

Constraints and Opportunities in Peanut Production and Marketing in Nyakach and Karachuonyo of Nyanza Kenya

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Abstract: According to Food Agriculture Organization World Food Summit in 1996, Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food production is basic to the survival of any nation, be it at individual, family or national level. This therefore means that food production should have top priority since no meaningful development in economic, social or cultural sphere is possible without it. However, in Kenya, with a population of more than 47 million people, there have been several challenges facing agricultural sectors leading to low production thus food insecurity in most parts of the country. Kenya is the largest import market for food and agriculture products in East Africa. Kenya imported about 725 million in agriculture products during 2019, up from 525 million in 2017 in an attempt to mitigate the crisis. This implies that the Government of Kenya should come up with policies that ensure people have access to farm inputs, extension services on neglected crops, education on climate change etc to ensure enough food production in Kenya.

Keywords: Smallholder farmers, Peanuts, Food Security, Policy Framework, Economic Development, Agricultural Sector, Kenya

I. INTRODUCTION

A. Kenya: Macroeconomic overview

Kenya is a country in eastern Africa located on the shores of the Indian Ocean. Kenya is divided horizontally by the Equator and vertically by longitude 38° E. Kenya shares borders with South Sudan and Ethiopia to the north, Somalia and the Indian Ocean to the east, Tanzania to the south, and Lake Victoria and Uganda to the west. The country has a land area of approximately 580,367 km². The country is a member of the East African Community and the Common Market for Eastern and Southern Africa (COMESA), as well as the African Union (AU).

Political corruption, COVID-19, and poor ethnicity have hampered Kenya's progress toward achieving the Sustainable Development Goals (SDGs). To learn from past mistakes and achieve meaningful poverty reduction, the country

began to implement the 2010 constitution, which advocated for devolution, which means that resources were sent to the grassroots level via county governments to boost growth and development at a local level. Simultaneously, the country issued the Vision 2030 policy paper and, later, the Big Four Agenda, both of which corresponded to the Sustainable Development Goals [2]. The central pillars of the Vision 2030 strategy are: sustainable economic growth, social development, infrastructure development, protection for the most vulnerable, and good governance, while the big four agenda items are food security, affordable housing, manufacturing, and affordable healthcare [3].

Kenya's economy is heavily reliant on agriculture due to the country's scarcity of exploitable natural resources. Agriculture is critical to Kenya's economy, accounting for 26 percent of GDP and another 27 percent indirectly through linkages with other sectors. The sector employs more than 40% of the total population and more than 70% of Kenya's rural population [5]. Despite having the sixth largest economy in Africa and the most developed in Eastern and Central Africa, 36.1 percent of Kenya's population lives below the international poverty line [5]. Economic inequality, government corruption, ethnicization of development, and health issues are the primary causes of this extreme poverty. The COVID-19 pandemic, in turn, exacerbated these factors [7].

Food security is defined as having physical and economic access to sufficient, safe, and nutritious food to meet dietary needs and food preferences for an active and healthy life at all times. This necessitates a nutrient-diverse diet. Kenya's framework includes four dimensions of food security: availability, accessibility, stability, and nutritional requirements. Kenya's approach to food security combines long-term efforts to increase productive potential and income with programmes and policies that address the immediate needs of the poor and food insecure [5].

Malnutrition levels in Kenya remain high, particularly in the northern corridor. According to the United Nations Children's Fund (UNICEF), 26 percent of children under the age of five are stunted in the United States. This figure rises to 46% in Kitui and West Pokot. In Kenya, 11% of children are underweight, and 4% are wasted. In 2020, 4.5 million children aged 6 to 59 months (82%) received two doses of

vitamin A supplement [1]. According to the Food and Agriculture Organization of the United Nations (FAO), 33 percent of the world's population does not consume enough calories. Kenya's ability to achieve economic growth and poverty reduction is being hampered by political corruption and health issues. Valuable resources are being diverted from productive use and directed toward individual families and sick care. Irreplaceable human capital is being lost, and hundreds of thousands of children are going hungry [6]. Despite the crisis's catastrophic scale, there are a few encouraging signs. The Kenyan economy has grown over the decade to rank sixth in Africa, according to the World Bank [9].

B. Agricultural sector performance in Kenya

Kenya's agricultural sector is divided into large-scale and small-scale sectors. The large-scale sector is made up of a small number of large-scale farmers who occupy roughly 20% of the fertile land and produce almost entirely for domestic and export markets. 3 million ha of the 28 million ha cultivated in Kenya over the last five years are held in approximately 30,000 estates, with an average farm size ranging between 10 and 500 ha. The small-scale sub-sector includes a large number of farmers who primarily grow food crops for their own consumption.

Smallholder farmers cultivate 15 million hectares. More than 55% of smallholder farmers have an average farm of less than 0.5 ha, and more than 75% cultivate less than one ha of land [4]. According to the Kenya National Bureau of Statistics (KNBS), smallholder agriculture accounts for more than 85 percent of production, meeting the country's demand for food staples while also providing some export surplus [4]. It should be noted that tea accounts for the majority of Kenya's agricultural exports. Kenya is the world's largest tea exporter, accounting for 22% of total global tea exports. The tea industry accounts for approximately 4% of the country's GDP and 26% of its exports.

C. Peanut in the Kenyan economy

Peanut production is common in Kenya's Western and Nyanza regions. It is produced by smallholders and in smaller quantities in other areas such as the Eastern, Rift Valley, and coastal pockets. ICGV 99568, ICGV 90704, Homa Bay local, Valencia Red, ICGV 12988, ICGV 12991, JL24, and CG7 are common varieties grown, with the latter four being improved varieties introduced by ICRISAT [7].

Peanuts are primarily grown in Kenya by communal farmers using natural farming methods in dryland conditions. Smallholders are the primary peanut growers; the number of smallholder peanut growers is estimated to be more than one million, while the number of large-scale growers is estimated to be less than ten thousand [5]. Rachier. [6] state that the crop is used for subsistence, cash income, and raw materials for agro-based industries. Peanuts are consumed as a food in the form of raw, boiled, or roasted nuts, as well as peanut butter. It is also pounded and used as a cooking oil, or made into a paste and eaten with sweet potatoes, cassava, and bananas.

