FACTORS INFLUENCING GROUNDNUT(*Arachis hypogea*) PRODUCTION BY SMALL HOLDER FARMERS IN BUWUNGA SUB COUNTY, BUGIRI DISTRICT

BY

WANJALA WILLIAM

BU/UP/2021/1783

A RESEARCH REPPORT PRESENTED TO THE FACULTY OF SCIENCE AND EDUCATION,DEPARTMENT OF AGRICULTURELE IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELORS OF SCIENCE EDUCATION, AGRICULTURE DOUBLE MAIN OF BUSITEMA UNIVERSITY

SEPTEMBER, 2024

DECLARATION

I Wanjala William, hereby declare that this research proposal for a topic *"**Factors influencing ground nut production by small holder farmers in Buwunga sub county, Bugiri District**"*. A case study in Buwunga village, Bugiri district is my original work and has not been presented for a degree award in any other institution of higher learning.

SIGN: ..... DATE: 06, Sept, 2024

WANJALA WILLIAM

STUDENT

APPROVAL:

This reseaserch report on *"**Factors influencing ground nut production by small holder farmers in Buwunga sub county, Bugiri District***, has been submitted for examination with the approval of the following supervisor

SIGNATURE:..... DATE : 6/9/2024

DR JOHN JAMES OKIROR

(SUPERVISOR)

ACKNOWLEDGEMENT

I take this magnificent opportunity to give great thanks to the Almighty God for enabling me make this research a reality.

I recognize and cherish my supervisor for this research, Dr. John James Okiror whose help through guidance, advice and kindness propelled the success of this research as well as the whole Agriculture department of Busitema University, Nagongera campus.

Exceptional thanks go to my parents (Ms. Misanya Ennide and Mr. Kalinaki James) who without second thought sponsored my whole course for this Bachelor's Degree. May the Almighty bless you.

I also appreciate the board of Greenfield High School,Iganga High School and everyone that played part in my education career whether directly or indirectly. I specially thank Mr. Baganzi Paul and Mr.Kirya Tomasi who shaped my education through secondary level.

I express sincere gratitude to all the people that were involved in this study either as respondents or helped in the data collection process at any point of this research.

DEDICATION

This is dedicated to my beloved parents (Ms. Misanya Ennide and Mr. Kalinaki James), beloved siblings, and my dearest friends for their unconditional support, love, care and guidance up to date, as well as my course-mates for their support in the different ways which has seen me make it through this course. I can only pray to the lord to bless you abundantly.

LIST OF TABLES AND FIGURES

ABSTRACT

This is a report of a study which was carried out during mid June to early July 2024 to assess factors influencing ground nut production by small holder farmers in Buwunga sub county, Bugiri District.The specific objectives were “To derive solutions to the limitations faced by most smallholder farmers engaging in groundnut production,to assess how groundnut production has contributed on the livelihoods of smallholder farmers and to find out the different ways in which the smallholder farmers have been using the local farming techniques in groundnut production.”Data were collected using research questionnaires from 50 respondents .The findings showed that many farmers are relatively new to groundnut farming, which could impact their productivity and efficiency.Male farmers preferred Igola-1 variety while women farmers preferred to grow the Virginia variety. Therefore, it was recommended that extension services for groundnut farmers should be targeted to the different needs of man and women farmers

Table of Contents

CHAPTER ONE

INTRODUCTION

1.1 Background

Groundnut (*Arachis hypogea)* a crop rich in nutrients originated in South America and spread to the rest of the World. It is primarily considered as an oil crop in most developing countries which is an important source of proteins and also serves as fodder for livestock industry. China, India, Argentina and Nigeria are the largest groundnut producers in the world .Ground nut (*Arachis hypogea*) is the second most widely grown food legume in Uganda after beans .The most common groundnut varieties grown in Uganda include Igola-1 ,Virginia type ,Roxo 531(red seed)Long Manyema type ,Red beauty (red seeded) ,Valencia type ,Serere red and Serenut 1-14. Currently average yield of groundnuts at farm level is about 800 kg ha^{-1}, but up to 3,000 kg ha^{-1} can be achieved(Meena et *al*., 2014). The most important constraints to its production are pests and diseases. Integrated pest management (IPM) technologies have been developed and demonstrated to farmers in Bugiri district. However, many farmers in the district have not adopted these technologies, for reasons not well known. The study was done to establish factors affecting groundnut production of smallholder farmers.

Groundnut (Arachis hypogaea L.), a species in the family Leguminosae, is an annual legume. It is known by many local names, including peanut, earthnut, monkey-nut and goobers. The groundnut originated in Latin America and was introduced to African continent from Brazil by the Portuguese in the 16th century . The crop is mainly grown for oilseed, food, and animal feed. It is the world's 13th most important food crop, 4th most important source of edible oil and 3rd most important source of vegetable protein(Taru, kyaga, & Mshelia, 2010).

Groundnut seeds, known as kernels, contain 40-50% fats, 20-50% protein and 10-20 % carbohydrates(Johansen & Sorensen, 2004). They are a nutritional source of vitamin E and other minerals for human health including niacin, folacin, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine and potassium. Groundnut is useful in the treatment of hemophilia, can cure stomatitis and prevent diarrhea, and is beneficial for pregnant women, nursing mothers and growing children. The kernels can be eaten raw, roasted or boiled and the groundnut vines are used as fodder for

cattle. The crop can be used for producing industrial materials, such as oil-cakes and fertilizer. Extracted oil from the kernel is used as culinary oil and other crop extracts are used as animal feeds. Almost every part of the crop is used in some way. The multiple uses of the groundnut plant make it an important food and cash crop for domestic consumption and export in many developing and developed countries.

Globally, 50% of total groundnut production is used for oil extraction, 37% for confectionery use and 12% for seed.

Groundnut is grown in nearly 100 countries. Globally, it is grown on almost 23.95 million hectares with total production of 36.45 million tons and an average yield of 1,520 kg/acre in 2009(Asekenye, 2012). China, India, Indonesia, Nigeria, Senegal, Sudan, USA and Myanmar are the major groundnut growing countries(Idi, Luka, Dauda, & Isa, 2019). Developing countries in Asia, Africa and South America account for over 97% of world groundnut cultivation and 95% of total production.

Production is concentrated in Asia with 50% of global cultivation and 64% of global production. In Africa, groundnut production accounts for 46% of global cultivation and 28% of global production.

