kenya sponsored Agriculture Development Services (ADS) program, through which oil palm cultivation was expanded into the Teso sub-counties.

Despite the good on farm performance the sub sector is largely a sleeping giant with most of the produce going to waste in the farms. Some notable challenges include:

a) A lack of entrepreneurial skills among smallholder's famers which would stir a vibrant economy support by oil palm cultivation;
b) Limited awareness of value addition technologies;
c) Poor linkages between producers and processors;
d) Lack of consumer awareness on utilization and nutritional benefits;
e) Limited market access;
f) Fragmented producer's systems and organized producer groups leading to uneconomical returns;
g) In addition there has been minimal research on value added technologies which has been conducted in the value chain.

Some of the remedies proposed to address the afore mentioned challenges include

- Allow intercropping around immature oil palm to improve the producer cropping system by balancing between cash crops and food crops
- Establish small scale nucleus plantation through farm clusters to reduce transportation challenges and improve producer, processor linkages

Large oil processors in Kenya have not been of much help in creating a ready market for these small scale producers, they have cited fast deterioration in quality of oil collected and stored in farm warehouses as the main reason for not absorbing the

produce available locally. The processors would expect that oil palm fresh fruit bunches are milled within 24 hours of harvest to avoid deterioration in quality, unfortunately the mills are not in place to enable farmer carry out primary milling before delivering to the large processors.

Overall most parts of Busia County have demonstrated suitability and adaptability for the crop and potential for value addition enterprises within smallholder farming system. It is worth noting that these opportunities can be exploited to stimulate economic growth and development of the county. The oil palm sub sector has a greater capacity of improving livelihoods through income generation, employment creation, promotion of nutrition and poverty alleviation.

To best exploit these opportunities, smallholder oil palm farmers like the ones in Busia County are only going to make headway locally and in national and international policy processes through grouping together around issues of common concern, such as costs, prices, risk mitigation, improving government policy, and capturing new markets.

4.4 Value addition Initiatives

There is need for training the farmers on the different products that can be processed from their harvest. Lack of/minimal value addition has been the greatest challenge affecting the farmers in the region. According to the finding there is little value addition of the nuts and oil crops in the region especially in the case of coconut where the only product that is familiar to the farmers was the coconut oil and makuti.

How can this be achieved?

• Training producers on better post-harvest handling of produce since that is the start of the journey towards a good product on the market.

• Training on multiple processing alternatives of produce.

• Creating village teams of farmers that can combine their expertise and resources to collectively engage in a value addition exercise.

• Harnessing indigenous technologies for food processing that are already embedded in the local skill sets. They would merely improve on them to achieve what is otherwise being done primarily using "modern" technologies.

• Educating the producers on the potential uses of the 'waste' material from processed raw material.

In Conclusion it is important to note that most nuts and oil crops do well even where the rainfall may not be adequate enough. Nuts and oil crops are thus a good starting point to consider when trying enhancing resilience, agricultural productivity, food and nutrition security and overall economic welfare of actors along the value chain.

Annex: Table 19: CONTACT PERSONS

	OFFICER'S NAME		STATION	CONTACT ADDRESS
1	Innocent Masira	MDO	Mombasa	0725738277
2	Judy Maina	Statistician	Mombasa	0702033943
3	Gilbert Ngure	Driver	Mombasa	0703467722
4	Robert Murega	Crops Officer	Teso South	0722289048
5	Catherine Mumo	Crops Officer	Samia	0724274490
6	JecintaOsiema	Crops Officer	Bunyala	0720364972
7	Peter Chege	Crops Officer	Butula	0711361448
8	James Odipo	Crops Officer	Matayos	0710160120
9	James Omemo	Crops Officer	Nambale	0717426688
10	Martin Wamalwa	SCAO	Teso North	0726903870
11	Joseph Sang'alo	Crops Officer	Teso North	0700360229
12	Dr. John Achieng	Researcher	KALRO Alupe	0722371873
13	Rose Ngoya	WAO	Mayenje	0720539280
14	Martin Nahama	WAO	Chakol South	0724816936
15	Doris Iliwa	WAO	Chakol North	0716806644
16	Joshua Oriama	WAO	Amukura East	0725720344
17	Stephen Omadir	WAO	Amukura Central	0717088333
18	Grace	WAO	Amukura West	0712996344
19	Jane Ayieko	WAO	Angorom	072243809
20	Doretti Ngongo	WAO	Busibwabo	0721327666
21	Roselida Mukanga	WAO	Buhayo West	0726641365
22	Humprey Mukanga	WAO	Buhayo Central	0727236926
23	Erick Magero	WAO	Buhayo East	0723211705
24	Francis Wasike	WAO	Matayos South	0721214621
25	Lornah Wanyama	WAO	Burumba	0717510780

26	HumpreyWafula	WAO	Angurai North	0727334727
27	Joan Barasa	WAO	Angurai South	0720484792
28	Samson Simiyu	WAO	Malaba South	0714955677
29	Grace Ipomae	WAO	Malaba Central	0727316194
30	Joseph Omojong’	WAO	Malaba North	0711361461
31	Joseph Netia	WAO	Township Ward	0712618210
32	Johannes Onyango	WAO	Marachi West	0724906249
33	Joseph Juma	WAO	Marachi East	0729949346
34	Tabitha Masinde	WAO	Kingandole	0714743323
35	Eliakim Hisa	WAO	Elugulu	0717480676
36	Pulton Otieno	WAO	Marachi Central	0726523579
37	Getrude Wambia	WAO	Angenga Nanguba	0721173694
38	Charles Chweya	WAO	Bwiri /Funyula	0725720209
39	Charles Oduori	WAO	Nangina	0721943731
40	Lawrence Okwiri	WAO	Namboboto/Nambuku	0700487944
41	George Gare	WAO	Bunyala North	0721728700
42	Polycarp Ndubi	WAO	Bunyala Central	0717996832
43	Stephen Bakasa	WAO	Bunyala South	0710165198
44	Jeniffer Lutonyia	SCAO	Butula	0711796798
45	Samson Khachina	CDA	Busia County	0720990143
46	Phitallis Rono	SCAO	Teso South	0725540916
47	Callebo mondi	SCAO	Nambale	0728739371
48	Wekesa Opilo	SCAO	Bunyala	0725609681
49	Jackline Ongweso	SCAO	Samia	0721544737
50	Florence Kiguzu	SCAO	Matayos	0721292403
51	Justina Otsula	Junior Expert	PALWECO- Busia	0723901988