

**FACTORS INFLUENCING MARKET PARTICIPATION OF SMALLHOLDER
GROUNDNUT FARMERS IN AWEIL EAST COUNTY OF NORTHERN BAHR EL
GHAZAL STATE, SOUTH SUDAN**

ALIER AREM DENG

S21M43/014

**A DISSERTATION SUBMITTED TO THE FACULTY OF AGRICULTURAL SCIENCES IN
PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE IN AGRICULTURE AND RURAL DEVELOPMENT OF UGANDA
CHRISTIAN UNIVERSITY**

June, 2024



**UGANDA CHRISTIAN
UNIVERSITY**

A Centre of Excellence in the Heart of Africa

DECLARATION

I, **Alier Arem Deng** hereby declare that this research dissertation is my original work and my own effort and that it has not been submitted to other institution of higher learning for any academic award



Signature... .Date 7 June 2024

Alier Arem Deng

S21M43/014

APPROVAL

This research dissertation has been done under my supervision and presented to the Graduate school for examination with my approval as university supervisor.



Sign----- Date—7th June, 2024

DR. Higenyi James (Supervisor)

DEDICATION

I dedicate this dissertation to my dear wives; Mrs. Rebecca Awal Kon, Mrs. Akuch Aler Chol and Mrs. Apajok Mayul Pager for their sincere support during my studies and learning process and equally thankful to God for utmost protection and blessing.

ACKNOWLEDGEMENT

I wish to acknowledge the efforts of my research supervisor Dr. Higenyi James for his tireless and invaluable effort in guiding and supporting me during the entire study and research period.

Appreciation goes to my fellow colleagues for sharing with me useful ideas during the entire period of study and research.

Above all, I honour and thanks the Almighty God for His mercy, care, strength and guidance during the entire period of study.

ABBREVIATIONS AND ACRONYMS

AMIS	Agricultural Market Information System
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
IFPRI	International Food Policy Research Institute
NGOs	Non-Governmental Organizations
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
SSP	South Sudan Pound
UCU	Uganda Christian University
UNDP	United Nations Development Program
USADF	United States African Development Foundation
WFP	World Food Program

TABLE OF CONTENTS

DECLARATION.....	1
APPROVAL.....	2
DEDICATION.....	3
ACKNOWLEDGEMENT	4
ABBREVIATIONS AND ACRONYMS	5
TABLE OF CONTENTS	6
LIST OF TABLES.....	8
LIST OF FIGURES	8
ABSTRACT	9
CHAPTER ONE	10
INTRODUCTION	10
1.1 Background of the study.....	10
1.2 Problem Statement.....	13
1.3 Objectives of the study.....	14
1.4 Research hypotheses	15
1.5 Justification of the study.....	15
1.6 Significance of Study.....	15
1.7 Scope and limitation of the Study.....	16
1.8 Theoretical Framework	17
1.9 Conceptual Framework	18
1.10 Operational definitions.....	20
CHAPTER TWO.....	21
LITERATURE REVIEW.....	21
2.1. Groundnut Marketing Channels	21
2.1.2 Actors along the Agriculture market channel	22
2.1.3 Market access constraints for smallholder farmers	23
2.2 Market Participation of ground nut farmers	26
2.4 Market participation challenges encountered by smallholder farmers	29
2.5 Effects of market participation on the sales volume.....	31
2.6 Review of Methodological Approaches in Similar Studies.....	33
CHAPTER THREE.....	37

METHODOLOGY	37
3.1 Study Area	37
3.2 Research Design.....	37
3.3 Sample size estimation	37
3.4 Sampling procedures and techniques	38
3.5 Data collection procedure	38
3.6 Questionnaires method	38
3.7 Data Analysis	38
3.8 Ethical considerations.....	43
CHAPTER FOUR.....	45
RESULTS	45
4.1 Social demographic characteristics of the farmers	45
4.2 Categorization of market channel used by groundnut farmers to sell groundnuts	46
4.3 Groundnut farmer participation in the different market channel.....	47
4. The characteristics of ground nut farmers associated with participation in the different market channel	48
4.5 Marketing and institutional factors associated with market participation.....	49
4.6 Factors influencing market participation among smallholder farmers in Aweil .	51
4.7 Factors influencing the sales volume of groundnut among smallholder farmers	53
CHAPTER FIVE	55
DISCUSSION	55
CHAPTER SIX.....	64
CONCLUSIONS AND RECOMMENDATIONS	64
6.1 Conclusion	64
6.2 Recommendations	65
REFERENCES	67
APPENDIX I: RESEARCH QUESTIONNAIRE TOOL	75
APPENDIX I1: RESEARCH DATA COLLECTION PHOTOS.....	81
APPENDIX I11: REC CLEARANCE LETTER	85