Between 2000 and 2009, the annual global production increased marginally by 0.4%, the area cultivated by 0.3% and yield by 0.1%. In 2011, Uganda accounted for 2.9% of the global area for groundnut cultivation and produced 1.7% of global production. The most important growing regions in Uganda include; Northern and Eastern Uganda as well as spreading to Western and Central regions as well. While groundnut production is considered a profitable venture, the total world production of groundnut with shells has not increased much. Global production increased from 35,880,941 tonnes in 2001 to 38,614,053 tonnes in 2011. Groundnut in African countries, such as Uganda, is grown at a small-scale level and with less application of modern inputs(Taru et al., 2010). For example, during the previous decade, groundnut production in Uganda has not exceeded 8% of the world output.

According to FAOST(Asekenye, 2012), groundnut production in Africa in 2011 was 9,435,493 tonnes with Uganda producing 651,397 tonnes. Yields in Uganda are also lower compared with other African countries. For example, in 2011, groundnut yield in shell was 964.7 kg/acre in Tanzania compared with 1,264.6 kg/acre in Nigeria and 1,724 kg/acre in Guinea-Bissau(Asekenye, 2012). Hitherto, the annual yield per hectare in Uganda has not increased substantially. However, factors associated with low groundnut yields in Uganda are neither known nor well documented.

Bugiri District in Eastern Uganda was selected for this study because it is one of the major groundnut producing areas in the country. In addition, unlike other producing regions where groundnut is considered as a food crop, groundnut in Buwunga is mainly regarded as a cash crop. It is the most important cash crop to household income after maize .Other food crops produced in the region include maize, rice, sorghum, cassava and beans.

1.2 Problem Statement

Groundnut production in Bugiri District is primarily done by smallholder farmers, who face challenges in accessing markets, inputs, and credit (Mukasa et al., 2017).

The district's groundnut yields are below the national average, with yields of 1.2 tons per hectare (UBOS, 2020). The specific factors influencing groundnut production by smallholder farmers in Buwunga Sub County, Bugiri District are not well understood, including; the impact of climate change, soil fertility, and pests on groundnut production in the district (MAAIF, 2019).

This study investigated the factors influencing groundnut production by smallholder farmers in Buwunga Sub County, Bugiri District, with a focus on climate change, soil fertility, pests, and diseases. The study identified the specific challenges faced by smallholder farmers in the area and provide recommendations for improving groundnut production and productivity.

1.3 Objectives

1.3.1 General objective

The general objective of this study was to find out the factors influencing groundnut production by smallholder farmers in Buwunga sub county

Specific objectives

The specific objectives were:

1. To determine factors limiting ground nut production among smallholder groundnut farmers in Buwunga sub county.
2. To assess the socioeconomic benefits of groundnut production on the livelihoods of smallholder farmers.
3. To find out the coping methods used by smallholder farmers to overcome challenges in groundnut production.

1.4 Significance of the study

The study of the factors limiting ground nut production of small holder farmers is significant for several reasons which among others include;

Most small holder farmers are engaging in groundnut production but still the yields are too low to meet their expectations, the research was conducted to assess the pressing issues on farmers, how they're adopting and also suggest some of the solutions they would use to improve on the situation

Groundnuts are an essential source of nutrition and income for many smallholder farmers. Understanding and addressing the factors limiting their production can help improve food security for these communities.

Grou ndnuts are a cash crop for many smallholder farmers. By identifying and overcoming the constraints on their production, farmers can increase their yields and income

Groundnut production can be affected by various factors such as soil health, climate change, pests, and diseases. By studying the limiting factors, solutions can be developed to ensure the sustainability of groundnut farming practices.

Findings from this study can inform policymakers about the challenges faced by smallholder farmers in groundnut production. This can lead to the development of targeted policies and interventions to support these farmers.

Investigating the factors limiting groundnut production among smallholder farmers can contribute to the existing knowledge base in agriculture. It can help researchers and practitioners identify areas for further research and potential innovations in farming practices.

Overall, understanding the factors limiting groundnut production for smallholder farmers is crucial for improving agricultural productivity, ensuring food security, and enhancing the livelihoods of farming communities.

1.5 Scope of the study

This research will be conducted in Buwunga subcounty, Bugiri district in the Eastern region 17km off Kampala-Mbale Road in Uganda, East Africa.

This will involve selecting samples of individuals in different age groups and observing and analyzing their awareness and experience concerning factors limiting ground nut production as a serious pressing issue among small holder farmers in agriculture. This will involve finding out how the different individuals handle factors affecting ground nut production cases and various control steps they take in case any.

To conduct a thorough and comprehensive study on the factors affecting ground nut production, collection of data from different sources will be needed such as scientific journals, environmental reports and academic publications. There may also be need to conduct field surveys and gather information on the adoptive measures among different individuals.

For the factors limiting ground nut production among small holder farmers, the researcher may explore different methods such as use of improved ground nut species, fertilizer application, educating individuals and communities about the formal ways of gaining capital and also transitioning of renewable energy sources such as solar, wind and hydroelectricity. The effectiveness of these measures may vary for different individuals depending on the severity and cause.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The review of literature was done according to the study objectives as follows: To determine factors limiting ground nut production among smallholder groundnut farmers in Buwunga sub county.To assess the socioeconomic benefits of groundnut production on the livelihoods of smallholder farmers.To find out the coping methods used by smallholder farmers to overcome challenges in groundnut production.

Overview of groundnut production in Uganda;factors influencing groundnut production in Bugiri district ;socioeconomic benefits of groundnut production;local knowledge and local farming techniques of most rural farmers.

2.2 Theoretical literature review

Over the past ten years, poverty has remained high, particularly in Eastern Uganda (about 30% of the total population) . It is estimated that more than 50% of the people living in Eastern Uganda are either directly or indirectly employed in agriculture. Therefore, investing in agriculture could contribute significantly to reduce poverty here. Although agriculture in the past ten years has been challenged by increasing drought, market shifts, and biotic and abiotic stresses, experience indicate that improved varieties can overcome these challenges, including for the case of groundnut(Katundu & Mhina, 2014).