The peanut is a cash crop that is sold in the local market as boiled unshelled, raw unshelled, raw shelled, and roasted

nuts, as well as peanut butter, peanut sugar, peanut candy, and peanut brittle, among other products [7]. Asia is the leading commercial producing continent, with China, India, Nigeria, and the United States of America producing the most. Kenya has relied heavily on groundnut imports from Malawi and Zambia, despite the fact that many regions of the country have the potential to produce more groundnuts.

D. Production barriers and opportunities

The most important constraints in peanut production, according to Daniel Kwadjo Dzidzienyo (2018), are the cost of credit and inputs, unattractive prices, and water scarcity. Today, the list of constraints may look quite different: competition with more profitable food crops, such as maize; limited access to improved seed; and ineffective crop management practises. Many communal farmers grow only traditional varieties with generally low yield potential. Despite the fact that improved cultivars and management practises have been recommended to farmers, peanut yields in Kenya remain extremely low.

Peanut productivity is declining due to a number of constraints faced by smallholder farmers. These constraints include the use of low-yielding materials, declining soil fertility due to poor crop management and low nutrient application, insufficient extension services and credit facilities, pests and diseases, and a labour demand mismatch. Peanut yields are low due to unreliable rainfall, often with midseason drought. The planting season is susceptible to drought, and there is no irrigated land. Because of the small and fragmented nature of land holdings, the average area planted to peanuts cannot be significantly increased.

Peanut production is labour intensive, and extra help is needed, particularly for stripping, shelling, and even grading. According to the findings of a gross margin experiment [4], stripping and shelling were the most labour-intensive activities in peanut production, accounting for approximately 60% of total production costs. Only a few smallholder farmers use draught animal power; manual labour and hand-hoe technologies account for 83 percent of farm operations.

Another major disadvantage is that seed supply is seasonal, and production is dependent on weather and price fluctuations. The private sector does not readily invest in seed production for a variety of reasons, including low multiplication factor and farmer seed recycling. Smallholder farmers are primarily responsible for seed production. When a crisis strikes, farmers frequently sell or consume what they would have saved as seed.

II. STUDY OBJECTIVES AND METHODOLOGY

A. Objectives

➤ Overall objective

The overall goal of this research is to find practical solutions to the low peanut production in the study areas, as well as the low incomes of smallholder farmers in Karachuonyo and Nyakach, through improved peanut productivity and marketing arrangements.

➤ *specific objectives of the survey were to:*

1. identify and assess production and marketing barriers and challenges for peanuts in Kenya
2. explore opportunities and options for more firmly linking peanut farmers to input and product markets for sustained adoption and improved incomes.

B. Study Location

The study included smallholder peanut farmers and traders, who are key stakeholders in Kenyan peanut production and marketing. The household survey was carried out in two sub-counties of Homabay and Kisumu counties, Karachuonyo and Nyakach, respectively. The two sub-counties were chosen because they are the major peanut-growing sub-counties in Kenya, and they have also neglected the crop in recent decades. The villages of Karachuonyo and Nyakach were also chosen because they lack organised peanut marketing systems. As a result, the study would be able to identify the various marketing channels available to farmers.

C. Research Methodology

➤ *Targeted population*

Smallholder farmers, traders, value chain enablers, and processors were surveyed in both Homabay and Kisumu Counties. Individual farmers as well as officials from the Ministry of Agriculture and extension officers were among those who responded.

➤ *Sample size*

From January 19th to February 3rd, 2021, a cross-sectional household survey, including questionnaires, was conducted in two sub-counties in Kenya: Nyakach and Karachuonyo, Kisumu and Homabay counties. It was carried out during a period thought to be "neutral" from the standpoint of planting, i.e., outside of the planting season.

A total of 120 peanut farmers were sampled from Nyakach and Karachuonyo sub-counties for the interview. The households were chosen using systematic random sampling, with every fifth household interviewed beginning at the beginning. Consumers, peanut farmers, marketers, handlers, and processors were among those who responded, rather than groups. Widowers were the respondents in some households because they are in charge of food in their households. The table below shows the distribution of farmers interviewed in the two sub-counties. Farmers from each county were selected from administrative locations, which also served as sampling units for the statistical data section of this report. A questionnaire was used to conduct the interview. Additional information, however, was obtained from extension officers at both the ward and sub-county levels.

This baseline study provides data that enables the research project team to capture smallholder farm practises in Nyakach and Karachuonyo, while also highlighting links to available markets, the food value chain, and soil and water quality issues relevant to the research project.

➤ *Data collection*

The study collected data using both quantitative and qualitative methods. A survey was carried out to collect quantitative data from smallholder peanut farmers as well as traders. The questionnaire was distributed to selected farmer households in Nyakach and Karachuonyo sub-counties, and market visits were planned to traders in both major and minor markets in Kisumu and Homabay counties. The research process used complementary qualitative participatory approaches, specifically Key Informant Interviews (KII), with at least six stakeholders in the study areas.

➤ *Analytical Techniques*

The data was mostly subjected to descriptive statistical analyses in order to establish peanut production and marketing links, as well as relationships between different variables in order to explain certain key features in the peanut industry.

III. RESULTS

A. Demographic information and their influence on peanut production

The purpose of this section is to highlight the characteristics of the sampled households in both Nyakach and Karachuonyo sub-counties and to assess how they influence peanut production. Some important factors that may have an impact on peanut production include age, household size, land availability, and education, all of which have an impact on production scale and decision-making.

Kisumu and Homabay counties are predominantly farming communities, though there is significant trading and fishing activity as a source of income for the locals. According to County Ministry of Agriculture reports, the table below depicts the county population distribution and the proportion of people who rely on agriculture for a living.