LIST OF TABLES

Table 1: Socio demographic characteristics of farmers	45
Table 2: Social demographic characteristics of farmers	45
Table 3: The characteristics of ground famers associated with market participations.	48
Table 4: Marketing and institutional factors associated with market participation..	50
Table 5: Factors influencing market participation among smallholder farmers in Aweil	52
Table 6: Factors influencing the sales volume of groundnut smallholder farmer	53

LIST OF FIGURES

Figure 1: Conceptual Framework.....	19
Figure 2: Market channel used by groundnut farmers for selling produce	46
Figure 3: Percentage of farmers that participate in the different market channel by Payam	47

ABSTRACT

The marketing of groundnut by smallholder groundnut farmers is increasingly problematic in Aweil East County in the Northern Bahr El Ghazal State due to a poorly organized marketing system arising from collapse of the marketing board. This has led to decline in groundnuts production. The objective of the study to assess the factors influencing market participation of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan. A descriptive survey research design was employed in the study using structured questionnaires to assess the market channels, socio-economic and intutional factors. A total of 396 respondents were randomly selected and interviewed, data analysed using descriptive statistics, logistic regression and general linear Models. The results revealed that majority (67.7%) of respondents were female. The respondents had a mean age of 33.1 years and most of them had no formal agricultural training at 69.4%. Most (78.0%) of them had over 5 years' experience in ground nut farming. Findings showed 93 farmers market participants and 303 farmers non-market participants. Farmers' participation was high in Farmer to consumer (42%) and Farmer to wholesale (37.7%) market channels. Largely (79.7%) female respondents directly sold their groundnuts to consumer. Most (60.9%) youth engage in the enterprise, and majority of the respondents had no formal education (68.9%). Farmers education, size of land for cultivation and experience in groundnut growing showed statistical difference between market participants and non-participants. Logistic regression model revealed factors which significantly ($P < 0.05$) influence farmers market participations decision as; Farmers group VSLA ($OR = 3.3$), transport facility ($OR = 6.3$), yield ($OR = 0.3$) and agricultural input and access to market ($OR = 4.4$). General linear models showed quantity of ground nuts consumed (Adjusted Coef = -0.751), use of bicycle and Raksha as means of transport to market (Adjusted Coef = -0.735) and formation of VSLA groups (Adjusted Coef = -0.635) as factors which significantly ($p < 0.05$) influence sales volume. In conclusion, the study has found out that farmers largely consider market and institutional factors in market participation decision. Prevalence of market participation is still low in the study area. However, increased volume for home consumption, type of farmer group and transport facility impact on the sale volumes. I recommend creation of farmer organizations like farmer cooperatives and associations to collectively market their produce and negotiate better prices with buyers, support in agricultural inputs and access to market as well as deliberate farmer investment in more efficient transportation facilities.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Agriculture contributes more than 50% to most African economies, and is the basis for at least 70% of livelihoods in most countries (UNDP, 2013). Smallholder farmers produce 70% of Africa's food supply contributing to the broader economy, GDP and food security of their respective countries. groundnuts are 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. Groundnuts are also commercial crops (cash crop) estimated by export values for different countries including; China (38.0%), India (19.7%), Tanzania (1.1) and Sudan (2%) (Taru & Kyagya, 2010).

In Africa, it is reported that numerous barriers have limited market access for smallholder farmers such as challenges of determining appropriate marketing channels, lacks of market information, poor road network coupled by illiteracy. This prohibits them to leverage and benefit from recent gains in farm productivity (AGRA, 2020). But access to market enables farmers to make decision to sell, improve their income; it is prerequisite for gaining profit and has positive impact on household welfare (Panda, & Sreekumar, 2012). Exploring available marketing channels and selecting the best rewarding is an important production decision that was increase producers' net price when they direct supply to the market channel they want (Jerena, 2017).

According to Augustine (2020), as efforts are directed towards increasing food supply and reducing hunger in Africa by raising smallholder productivity, an equal push to improve access to markets is lagging. The under-developed and inefficient agriculture markets mean that farmers face challenges in preparing to sell their crops and connect with buyers. Many African countries lack key elements necessary for efficient and effective markets infrastructure, including transport systems, market linkages, storage facilities, legal and policy frameworks, and financial systems. For farmers, the inadequate market resources are linked to low farm-gate prices, weak farmers'

organizations, narrow markets, inadequate market information, and inadequate affordable finance (Augustine, 2020).