Groundnut is one of the most important annual crops in the world, rich in food nutrients with about 20% protein, 40% oil, minerals, and vitamins. It is estimated that, at the farm level, at least 23% of households in developing countries are employed in groundnut production. In some developing countries, groundnut contributes to about 25 to 60% of the small-scale farmer's income. In Uganda, groundnut is one of the main annual crops(Akpo, Muricho, Opie, Ojiewo, & Varshney, 2020) . It can be produced in all areas with an altitude below 1500 m and with alluvial soils. These areas are either semi-arid or arid and mostly challenged by drought, food insecurity, and poverty. The production cost of groundnut is lower than that of other annual

crops, such as rice. The total production cost of groundnut ranges from 500,000 Ugs/ha to 1,000,000 Ugs/ha compared to rice, which ranges from 2,500,000 Ugs/ha to 3,250,000 Ugs/ha (USD 1 equals about 3600 Ugs). In recent times, the country increasingly has had to cope with market shifts, drought and other biotic and abiotic stresses(Akpo et al., 2020)

Even though the new varieties were available, it was reported that about 81% of the groundnut producers still used old varieties, which are less resistant to drought and diseases (e.g., foliar disease), have low productivity and low market value. The price for certified seed varied from 5000 to 6380Ugsh/kg. It is understood that improved varieties will create long-term benefits. The groundnut market is expanding in Uganda, due to a rapid population growth rate of 3.1 per year, the multiple uses of groundnut, and exports of about 20,000 tons per year(Feder, Just, & Zilberman, 1985). Considering the promising demand forecast, it is important to understand the factors hindering farmers to use improved groundnut varieties. Unfortunately, recent literature about this subject is limited.

Research carried out on factors limiting ground nut production of small holder farmers in Buwunga subcounty,Bugiri district can be grouped into three broad categories(Ndjeunga et al., 2013). These categories are: (i) factors related to the characteristics of farmers, (ii) factors related to the characteristics and relative performance of the technology, and (iii) communication of the new technologies. The factors related to the characteristics of farmers include educational level, experience in the activity, age, gender, technology availability, farm size, and labor availability(Ndjeunga et al., 2013). The factors related to the characteristics and performance of the technology include the economic functions of the product and farmers' perceptions of the new technology. The complexity/simplicity of the new technology, relative advantage, trialability, and observability is also important. Likewise, effective communication channels able to transfer quality information on the technology and market accessibility play important roles.

Concerning social characteristics, evidence indicate that age of the farmer negatively affects the decision to adopt improved variety, while education, farming experience, and extension contact are positive contributors. However, the literature also reported age to positively affect the adoption of new technology. An analysis of the socio-economic determinants of adoption of improved groundnut varieties in Nigeria through the probit regression method found that adoption is largely explained

by age and education of household head, and household size. In Kwara State of Nigeria, a study conducted to identify factors which influence adoption, found that labour, age, education, farming experience, and sex significantly affected groundnut variety adoption(Isham, 2002). Other reported factors included knowledge of rice cultivation, availability of seed, existence of farmer groups, information availability about improved varieties from input dealers, extension officers, and through mobile phones.

Other studies indicated that group effects are important for individual decisions, and that, in the particular context of agricultural innovations, farmers share information and learn from each other. Individual adoption decisions depend on the choices of others in the same social groups. Since farmers anticipate that they will share information with others, they are expected to be more likely to adopt when they know many other adopters. One factor that has not received much attention in the literature is the time of the existence of a technology, which can influence adoption at scale in an area.

In Uganda, a study was conducted in Buwunga region to determine the factors limiting production of improved groundnut. It was found that limited extension services and labor affected production(Mesfin, Ahmed, & Abady, 2016). Another Ugandan study was conducted to analyse the gender yield gap between male and female farmers in groundnut production, computing the adoption rate by agro-ecological zones, age, and sex(Kalule Okello, Monyo, Michael, Jane, & Herbert Kefa, 2013).These studies do not adequately capture factors such as innovation motivation, time lag, communication channels and social characteristics. In general, the scope of these studies was narrow. To provide a more in-depth analysis of adoption, the present study will be carried out to identify a broad range of factors and their probability to influence decision making among a larger number of farmersusing the theory of diffusion

The findings could be useful to inform the implementation of new projects, the delivery of more effective extension services and the 2025 government vision of transforming the citizens to at least middle-income earners(Mugisha, Ogwal-O, Ekere, & Kkiyar, 2004). The study first identifies the improved groundnut varieties and their preferences among farmers in Uganda. Second, it determines the factors limiting ground nut production of small holder farmers. Third, it analyzes the key factors

influencing the adoption of improved and recently released varieties of groundnut among farmers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the Research method,area of study,target population, sampling criteria, research tools and instruments, data analysis, validity and reliability of the methods proposed ethical consideration in the study and limitation of the study are explained.

3.2 Area of Study

The field survey will be conducted in Buwunga subcounty, Bugiri District, involving a total of 50 local farmers with varying age groups. The research will be categorized into different age groups that is; A (Below 20), B (20-29), C (30-39), D (40-49), and E (50 and above). Samples of 10 people will be taken from each group and the overall factors limiting ground nut production among small holder farmers will be recorded based on visual signs.

3.3 Target Population

This study was conducted in Buwunga sub county,Bugiri district, Uganda. The sub county was selected randomly from the subcounties in Bugiri district because they are profound groundnut producers within the district.

3.4 Sample Selection

The population was based on groundnut farmers of the selected sub county in Bugiri district. Buwunga subcounty is the selected in groundnut production within the place.

3.5 Instrumentation

The instruments used in this study, were;

Questionnaire: A questionnaire was administered to collect quantitative data from the purposively selected groundnut farmers. The questionnaire comprised of questions that were designed to collect data on factors influencing groundnut production by smallholder farmers in Buwunga sub county,Bugiri districy.

3.6 Validity and reliability of instruments

Content validity: The questionnaire was reviewed by the supervisor to ensure the questions was relevant and appropriate for the study.

Pilot testing: Questionnaire was pilot tested with small groups of respondents to identify any potential issues with the questions and to ensure they are understandable and appropriate.

Data triangulation: The use of questionnaires will enhance the validity of the findings

To establish the validity of the instruments, the study administered questionnaires to the various respondents, computation was done by Microsoft excel including tables.

3.7 Data collection procedures

Before administering the questionnaire, head of each household will be informed about the aim of the study and asked for his/her consent to provide the necessary information for questions contained in the data collection tools. Both close and open-ended questions will be prepared to gather data about the adaptation strategies and the determinants of adaptation strategies of climate change from the perspectives of smallholder farmers(Anokwa, Hartung, Brunette, Borriello, & Lerer, 2009). The survey questionnaire will be administered with the support of my research supervisor. Each of the questions in the questionnaire will be discussed with the research supervisor before starting the field survey. This will give me the opportunity to help the respondents who cannot read and write.