Table 3.1: Nyakach and Karachuonyo Sub-counties Population Distributions

Area	Population	No of Households
Nyakach	133,041	29,214
Karachuonyo	162,045	31,534
Total	295,086	60, 748

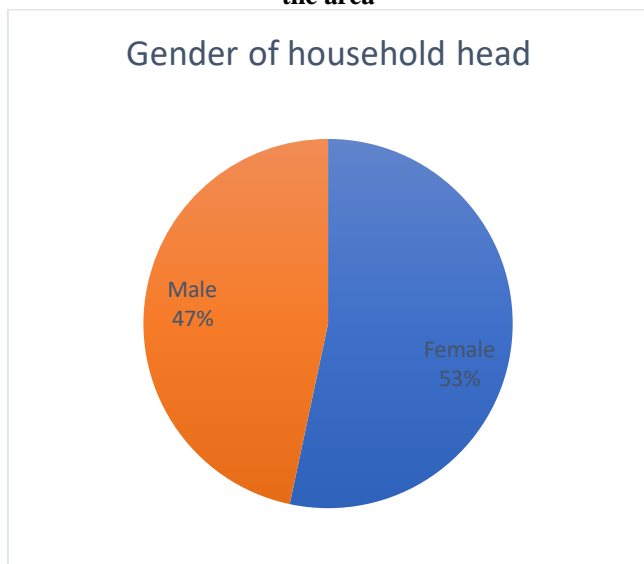
B. Gender of the respondents

Understanding the different gendered roles of women and men in society is essential for a gender-sensitive approach to livelihoods in peanut farming. Gender disaggregation of households was used during the survey to capture the different priorities and livelihood constraints of men and women. This disaggregation was also important in understanding the division of labour in productive work within the household, community, and wider society; access and control over resources and services; and participation in peanut farming decision-making structures and processes. The gender distribution of respondents across the two sub-counties is shown in the table below.

Table 3.2: Gender Distribution of the Farmers across the area

	Frequency	Percent
Female	63	53.0
Male	56	47.0
Total	120	100.0

Figure 3.1: Gender Distribution of the Farmers across the area



According to the findings, females dominate peanut farming in the two sub-counties. Females make up 53 percent of farming households in the Nyakach and Karachuonyo areas, with the remaining (47 percent) being male. The findings show that, contrary to previously widely held beliefs about gender inequality in many African societies, women are heavily involved in agricultural activities; and those women and men frequently do not have equal access to the assets they require to pursue or sustain their livelihoods and those of their families.

C. Age of the respondents

Generational renewal in agriculture is required to maintain viable food production and improve the sector's competitiveness. Young farmers are required to take over from older farmers, as well as to invest in and modernise their agricultural holdings. However, in areas where good agricultural land is scarce, they rely on land transfers from existing farms. If their farms are to become more modern and competitive, they will also require assistance with initial investments, loan access, business advice, and training. The survey sought to determine the age of farmers involved in the peanut sub-sector for the reasons stated above. The results are shown in the table below.

Table 3.3: Age of the household head

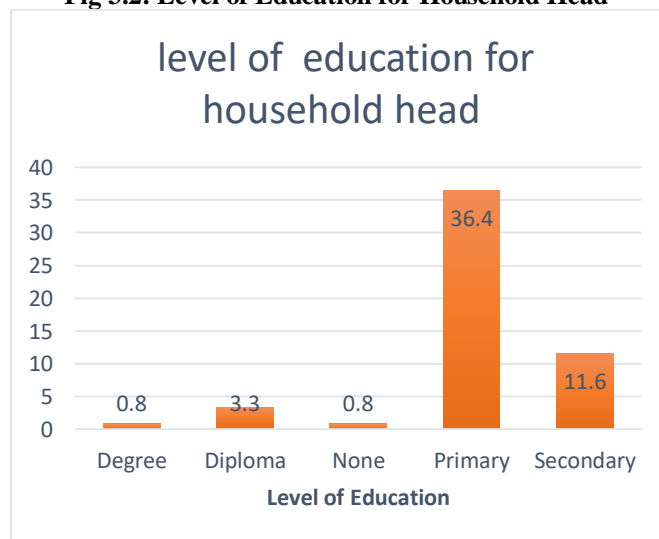
	Frequency	Percent
24-29	3	2.5
30-35	19	15.7
36-40	16	13.2
41-45	12	9.9
46-50	23	19.0
51-55	19	15.7
56-60	9	7.4
above 60	18	15.7
Total	120	100.0

A larger proportion of peanut farmers are between the ages of 46 and 50, accounting for 19% of the total sampled population. Farmers aged 51–55 and over 60 account for 15.7 percent, 13.2 percent of farmers aged 36–40, and 7.4 percent of farmers aged 56–60. Farmers aged 24–29 make up only 2.4 percent of the population sampled. In general, the farming population in the two sub-counties is ageing rapidly. There are only three farmers for every farm owner under the age of 30. This is a concerning trend because many young people do not work in agriculture.

D. Level of education

Extension delivery studies have shown that the relationship between farmer education and productivity is positive, continuous, and significant over time. A similar relationship exists between education level and other agricultural inputs. As a result, education is an important factor in understanding farm dynamics because it influences the level of participation, communication, and implementation of technologies delivered through extension or self-learnt agricultural techniques. The survey results in relation to the educational level of the household head are as follows:

Fig 3.2: Level of Education for Household Head



The majority of the farmers sampled have only a primary level of education (36.4 percent). In both regions, those with formal education account for 4.1 percent, while those with at least secondary education account for 11.6 percent.

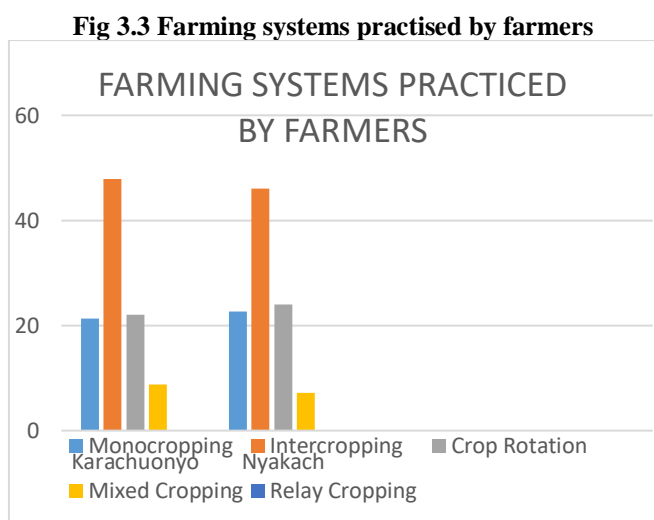
E. Land ownership holding sizes and allocation to peanuts

Land and labour are the two most important factors of production for Kenyan smallholder farmers. As shown below, land ownership in Nyakach and Karachuonyo is primarily inherited from family members among both male-headed and female-headed households. The size of land owned by farmers in these two areas varies by household. The proportion of land dedicated to peanut farming was of particular interest in this survey. It is difficult to distinguish land sizes dedicated to the cultivation of different crops, such as peanuts. This is because, in most cases, this crop is not grown in a pure stand. The table below summarises the amount of land dedicated to peanut farming in the two regions.

Table 3.4: Land area under peanut

	Frequency	Percent
Less than 1 acre	116	96.7
1.5 acres to 2 acres	3	2.5
More than 2.5 acres	1	.8
Total	120	100.0

According to the findings, 96.7 percent of respondents devote less than one acre of land to peanut production; 2.5 percent devote 1.5 to 2 acres of land to peanut production; and only 0.8 percent devote more than 2 acres to peanut production. This suggests that land is a problem in this area, or that peanut production has not received the special attention it deserves or requires for maximum production in the region.



The majority of farmers in both regions intercropped peanuts with other crops, while the remainder practised both mono-cropping and mixed cropping systems. In the Karachuonyo region, 47.9 percent of farmers practise intercropping, 21.3 percent practise mono-cropping, 22% practise crop rotation, and 8.8 percent practise mixed cropping, whereas 46.1 percent practise intercropping, 22.7 percent practise mono-

cropping, 24 percent practise crop rotation, and 7.2 percent practise mixed cropping.

➤ *Use of fertilisers by farmers in Peanut production*

Table 3.5: Use of fertilisers by farmers in Peanut production

Type of fertiliser	Karachuonyo	Nyakach
Organic	1%	2%
Inorganic (Manure)	10%	7%
Both	11%	9%
None	89%	91%
Total	100	100

The majority of farmers in Karachuonyo (89%) and Nyakach (84%) do not use any type of fertiliser in their peanut production. On their farms, approximately 11% and 26% of Karachuonyo and Nyakach, respectively, use homemade manure.

F. Type and sources of peanut seed used by smallholder farmers

According to the findings, recycled peanut seeds were used by more than 90% of the smallholder farmers who participated in the study. Only 2% of people have ever used certified seeds. Recycling of seeds has been blamed for low productivity, particularly when done repeatedly, as is the case when using local varieties, or even when certified peanut seeds are recycled more than three times, resulting in a low yield due to viability loss.

Table 3.6: Type of peanut seeds used by the smallholder farmers

Type of seed used	Nyakach	Karachuonyo
Recycled	58	59
	96%	98%
Certified	2	1
	4%	2%
Total	60 (100%)	60 (100%)

G. Sources of seeds

Proper seeds are required for maximum production in any economy's agricultural sector. The majority of smallholders in Sub-Saharan Africa use traditional or uncertified seeds, resulting in very low yields. The table below lists the groundnut seed suppliers in the Nyakach and Karachuonyo sub-counties.

Table 3.7: Sources of seeds

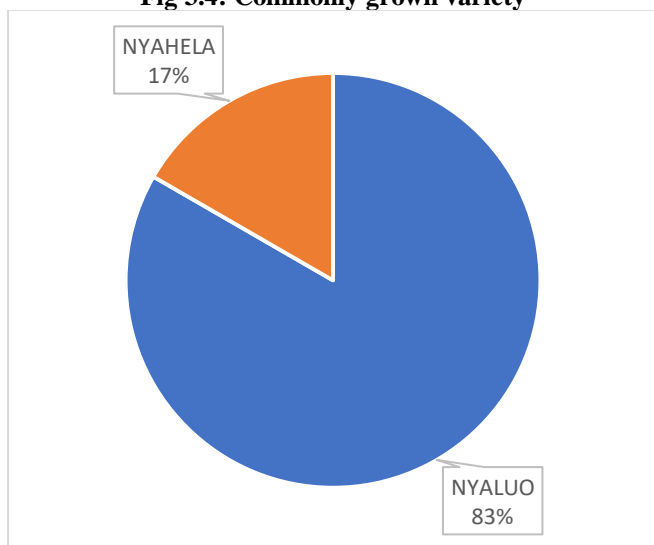
Source of seeds	Frequency	Percent
Ordinary retail shop	14	5.1%
Previous own harvest	96	34.9%
Government subsidy	1	.4%
Relatives/neighbours	67	24.4%
Local market	97	35.3%
Total	275	100.0%

According to the findings, 35.3 percent of respondents get their seeds from local markets from retailers; 34.9 percent use the previous year's harvest as seeds for the current season; 24.4 percent get their seeds from relatives and neighbours; 5.1 percent get their seeds from regular retail shops; and only 0.4 percent get their seeds from the government subsidy. According to the findings, the majority of smallholder farmers do not use certified seeds in their farms, which results in pest and disease attack, low production, and poor quality, resulting in market rejection and food insecurity.

H. Commonly grown variety

According to the findings, the most commonly grown peanut variety in these two regions is Nyaluo (medium brown seed), which accounts for 83% of the total, and Nyahela, which accounts for 17%. Farmers claim that nyaluo performs better in these areas than nyahela (small and large red variety).

Fig 3.4: Commonly grown variety



Farmers in the two sub counties gave a variety of reasons for selecting the peanut varieties shown in the figure above. The main reason for selecting the peanut variety is its high yield potential. Other important factors include time to maturity, high market demand and price in comparison to other varieties, and suitability to the agro-ecological zone.

Table 3.8: Reasons for choice of peanut variety grown by smallholder farmers

Reasons for choice of peanut variety grown	Nyakach	Karachuonyo
Taste of the nut	20	18
Size of the nut	26	14
High Yield	69	74
Pest and disease resistance	16	42
Time to maturity	45	48
Fetch high price	58	57
Easy to market	35	41

I. Average peanuts yield for smallholder farmers

Table 3.9: Average peanuts yields for smallholder farmers (kg/ha)

Gender of HH-head	Average peanut harvested (kg/ha)
Male	250
Female	300

From the above table we can conclude that female headed households have obtained more yields than male headed households by an average of 25%.