3.8 Data Analysis

To address the stated objective, the study will apply a cross-sectional survey research design to guide the whole processes of this research i.e. from data collection to its analysis. This design has been used based on the nature of the research problem and the objective of this topic. In cross-sectional survey research design, mainly questionnaires and/or interview checklists will be applied to gather both quantitative and qualitative data at a single point in time (Darimont, Reimchen, Bryan, & Paquet, 2008). Both primary and secondary data sources will be used to address the objectives

of the study. The data collection tools will be household survey questionnaire, focus group discussion, key informant interview and observation. The second stage of sampling will involve sampling of Villages based on their share of production of groundnuts in the subcounty. The third stage of sampling will involve random selection of farmers from the selected villages. Lists of farmers obtained from the villages will be used as sampling frames and a total of 10 farmers will be randomly sampled from each age group, making a total 50 groundnut farmers in the subcounty. Data collection will be by use of direct face-to-face interviews with the aid of questionnaires. The questionnaire will capture data on socio-demographic characteristics of the respondents, production data, knowledge and awareness of technologies used in groundnut production, post-harvest handling and value addition

3.9 Ethical Considerations

Informed consent: The respondents were educated on the purpose of the study, their rights and the procedures involved in the study. The respondents were therefore required to provide informed consent before participating in the study.

Voluntary participation: The farmers participated voluntarily and were free to withdraw from the study at will without any consequences.

Confidentiality: The respondents' identities were kept confidential and the collected data was only accessible to the researcher.

Respect for respondents: The respondents were treated with respect and dignity

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

This section provides summary of data collected. Data was collected by the use of interview guides.Data was collected from 50 farmers ,including 26 females and 24 males using questionnaire method of data collection. In this chapter the findings are presented under headings per specific objective I, objective II objective III.This chapter contains two sections; the response rate and findings on the objective of the study which are explained in the tabula form by use of descriptive and inferential statistics.

4.1 Presentations of findings

4.2 Demographic information of the participants

This section includes the respondents' level of education, age, gender, farming acres and years of farming experience in groundnut production among small holder farmers in Buwunga sub county,Buguri district. The demographic information gathered from the respondents was very vital in understanding and ascertaining their relevance in the study.

Table 1:Demographic information of ground nut small holder farmers.

Characteristic	Category	No Of Respondents
Level of Education	Nursery	05
	Primary	15
	Secondary	20
	Tertiary	08
	University	01
	None	01
Age	Below 20 years	00
	20-29 years	13
	30-39 years	30
	40-49 years	06
	50 years and above	01
Gender	Male	24
	Female	26

Farming Acres	1 or less	17
	2-4	15
	5-6	10
	7-8	06
	Ohers	02
Years of Farming Experience	1 year or less	12
	1-2 years	10
	3-4 years	13
	5-6 years	07
	7-8 years	05
	Others	03

Table 2: factors limiting groundnut production among small holder farmers

Factor	Number of respondents	Percentage
Unready market	2	4
Illeteracy of most groundnut farmers	3	6
Limitted accessibility of farming inputs	3	6
Small scale land	2	4
Pests and diseases	20	40
Climate change	2	4
Limited capital	6	12
No response	09	18
Price changes	1	2
Poor soil fertility	2	4

Table 3:Assessement of the socioeconomic benefits of groundnut production on the livelihoods of small holder farmers.

Purpose	**True**	**Degree**
Food/Home consumption	27	194.4
Income	18	129.6
Both	05	36

Table 4: Coping methods used by small holder farmers to overcome the challenges in groundnut production

Copying methods	Number of respondents
Improve on extension services	6
Market research to increase markets	4
Iriigation	4
Contour ploughing	5
Fertilizer application	6
Spraying	6
Mulching	6
Provision of subsidies inform of seeds	6
Formation of cooperatives	7

General Discussion of Results

Level of Education

Most farmers (20) have a secondary education level,15 have primary education, 8 have tertiary education, and 1 has a university degree, 1 farmer has no formal education, and 5 are at the nursery level.

This suggests that most farmers have a moderate level of education, which could impact their ability to adopt new technologies or farming practices.

Age

The majority (30) of farmers are between 30-39 years old, 13 are between 20-29 years old, 6 are between 40-49 years old, and 1 is above 50 years old,no farmers are below 20 years old.

This indicates that most farmers are in their productive years, with a good balance of experience and energy.

Gender

Female farmers (26) slightly outnumber male farmers (24).This suggests that women play a significant role in groundnut farming in this community.

Farming Acres

Most farmers (17) cultivate 1 acre or less,15 farmers cultivate 2-4 acres, 10 cultivate 5-6 acres, and 6 cultivate 7-8 acres,2 farmers have larger farms (others).This indicates that most farmers are small-scale, with limited land resources.

Years of Farming Experience

Most farmers (12) have 1 year or less of experience,10 have 1-2 years, 13 have 3-4 years, 7 have 5-6 years, and 5 have 7-8 years and 3 farmers have more extensive experience (others).

This suggests that many farmers are relatively new to groundnut farming, which could impact their productivity and efficiency.

Overall, the demographic information suggests that:

Most farmers are moderately educated, middle-aged, and female,they are small-scale farmers with limited land resources and relatively new to groundnut farming,there is a need for training and support to enhance their productivity and efficiency,this will help the extension services, training programs, and agricultural interventions to better target and support groundnut smallholder farmers.

19 male farmers and 19 female farmers responded "Yes" to growing groundnuts,5 male farmers and 7 female farmers responded "No" to growing groundnuts.this implies that an equal number of male and female farmers (19 each) grow groundnuts, suggesting that both genders are equally involved in groundnut production.However, slightly more female farmers (7) than male farmers (5) do not grow groundnuts, which could indicate that a few more women are not engaged in groundnut production.

19 male farmers and 19 female farmers responded "Yes" to growing groundnuts, 5 male farmers and 7 female farmers responded "No" to growing groundnuts.

This shows that an equal number of male and female farmers (19 each) grow groundnuts, suggesting that both genders are equally involved in groundnut production, however, slightly more female farmers (7) than male farmers (5) do not

grow groundnuts, which could indicate that a few more women are not engaged in groundnut production.

Objective 1:To determine the factors limiting groundnut production

Unready Market

The absence of a well-established market system, limiting smallholder groundnut farmers' ability to sell their produce efficiently. This results into reduced Income, farmers receive lower prices for their produce due to lack of competition and negotiating power. Farmers also struggle to find buyers, leading to reduced sales and income. This may result into food Insecurity, reduced groundnut production affecting local food security and nutrition.

Illiteracy Among Groundnut Farmers

Illiteracy among groundnut farmers significantly affects groundnut production, leading to limited access to Information, Illiterate farmers cannot read instructions, labels, or manuals, hindering their ability to understand proper use of inputs (e.g., fertilizers, pesticides), follow best practices for planting, irrigation, and harvesting, access market information and prices.