J. Household decision making

A household's decision regarding which varieties to grow is usually jointly made among the children, male household head and female household head as shown in the table below:

Table 3.10: Household decision making

Sub-county	Member of the household involved in decision	% of the respondent
Nyakach	Children	2
	Male household head	54
	Female household head	43
Karachuonyo	Children	4
	Male household head	60
	Female household head	36

According to the findings, 54 percent of male household members in Nyakach sub-county make decisions about the variety to be grown, 43 percent of females do, and only 2 percent of children's input is permitted. In Karachuonyo, 60 percent of male household heads make decisions about peanut varieties, while females have a 36 percent chance of making such decisions. This demonstrates that in both regions, the male household head makes the majority of decisions regarding the variety to be grown.

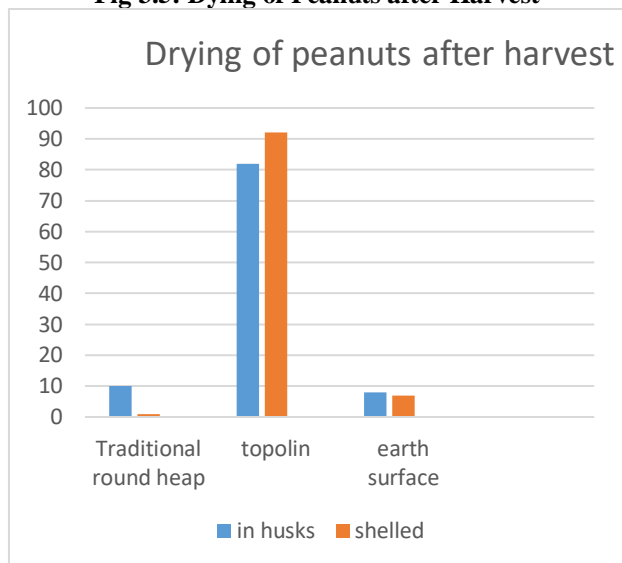
➤ **Peanut post-harvest handling**

This section presents the results on post-harvest handling activities performed by the farmers including drying, storage, shelling and grading of the peanuts

K. Drying of peanuts

After harvesting using the hand hoe, the nuts are then carried to be dried on the topolin or on the earth surfaces. These nuts are dried in husks before shelling to avoid losses which may be caused by breakages.

Fig 3.5: Drying of Peanuts after Harvest

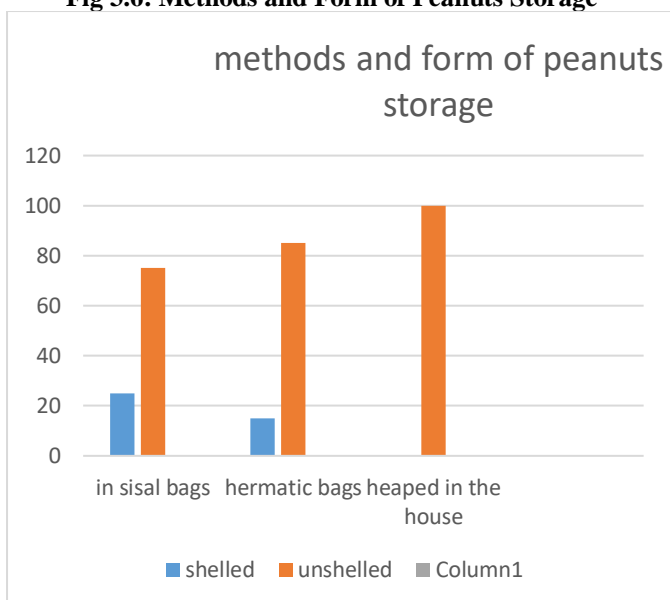


According to the graph above, the vast majority of smallholder farmers dry their nuts on top of the soil, with only a few using the traditional round heap and earth surface. Topolin is used by 82 percent of smallholders to dry their peanuts before shelling and 91 percent to dry their nuts after shelling.

L. Storage of peanuts by smallholder farmers

The figure below depicts the form and methods used by smallholders in Karachuonyo and Nyakach sub-counties to store peanuts. 55 percent of smallholders use improved sacks (hermetic bags), 35% use sisal bags, and 10% heap their nuts in the house.

Fig 3.6: Methods and Form of Peanuts Storage



According to the results, 75% and 25% of smallholder store their nuts in sisal bags in the form of unshelled and shelled respectively while 86% and 14% store them in hermetic bags in unshelled and shelled respectively and those who heaped their nuts in the house do not shell them.

M. Shelling and grading of peanuts

Shelling is another very vital activity of the post-harvest process performed by smallholder farmers. Methods used for shelling peanuts by smallholder farmers are shown in the table below.

Table 3.11: Methods of Shelling and Grading Peanuts

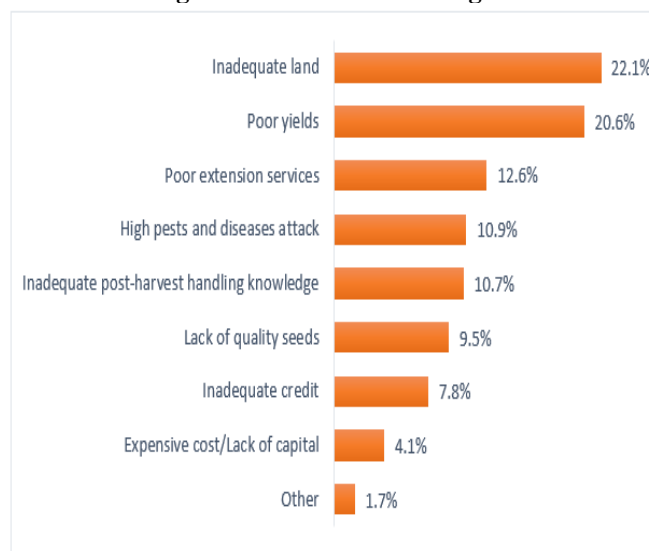
Methods of shelling	Percent
Manually	99
Using machine	1
Grading	
Yes	60
No	40

More than 90% of the households reported hand-shelling (manually) their peanuts. At the same time, 60% of farmers grade their peanuts before selling them in local markets, removing only the visibly rotten nuts. During market tour observation, it was discovered that farmers either grade or do not grade at all. The nuts sold or purchased by small traders confirmed that grading is done by light touch.