Illiterate farmers will also have low adoption of new technologies, Illiterate farmers struggle to understand and adopt Improved farming techniques, new crop varieties, irrigation systems, Pest management practices

Limited Accessibility of Farming Inputs

Limited accessibility of farming inputs significantly affects groundnut production, leading to reduced Quality and Quantity of Inputs, farmers may use low-quality seeds, insufficient or incorrect fertilizers, ineffective pesticides. It also increases travel time and costs as farmers must travel long distances to access inputs, increasing time spent on input procurement and transportation costs.

It also leads to decreased productivity, limited access to quality inputs leads to reduced yields, lower quality produce and increased post-harvest losses.

Small Size of Land

Small scale land affects groundnut production in several ways as it limits cultivation area, reducing land size which limits groundnut cultivation. Lower Yields, smaller land sizes result in lower overall yields. Increased Labor Costs, manual labor increases due to limited mechanization. Reduced economies of Scale, small scale farmers struggle to benefit from economies of scale. Limited Investment, small scale farmers have limited resources to invest in improved seeds, fertilizers, irrigation systems

Pests and Diseases

Pests like aphids reduce yields, transmit plant viruses, whiteflies transmit diseases, reduce yields, thrips damage leaves, reduce yields termites damage plants, reduce yields, nematodes reduce yields, damage roots. Diseases like leaf Spot reduces yields, affects quality, rust reduces yields, affects quality, powdery Mildew reduces yields, affects quality. These result into economic Losses; poverty as reduced income perpetuates poverty among farmers and food Insecurity

Climate Change

Climate change significantly affects groundnut production, leading to temperature-Related Impacts like rising temperatures which reduce yields, alter growing seasons, heat Stress damages plants, reduces yields, changed Phenology disrupts plant growth stages. Precipitation-Related Impacts like drought reduces yields, affects plant growth, floods damages crops, reduces yields. Changed Rainfall Patterns, disrupts planting and harvesting schedules. Increased Pest and Disease Pressure as warmer temperatures favor pest and disease development. Water Scarcity reduces irrigation potential.

Limited Capital

Limited capital significantly affects groundnut production, leading to Insufficient Inputs, limited capital restricts purchase of quality seeds, fertilizers, pesticide and Irrigation equipment. Inadequate Equipment, Limited capital hinders investment in tractors, Plows, Planters and harvesting equipment. Reduced Labor, Limited capital limits hiring of labor, leading to decreased productivity, increased labor costs

Price Changes

Price changes significantly affect groundnut production, leading to reduced revenue, lower prices decrease farmers' income, discourages production, lower prices demotivate farmers from producing. Reduced input use, lower prices limit farmers' ability to invest in inputs. Decreased livelihoods, lower prices worsen farmers' livelihoods. Uncertainty, price fluctuations create uncertainty for farmers, risk aversion, farmers may reduce production due to price risks. Limited Investment, price volatility discourages long-term investments.

Poor Soil Fertility

Poor soil fertility significantly affects groundnut production, leading to reduced yields, nutrient deficiencies limit plant growth, lower quality: Poor soil fertility affects groundnut quality. Increased Pest and Disease Susceptibility, weakened plants are more vulnerable. Decreased Water Holding Capacity, Soil's ability to retain water is reduced

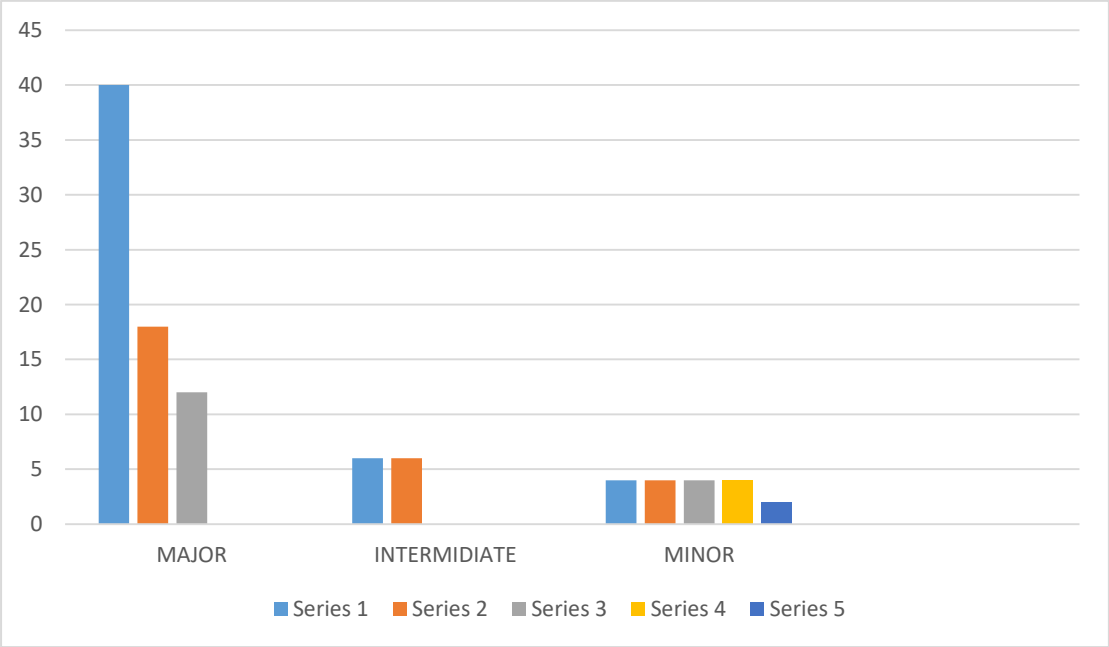


Fig 1: factors limiting groundnut production among small holder groundnut farmers.