N. Production Challenges

The market's supply and demand dynamics are entirely dependent on the quality and level of production of any product. As a result, the survey sought information on production, recognising that these production challenges have an impact on the products available on the market. Poor soils and steep slopes resulting in low yield, poor extension services, pests and diseases, and other issues were among the challenges identified by farmers in the production of peanuts. The results are tabulated and discussed further below.

Fig 3.7: Production Challenges



Pests and diseases, poor extension services, low yield, and small land size are the most prominent production-related challenges faced by a significant number of farmers in both Karachuonyo and Nyakach sub-counties, according to the findings. These difficulties exist in both areas. Expensive labour, a lack of certified seeds, and a lack of credit are the two

regions' second most serious challenges, and they are also more prevalent.

O. Marketing challenges

Farmers were asked to describe the difficulties they had in marketing their products. Low and/or unstable prices, a lack of processing facilities in the area, a lack of information on current market conditions, unsuitable weighing containers (gorogoro), and a lack of storage were some of the challenges.

Table 3.12: Marketing challenges

Marketing challenges	Frequency	Percentage
Low prices/ unstable prices	40	33.3
Lack of market information	17	14.2
Middlemen	12	10
Lack of storage facility	4	3.3
Unreliable quantity measurement	31	25.8
Rejection due to quality	16	13.4
Total	120	100

According to the findings, 33.3 percent of the sampled respondents identified price volatility as their main marketing challenge for peanuts. Unreliable quantity measurement was mentioned by 25.8 percent of respondents. 14.2 percent cited a lack of knowledge about current market conditions. According to the above table, 13.4 percent of respondents believed that rejection was due to the quality of their nuts, while only 3.3 percent said it was due to a lack of storage.

P. Price Determinants

A variety of market forces can alter the current or expected balance of supply and demand, influencing the general price level of an agricultural commodity. Many of these forces originate in domestic food, feed, and industrial-use markets, and include consumer preferences and changing end-user needs; factors influencing production processes include, but are not limited to, weather; input costs, labour costs, pests, diseases; relative prices of crops that can substitute in either production or consumption; government policies; and factors influencing storage and transportation. International market conditions are also important, depending on how open a country's domestic market is to international competition and how much trade it engages in. The survey selected a few of these price-determining factors and asked respondents to calculate the price at which they sell their produce.

Table 3.13: Price Determinant

Price Determinant	Percent
Cost of production	69%
Prevailing market price	50%
Grade/Quality	30%
Type of the groundnuts	47%
Household needs	70%

According to the findings, 70% of respondents indicated that household needs were the most important factor in determining the price of their groundnuts; 69 percent cited cost of production; 50% mentioned current market prices; and 47%

mentioned the type of groundnut. Price is determined by grade/quality, according to 30% of respondents.

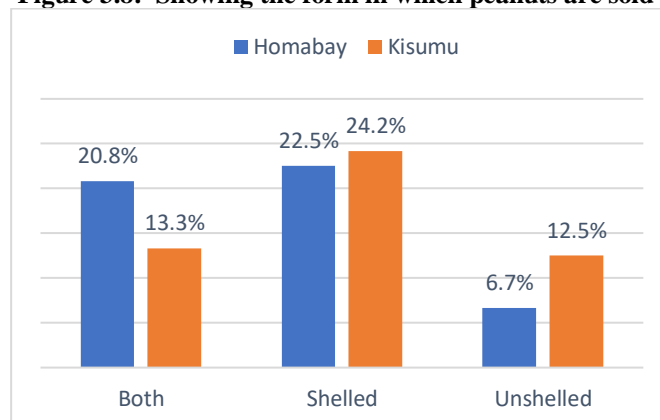
Q. Form in which peanuts are sold

Any product that has value and provides an appropriate return must always have value added before it is released to the market. According to the study, the majority of respondents do not add any value to their produce, resulting in very low market prices. The outcomes are shown in the table below.

Table 3.14: Form in which groundnuts are sold

		Both	Shelled	Un-shelled	Total
Karachuonyo	No.	25	27	8	60
	%	61.0%	48.2%	34.8%	50.0%
	%	20.8%	22.5%	6.7%	50.0%
Nyakach	No.	16	29	15	60
	%	39.0%	51.8%	65.2%	50.0%
	% of Total	13.3%	24.2%	12.5%	50.0%

Figure 3.8: Showing the form in which peanuts are sold



R. Value addition Initiatives

In agriculture, value-addition entails transforming a raw agricultural product into something new through packaging, processing, cooling, drying, extracting, or any other process that distinguishes the product from the original raw commodity. The entire process is designed to produce more desirable market characteristics while also providing additional benefits such as higher income, increased shelf life, and brand creation. The survey inquest was conducted to better understand the ongoing value-addition activities within the two sub-counties, as well as the form in which farmers sell their groundnuts. The outcomes are as follows:

Table 3.15: Form in which peanuts are sold

Form in which peanuts are sold	Percentage
Roasted nuts	5%
Peanut butter	1%
Boiled nuts	7%
Groundnut flour	0%
Raw nuts shelled	57%
Raw nuts unshelled	30%

According to the findings, 87 percent of farmers sell their raw peanuts. This indicates that they either sell them shelled or unshelled with no added value. This confirms the fact that groundnut prices in the areas are low. Only a meagre 13 percent attempted to add value to their nuts before selling them.

S. Factors influencing smallholders' decision to sell their peanuts

More than 80% of respondents across all study areas stated that the prices at which they sell peanuts are set by the buyers. Table 3.16 lists the factors that smallholder farmers consider before accepting or rejecting a buyer's offer. Before accepting or rejecting the buyer's offer, the main consideration is the cost of production. Then comes the household needs.