Objective 2:To assess the socioeconomic benefits of groundnut production

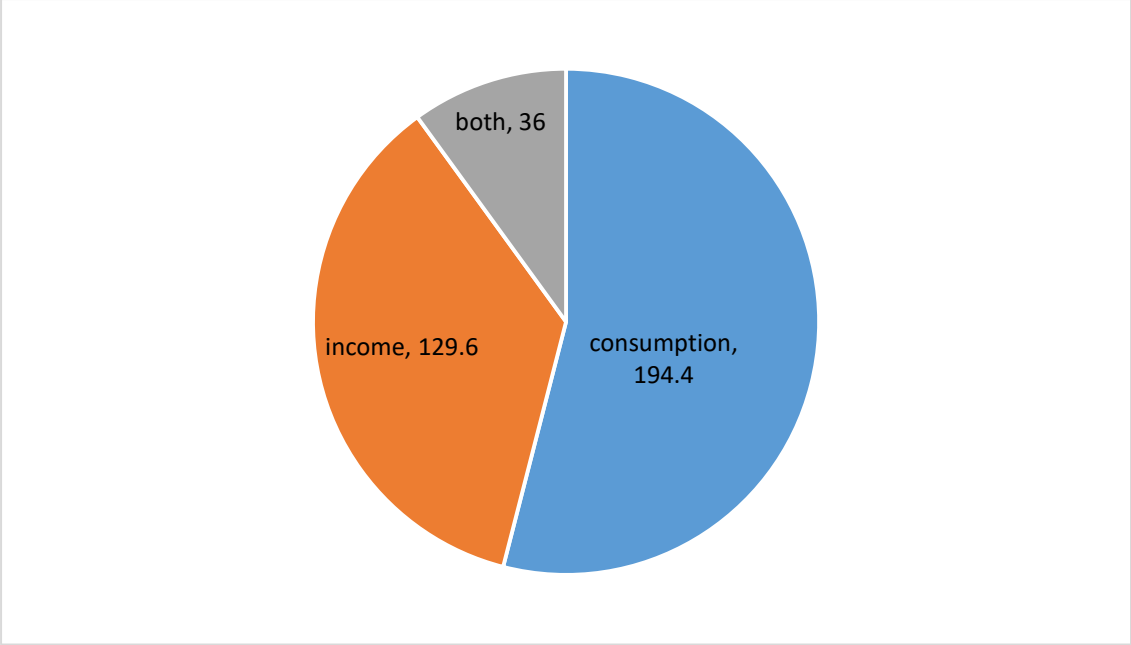
Home/Food Consumption Benefits

Food Security, groundnuts provide a reliable source of protein-rich food for smallholder farmers and their families. Nutrition, groundnuts are rich in essential nutrients, improving household nutrition and health. Food Availability, groundnut production ensures a steady supply of food throughout the year. Reduced Food Expenditure, home-grown groundnuts reduce household food expenditure.

Income and Economic Benefits

Cash Income, surplus groundnuts are sold, generating cash income for farmers. Increased Incomes, groundnut sales improve household incomes, enabling farmers to meet financial obligations. Economic Empowerment, groundnut production enhances farmers' economic status and decision-making power. Employment Opportunities, groundnut production creates employment for family members and hired labor. Improved Livelihoods, groundnut production enhances overall livelihoods, reducing poverty and vulnerability.

Social Status, successful groundnut farmers gain social recognition and respect. Community Development, groundnut production contributes to community development through improved infrastructure and services. Women’s empowerment, groundnut production often involves women, enhancing their economic and social empowerment



Fg 2: A pie chart showing socioeconomic benefits of groundnut production

Objective 3:To findout coping methods used by small holder farmers to overcome the challenges in groundnut production

Improved Extension Services

Enhances knowledge on best agricultural practices, provides technical assistance on soil management, pest control, and disease management, improves crop management and yields and increases adoption of new technologies and innovations.

Market Research to Improve Markets

Identifies profitable markets and market trends, also enhances market access and negotiation skills, improves price discovery and bargaining power and reduces market risks and uncertainties.

Irrigation

Mitigates drought risks and water scarcity, increases crop yields and quality, it enables multiple cropping and extended growing seasons and improves water use efficiency.

Contour Ploughing

Reduces soil erosion and degradation, conserves soil moisture and fertility, improves soil structure and water infiltration, increases crop yields and reduces landslides.

Fertilizer Application.

Replenishes soil nutrients and fertility, improves crop yields and quality, enhances soil health and structure, increases water use efficiency.

Spraying

Controls pests and diseases, reduces crop losses and damage, improves crop yields and quality and enhances food safety and security.

Mulching

Conserves soil moisture and reduces evaporation, suppresses weeds and reduces competition, regulates soil temperature and structure, improves soil fertility and crop yields.

Provision of Subsidies.

Reduces production costs and financial risks, increases access to inputs and services, enhances adoption of new technologies and innovations, supports vulnerable farmers and improves livelihoods

Formation of Cooperatives.

Enhances collective bargaining power and market access, improves input procurement and distribution, provides training and capacity building opportunities, increases social cohesion and support networks

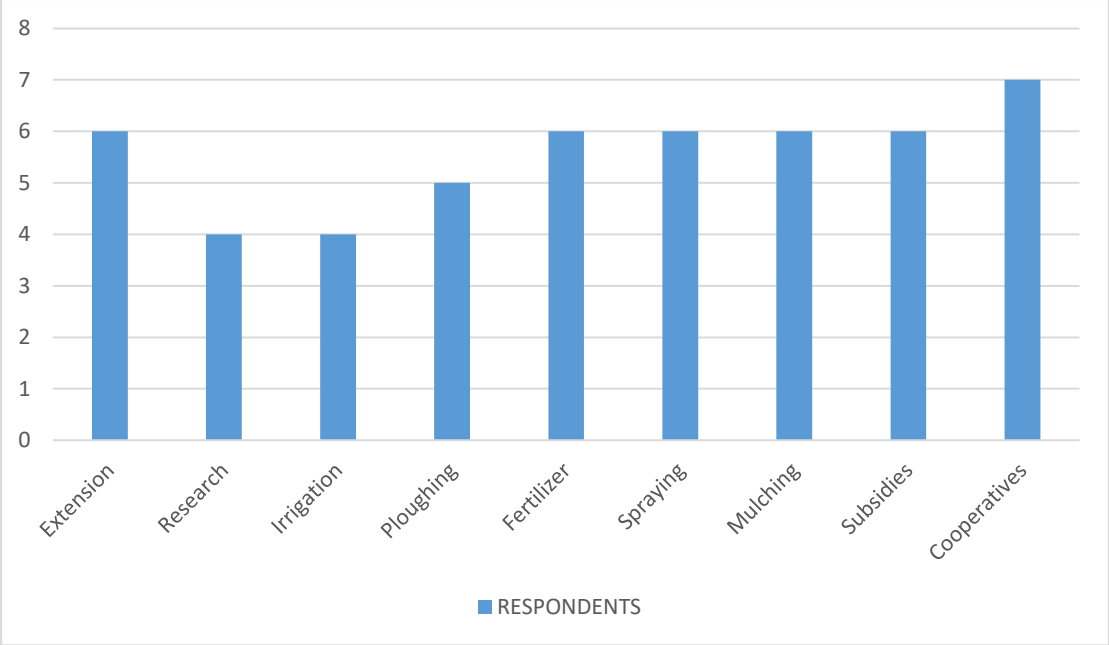


Fig 3: different coping methods used by small holder farmers to overcome challenges in groundnut production.

For each variety, the table shows the number of male and female farmers who grow (Yes) or don't grow (No) that particular variety.

Observations

1.Igola-1: More male farmers (18) grow Igola-1 than female farmers (8). Fewer male farmers (4) don't grow Igola-1 compared to female farmers (5).

2.Virginia: Most male farmers (22) grow Virginia, while fewer female farmers (13) do. No male farmers don't grow Virginia, indicating high adoption among males.

3.Roxo 531 (Red seed): An equal number of male and female farmers (9) grow Roxo 531. However, more male farmers (14) don't grow Roxo 531 compared to female farmers (4).

4.Long Manyema: More male farmers (20) grow Long Manyema than female farmers (11). Fewer male farmers (4) don't grow Long Manyema compared to female farmers (2).

5.Red Beauty: More female farmers (20) grow Red Beauty than male farmers (14). However, more male farmers (10) don't grow Red Beauty compared to female farmers (3).

6.Valencia type: Few farmers grow Valencia type, with only 2 male and 1 female farmer growing it. Most farmers don't grow Valencia type.

7.Serere Red: More male farmers (16) grow Serere Red than female farmers (8). Fewer male farmers (8) don't grow Serere Red compared to female farmers (4).Most male farmers (9) produced between 1-100 kg of groundnuts.Most female farmers (17) also produced between 1-100 kg of groundnuts.Only 2 male farmers produced 500 kg or more, while no female farmers reached this level.6 male farmers and 7 female farmers produced no groundnuts (None).

Fourty six (46) farmers use pest or disease management practices, while 4 do not,among those who use management practices, 36 use chemical control, 22 use cultural control, and 1 uses Integrated Pest Management (IPM). No farmers reported using biological control.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section outlines the discussion of findings and discussions of the research findings.This section also presents the conclusions of the study based on the findings and recommendations basing on the objectives.

5.2 Conclusions

The findings of this study showed that:

1. Groundnut production is a shared activity among male and female farmers, with no significant gender disparity.
2. There may be a slight gender difference in non-groundnut producers, but the sample size is small, and further research would be needed to confirm this.
3. Different varieties are preferred by male and female farmers.
4. Some varieties (like Virginia and Igola-1) are more popular among male farmers.
5. Other varieties (like Red Beauty) are more popular among female farmers.
6. Few farmers grow Valencia type, indicating a potential opportunity for promotion or introduction of new varieties.
7. The diversity of varieties grown suggests that farmers are experimenting with different types to find the best suited to their conditions.The majority of both male and female farmers produced relatively small quantities of groundnuts (1-100 kg). Female farmers are more represented in the lower production range (1-100 kg), indicating potential challenges in scaling up production.Male farmers are more likely to produce larger quantities (500 kg or more), suggesting better access to resources or more extensive farming experience.A significant number of farmers (13) produced no groundnuts, indicating potential barriers to production, such as lack of access to inputs, credit, or markets.
8. A vast majority of farmers (46) use some form of pest or disease management, indicating a recognition of the importance of these practices.Chemical control is the most commonly used method, which may indicate a reliance on chemical pesticides.

9. The low adoption of IPM (1 farmer) suggests a need for training and promotion of this holistic approach.

5.3 Recommendations

Basing on the above conclusions, the following recommendations have been made:

1. These insights can inform extension services, training programs, and agricultural interventions to better target and support groundnut smallholder farmers.
2. The extension services, agricultural programs, and policymakers should:
3. Design gender-inclusive training and support programs for groundnut farmers.
4. Identify reasons why some women are not engaged in groundnut production and address potential barriers.
5. Develop targeted interventions to enhance groundnut productivity and income for both male and female farmers.
6. Provide targeted support for specific varieties.
7. Promote new varieties that may be better suited to local conditions.
8. Enhance market access for popular varieties.
9. Address potential gender disparities in variety adoption.
10. Extension services and agricultural programs should focus on supporting small-scale farmers, particularly women, to increase their productivity and production levels.
11. Initiatives to improve access to inputs, credit, and markets could help farmers overcome production challenges.
12. Training and capacity-building programs can help farmers, especially women, to improve their farming practices and scale up production.
13. Policymakers should address the underlying causes of low production levels, such as limited access to resources, to ensure sustainable agricultural growth.
14. Extension services and agricultural programs should promote fertilizer use and provide training on organic and inorganic fertilizer application.
15. There is a need to promote IPM practices and reduce reliance on chemical pesticides Farmers who do not use fertilizers or pest management practices may benefit from training and support to improve their crop productivity and resilience.

REFERENCES

Akpo, E., Muricho, G. A., Opie, H., Ojiewo, C. O., & Varshney, R. (2020). Legume seed production for sustainable seed supply and crop productivity:Case of Groundnut in Tanzania and Uganda. *Journal of crop improvement, 34*(4).

Anokwa, Y., Hartung, C., Brunette, W., Borriello, G., & Lerer, A. (2009). Open data collection in the developing world.

Asekenye, C. C. (2012). Analysis of productivity gaps among small holder groundnut farmers in Uganda and Kenya.

Darimont, C. T., Reimchen, T. E., Bryan, H. M., & Paquet, P. C. (2008). Faecal - Centric approaches to Wildlife ecology and conservation;methods,data and ethics.

Feder, G., Just, R. E., & Zilberman, D. (1985). Adoption of Agricultural innovations in developing countries. *A survey :Economic development and Cultural change, 33*(2).

Idi, H., Luka, J., Dauda, M., & Isa, Y. (2019). Analysis Of Variance of Groundnut production in Bauchi State.

Isham, J. (2002). The effect of social capital capital on fertiliser adoption:Evidence from rural Tanzania *Journal of African economies, 11*(1).

Johansen, J., & Sorensen, N. N. (2004). Aerofoil characteristics from 3D CFD rotor competitions. *Internal Journal for progress and applications in wind conversion technology, 7*(4).

Kalule Okello, D., Monyo, E., Michael, D. C., Jane, I., & Herbert Kefa, O. (2013). Groundnut production guide for Uganda: Recommendation practices for farmers.

Katundu, M. A., & Mhina, M. L., Mbeiyererwa. (2014). Factors limiting smallholder groundnut production in Tabora region. *REPOA*.

Meena, V. D., Dotaniya, M. L., Coumar, V., Rajendiran, S., Ajay, Kundu, S., & Subba Rao, A. (2014). A Case for Silicon Fertilization to improve crop yields in tropical soils. *Proceedings of the National Academyof Sciences, India, 84*.