Table 3.16: Factors influencing smallholders' decision to sell their peanuts (%)

Factors influencing smallholders' decision to sell their peanuts	Nyakach (N=60)	Karachuonyo (N=60)
Cost of production	59	67
Household needs	48	56
Market demand	5	7
Planting season	2	3

T. Other services available to smallholder farmers in the peanut value chain

Availability of other services that help in the running of the peanut value chain such as extension services and credit availability were also considered in this study. Smallholder farmers' access to extension is presented in the table 3.17 below

Table 3.17: Access to extension services by smallholder peanut farmers

		No	Yes	Total
Karachuonyo	No	57	3	60
	%	50%	50%	50.0%
	% of Total	47.5%	2.5%	50.0%
Nyakach	No	55	5	60
	%	50%	50%	50.0%
	% of Total	45.8%	4.2%	50.0%
Total (%)		93.3%	6.7%	100%

A total of 93.3% of the smallholder farmers in the study area have no access to extension services on peanut production. Respondents mentioned that they use their indigenous knowledge and consultation from the neighbours as a source of extension services. This is an indicator as to why low yield in the area as most of the smallholder farmers have no relevant knowledge plus lack of capacity building to enhance peanut production in the study areas.

Table 3.18: access to credit by peanut smallholder farmers

Sub-county	No		Yes	
Karachuonyo	41	34.2%	19	15.8%
Nyakach	44	36.7%	16	13.3%
Total	85	70.9%	35	29.1%

70.9 percent of respondents do not have access to credit. Only 29.1 percent obtained credit from self-help groups and NGOs operating in the study areas. Furthermore, the smallholder farmers who were able to obtain credit did so in both cash and farm inputs. They obtained cash from their self-help groups, while farm inputs were obtained from NGOs working in the study areas.

U. Knowledge on aflatoxin in peanuts and its effect on human health

The majority of smallholder farmers are unaware of the existence of aflatoxin. Even though some of them stated that their groundnuts were occasionally rotten or contaminated with aflatoxin in the farm and storage areas, they were unable to link this to aflatoxin. When asked about the effect of aflatoxin on human health, the majority of respondents said they had no idea what it did to the human body when consumed. This demonstrates that farmers are unaware of how to manage their produce both on and off the farm in order to control the effect of aflatoxin in their peanuts.

Table 3.19: Knowledge on aflatoxin in peanuts and its effect on human health

		No	Yes	Total
Karachuonyo	No.	52	8	60
	%	50.0%	50.0%	50.0%
	% of Total	43.3%	6.7%	50.0%
Nyakach	No.	50	10	60
	%	50.0%	50.0%	50.0%
	% of Total	41.7%	8.3%	50.0%

Aflatoxin contamination occurs during the pre- and post-harvest production phases, making its management critical at all stages. Table 3.19 reveals that smallholder farmers have little knowledge of aflatoxin contamination. Only 6.7 percent of smallholders in Karachuonyo and 8.3 percent of smallholders in Nyakach reported being aware of aflatoxin and engaging in farming practises such as digging terraces to reduce water stress in farms and proper drying of produce using appropriate surfaces. Furthermore, most farmers store peanuts in polypropylene sacks in the house, while others hang them in sisal backs to avoid contact with water and rodents such as mice. Those who cannot afford these sacks, on the other hand, pile the peanuts in the house, exposing them to moisture and promoting aflatoxin contamination.

➤ *Peanut in the Kenya economy*

Smallholder agriculture is one of the food crops in Kenyan smallholder agriculture, accounting for approximately 10% of agricultural cash income. The seeds are composed of 25% digestible protein and 50% edible oil. The surplus is marketed, providing the smallholder farmers with much-

needed cash income. As a leguminous crop, peanuts enrich the soil with nitrogen via biological nitrogen fixation and are thus useful in crop rotations and soil improvement. Peanut waste can also be used as animal feed and fuel.

➤ *Current Peanut Production constraints, challenges and opportunities*

Some of the identified constraints in peanut production include the cost of credit and inputs, unattractive prices, crop diseases, and drought. The competition from other cash crops and staple food crops such as cassava, beans, maize, and sweet potatoes is a constraint. There is also a scarcity of improved seed and poor crop management practises. Many farmers in these two study areas grow only traditional varieties, most of which have low yield potential. However, improved seeds are difficult to find in grocery stores, and management practises taught by extension workers are not readily available to the majority of smallholders in these areas, resulting in low peanut yield.

Peanut productivity is declining due to a number of constraints faced by smallholder farmers. These constraints include the use of low-yielding materials, declining soil fertility as a result of poor crop management and low nutrient application, insufficient support services such as extension services and credit facilities, pests and diseases, and high labour costs in the region. Peanut yields are low due to unreliable rainfall, often with midseason drought. Even though the two sites are not far from Lake Victoria, the planting season is prone to drought, and there is no irrigated land in the area. Because of the small, fragmented nature of land holdings, the average area planted to peanuts cannot be increased.

Peanut production is labour intensive, and extra help is needed, particularly for planting, stripping, shelling, and even grading. According to the findings, stripping and shelling were the most labour-intensive activities in peanut production, accounting for approximately 47 percent of total production costs. Manual labour and oxen technologies are used in 75% of farm operations.

Another major challenge is the lack of quality seed due to the fact that seed supply is seasonal and production is dependent on market prices. Most privately owned businesses do not readily invest in seed production for a variety of reasons, including a low multiplication effect and the recycling of seed planted by farmers. Smallholder farmers primarily produce seeds by recycling their previous harvest. When a crisis strikes, farmers frequently sell or consume what they would have saved as seed.

Farmers reported that one of the most significant marketing constraints they faced was low producer prices. Peanut prices typically rise near planting seasons, when farmers can obtain a higher price than during harvesting. As a result, most smallholders focus more on peanut storage before the selling season than on produce management, resulting in losses due to aflatoxin and rodents. Other issues raised included a lack of market information, difficulty accessing credit for value addition, inadequate support and extension services, and a

lack of marketing expertise. Access to markets was also identified as a problem in rural areas due to inadequate systems.

➤ *Other challenges include:*

- i. Incidences of striga (hayongo) affecting cereals
- ii. Cross border trade which has led to Kisumu and Homabay farmers being heavily reliant on produce from Uganda and Tanzania.
- iii. Lack of extension services/ lack of knowledge on crop husbandry
- iv. Incidences of Hailstones
- v. Birds and other wild animals like squirrel destroying crops
- vi. Lack of milling equipment for groundnuts and other cereals
- vii. Inadequate technical knowledge by farmers

IV. SUMMARY

This survey focused on three areas: a review of existing literature to better understand the peanut sub-sector in Kenya; a survey of peanut-growing households to understand production and marketing dynamics and specifically to appreciate the challenges they face; constraints encountered in promoting the peanut sub-sector through modern methods, institutions, and policy interventions; and a small sample of traders was also traced to understand market dynamics in Kenya.

Although peanuts are not among Kenya's top agricultural commodities exported, they play an important role in the farming community because they provide food and nutrition security as well as cash income. Its production and management are also very accommodating, allowing participation by both smallholder and large-scale farmers.

➤ *Salient issues from the study*

1. Peanut prices are determined in an awkward manner in Nyakach and Karachuonyo, which is undoubtedly discouraging for increased peanut production. Farmers are at the mercy of middlemen and local buyers from different parts of the country who comb the villages before, during, and after harvest to negotiate prices with farmers at the farm gate because there are insufficient market information systems. Farmers surveyed by the team revealed that 39% of the peanuts were sold while still in the field. These prices are typically very volatile, reflecting the difference between harvesting and planting seasons by up to 90% or more.
2. Farmers are not seriously applying crop management practices that would have enabled them to improve yields.
3. We also observed that there is no deliberate anti-peanut policy, nor is there a policy encouraging the promotion of peanuts. However, it appears that peanuts are a neglected crop in Kenya, as those interviewed could not recall the last time agricultural extension officers visited them to educate them on peanut production. As a result, it appears that opportunities exist to expand the role of peanuts in the Kenyan economy, thereby contributing to food security and increased incomes for smallholder farmers.
4. Due to high population, there is stiff competition between peanut production and other food crops such as maize,

beans, cassava and sweet potatoes which locals prefer because they can both be used as food crops and be sold when need arises. These other crops according to the respondents have high yield due to the extension services available in the area offered by certain NGOs such a One Acre Fund.

V. RECOMMENDATIONS

The following recommendations are based on the baseline survey involving interviews of individual farm households as well as peanut traders. In providing these recommendations, some thought is also given in ensuring that they are practicable as much as possible and addressing the who and how questions.

- i. Peanut seed availability: In these two areas, there are no peanut seed banks or seed projects. As a result, there is an urgent need for such facilities in these areas or nearby to increase the use of certified seeds, thereby increasing farm yield. The survey results have yet to be published, but farmers interviewed indicated that the availability of certified seeds would be beneficial to peanut production in the area. The challenge is to ensure that seeds are always available. This can be accomplished by implementing specific sustainability measures throughout the region. To increase the production of high-quality seed and ensure farmers' access to improved-variety seed, efforts must be made to empower farmers to participate more profitably in peanut production and the entire value chain. The target farmers must be introduced to improved varieties and agronomic practises through the use of lead/model farms as field schools for farmer training.
- ii. Peanut policy: The government does not have a separate policy for the peanut crop. However, this does not prevent both the national and county governments from encouraging more quality control and creating an enabling environment for groundnut marketing and trade, including encouraging domestic industries to process groundnuts.
- iii. Linking farmers to markets: County governments, in collaboration with strategic partners, must make a concerted effort to connect farmers to markets by improving the existing agricultural market information system. This enhancement is not limited to peanuts but will benefit all commodities. In order to do so, a framework for identifying and describing farmers is required, so that their varying information needs can be mapped. This can be accomplished at the very least by facilitating the formation of farmer groups with varying characteristics and functions. These organisations would aid in increasing bargaining power and lowering transaction costs for commodities produced by farmers, including peanuts. Regular radio programmes, the printing and distribution of price information leaflets that provide some price guides both temporally and spatially, as well as industry publishing requirements in terms of quantities and prices offered, are required. Peanut innovation platforms and associated forums will aid in bringing sub-sector stakeholders together to provide forums for discussing challenges, constraints, and opportunities, as well as sharing information on how

to overcome them. This will open up opportunities for improved public–private–farmer (PPF) partnerships, as well as the peanut value chain.

- iv. Peanut processing technology: This is still a barrier to accelerated peanut production and marketing. Farmers require assistance in quality peanut processing as well as information on where and what prices are charged for processing peanuts in order to meet the various demands. The majority of farmers in these areas are unaware of aflatoxin and need to be educated on how to manage their harvest. The region's future competitiveness will be determined not by whether it can produce more peanuts, but by whether the quality of the peanuts produced can compete favourably in the global market and command high prices. Hand processing of peanuts is time-consuming, especially as the opportunity cost of labour continues to rise. As a result, county governments and private companies must seize this opportunity to improve peanut processing technology, particularly shelling and grading.
 - v. Improved farm management practises: The use of certified seed is not an impediment to increased peanut productivity. Certified seed must be used in conjunction with improved farm management practises and appropriate extension services. Baseline survey results from across the region consistently show that gains from improved farm management practises and extension services outweigh those from certification. The extension policy should emphasise the importance of certified seeds as well as the importance of timely planting, moisture management, timely weeding, and appropriate postharvest practises.
 - vi. Value-added Initiatives: Farmers must be trained in the various products that can be made from their harvest. The greatest challenge facing the farmers in the area has been a lack of value addition. According to the findings, there is little value addition to peanuts in the area where the farmers' only product is boiled peanuts.
- ❖ *How to achieve this*
- Training producers on better post-harvest handling of produce to enhance the quality of their produce.
 - Training on multiple processing alternatives of produce.
 - Creating village groups 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 the current technologies.
 - Educating the producers on the potential uses of the by-product materials from processed raw material.

VI. CONCLUSION

It is important to note that peanuts can do well even where the rainfall may not be adequate enough. Peanuts are thus a good to be considered when trying to enhance resilience, agricultural productivity, food security and economic welfare of smallholder farmers along the value chain.

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