Mesfin, H. M., Ahmed, M. H., & Abady, S. (2016). Determinants of Multiple Groundnut Technology Adoption in Eastern Ethiopia. *Review of Agricultural and Applied economics (RAAE), 19*(2).

Mugisha, J., Ogwal-O, Ekere, W., & Kkiyar, V. (2004). Adoption of IPM groundnut production technologies in Eastern Uganda. *African crop science journal, 12*(4).

Ndjeunga, J., Ntare, B. R., Ajeigbe, H. A., Echekwu, C. A., Ibro, A., & Amadou, A. (2013). Adoption and impacts of modern groundnut varieties in Nigeria.

Taru, V. B., kyaga, I. Z., & Mshelia, S. I. (2010). Profitability of groundnut production. *Journal of agricultural sciences, 1*(1).

MAAIF (2019). Agriculture Sector Strategic Plan 2019-2024. Ministry of Agriculture, Animal Industry and Fisheries.

Mukasa, S., et al. (2017). Groundnut production and marketing in Uganda*: A review. Journal of Agricultural Science and Technology, 17(3), 537-554.*

UBOS (2020). Uganda National Household Survey 2019/2020. Uganda Bureau of Statistics.

APPENDICIES

QUESTIONNAIRE FOR RURAL SMALLHOLDER FARMERS

Dear respondent

I am in my final year of study at Busitema University pursuing a Bachelor of Science Education, Agriculture double main and as part my course, I am carrying out research on the topic, ‘Factors affecting ground nut production among small holder farmers in Buwunga sub county, Bugiri district.

You have been identified to greatly contribute to this study by giving responses which honestly reflect your views.

The researcher assures you that the information obtained will be exclusively confidential and will be used for this study only.

Please answer all the questions in all the sections by ticking the response of your choice.

Your co-operation is highly appreciated.

Thank you in advance for your anticipated response and taking your time to fill in this questionnaire.

Sincerely,

Researcher.

SECTION: A

Demographic information

Introduction:

Thank you for participating in this survey. The purpose is to understand the factors that affect groundnut production among smallholder farmers in rural areas. Your responses will help us better understand the challenges and opportunities in groundnut production. Please answer the questions honestly.

Section 1: Demographic Information

What is your age range?

Below 20years 20-29years 30-39years 40-49years above50years

2. What is your gender?

Male Female

3. What is your level of education?

Nursery Primary Secondary Tertiary University None

4. How many farming acres do you have?

Less than 1 1-2 3-4 5-6 7-8 Others

5.How many Years of farming experience?

Less than 1 1-2 3-4 5-6 7-8 Others

Section 2: Groundnut Production

Do you grow groundnuts?

Yes No

2.What variety of groundnuts do you grow? (Tick for Yes or No)

S/N	Variety of Groundnuts grown	Yes	No
1	Igola-1		
2	Virginia		
3	Roxo 531 (Red seed)		
4	Long Manyema		
5	Red Beauty (Red seeded)		
6	Valencia type		
7	Serere Red		

How many bags (Kg) of groundnuts did you produce in the last season?

4. What is your average yield per acre (kg)?

Section 3: Factors Affecting Groundnut Production

1. What are the main challenges you face in groundnut production? (Check all that apply)

Challenge	True	False
Drought		
Pests and diseases		
Soil fertility		
Access to markets		
Lack of inputs (seeds, fertilizers, etc.)		

Other (please specify)

……

…….

……

……

……

…….

How do you manage pests and diseases in your groundnut farm? (Check all that apply)

Method	True	False
Chemical control		
Cultural control		
Biological control		
Integrated pest management (IPM)		

Other (please specify)

……

……..

……

…….

3. Do you use irrigation in your groundnut farm?

Yes No

4. How do you access groundnut markets? (Check all that apply)

Method used to access ground nut market	True	False
Local market		

Cooperatives		
Private traders		
Government programs		

Other (please specify)

……

……..

……

……..

……

……..

Section 4: Land and Soil Factors

Question Response (Tick where appropriate)

What is the soil type on your farm?	Sand	Clay	Loamy	Other (specify)
How would you rate the soil fertility in your farm?	Low	Medium	High	
Do you use any soil conservative practices?	Yes	No		
If yes, specify the practices	Contour ploughing	Terracing	Mulching	Other(specify)

Section 5: Water and Irrigation

(TICK WHERE APPROPRIATE)

1. Do you have access to irrigation water? Yes / No

2. If yes, what is the source of irrigation water? | River / Dam / Well / Rainwater harvesting

3. How often do you irrigate your groundnut farm? | Daily / Weekly / Monthly / Rarely

4. What is your primary irrigation method? | Flooding / Drip irrigation / Sprinkler / Other (specify)

……
……..

……
…….

……
……..

Section 6: Inputs and Technology (TICK WHERE APPROPRIATE)

1. Do you use certified groundnut seeds? Yes / No

2. How often do you purchase groundnut seeds? Every season / Every other season / Rarely

3. Do you use fertilizers in your groundnut farm? Yes / No

4. If yes, what type of fertilizers do you use? Inorganic / Organic / Both

5. Do you use any pest or disease management practices? Yes / No

6. If yes, specify the practices. Chemical control / Cultural control / Biological control / Integrated pest management (IPM)

Section 7: Marketing and Sales (TICK WHERE APPROPRIATE)

1. How do you market your groundnuts? Local markets / Cooperative societies / Private traders / Government programs

2. How often do you sell your groundnuts? Daily / Weekly / Monthly / Rarely

3. What is your primary sales outlet? Local market / Cooperative society / Private trader /Government program

4. Do you receive any extension services or support? Yes / No

5. If yes, specify the services or support. Training / Credit / Input supply / Marketing assistance

Section 8: Additional Information

What do you think is the most significant constraint to groundnut production in your area?

……
……

2. Have you received any training or support on groundnut production in the last 12 months?

Yes	No

3.Are there any other crops you grow besides groundnuts? (Yes/No)

Yes	No

4. What is your primary purpose for growing groundnuts? (TICK WHERE APPROPRIATE)

PURPOSE	TRUE	FALSE

Food		
Income		
Both		

Other (Specify)

……
……

……
……..

Conclusion

This questionnaire covers various aspects of groundnut production, including demographic information, groundnut production practices, limitations faced, contribution to livelihoods, local farming techniques, and additional information. The responses will provide valuable insights into the factors affecting groundnut production among smallholder farmers in rural areas, and help derive solutions to the limitations faced by these farmers