The importance of agricultural commercialization is deeply rooted in the sustainable development goals (SDGs), specifically goal one which calls for an end to all forms of poverty. The impacts of low market participation of smallholder groundnut farmers increase poverty level, low income from production proceed and increased inequalities among the farming households and communities (Matt, 2017).

South Sudan, amongst other countries, has liberalized its economy in an effort to create open market-led exchanges, with an aim at boosting economic growth which has also reduced government control in agricultural markets (USAID, 2013). The main reason for liberalization programs was due to the general failure of parastatal marketing boards and donor pressure. The parastatal was the main marketing channel for the smallholder groundnut farmers in Aweil East County. Thus, the collapse of the marketing board resulted into poorly organized marketing system characterized by middle men, informal channels, private dealers, agro dealers in distant or local towns, or through other informal channels such as the road side (USAID, 2013). In spite of the existence of the various informal channels, marketing of cash crops including groundnuts is still constrained, resulting into decline in prices and sales (SORUDEV, 2016).

In South Sudan, particularly Aweil East County, smallholder farmers including groundnut farmers are faced with difficulties in enforcing contracts and meeting stringent food safety norms, poor physical infrastructures, weak institutions in markets, lack professional marketing skills, and reliance on middlemen (World Food Program, 2015). In addition, there is limited participation in the marketing of groundnuts by the small-scale farmers (Adam, 2018). This has constrained small-scale farmers' sell of their groundnuts leading to a significant decline in prices and total export values of ground nuts (SORUDEV, 2016).

The South Sudanese groundnuts market was estimated at \$ 1.5billion in 2022, representing an increase by 4.5% against the previous year. For instance, groundnuts

revenue peaked at \$2bn in 2020; stagnating in 2021 to 2022 which greatly impacted on farmers' participation in the markets (FAO, 2023).

Groundnut production decreased in value terms; for example, revenue was anticipated to have reached \$2 billion in export price in 2022, down from \$2.5 billion in 2020 (FAO, 2023). The majority of these output estimates come from smallholder farmers who physically cultivate tiny pieces of land with hand tools. An average of 0.90 hectares was farmed by each of the 1,199,083 smallholder groundnut farming households that were projected to exist in 2022. Of them, Aweil East County in Northern Bahr El Ghazal State is home to an estimated 78,814 smallholder groundnut farming households (FAO, 2023; Knoema, 2022).

Regarding export price per kilogram of groundnuts from South Sudan over the last three years, there has been on the declining trend, for instance, 0.68 US \$ per kg in 2018., 0.02 US \$ per kg in 2019 and 0.01 US \$ per kg in 2020. (Selina Wamucii, 2023). The national average retail price of groundnut was SSP 14,531 per sack, representing a slight decrease of 1.9% compared to the previous month (WFP, 2022). Equally, revenue for small scale farmers collected from groundnuts sales in Aweil East County has a declined. For instance, an estimate of SSP 2,516,000 was collected by smallholder farmers in 2022 which is slightly less as 2,944,200 SSP (approx. \$ 22,602.6) collected in 2021 (SORUDEV, 2016; Independent Terminal Evaluation, 2022). The main drivers for the decline of cash crop production, retail prices and exports values have been associated with socio-economic, liberalization of agriculture produce markets, climatic disruption (floods) and political instability (AMIS, 2017; FAO, 2023).

However, recent studies indicate that limited access to markets for the smallholders is a hindrance to production and understanding right marketing channels and factors that limit access to markets directly increases the incomes of smallholder farmers through better prices (Matt, 2017; UNDP, 2013). While small scale producer market participation is influenced by; Socio-economic factors, Processing capacities, Knowledge and type of market channels, Infrastructure, Prices and Transportation cost (Adam, 2018). Presently, studies in South Sudan provide information drivers of declining

production, prices and export values. But dearth information on factors influencing market participation of small-scale ground nut farmers.

Premised on the above, this study intended to assess the factors influencing market participation of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan

1.2 Problem Statement

The collapse of the marketing board resulted into poorly organized marketing system characterized by middle men, informal channels, private dealers, agro dealers in distant or local towns, or through other informal channels such as the road side (USAID, 2013).

The small-scale groundnut producers in South Sudan including in Aweil East County are constrained on where to sell their produce, which led to decline in groundnuts production, for instance, production amounted to \$2bn estimated in export price in 2022 from production estimate at \$2.5 billion in 2020 (FAO, 2023).

Export price of groundnuts from South Sudan over the last three years have declined, for instance, US \$0.68 per kg in 2018, US \$0.02 per kg in 2019 and US \$0.01 per kg in 2020. (SORUDEV, 2016; Selina Wamucii, 2023). The average retail price of groundnut was SSP 14,531 per sack, which is a slight decrease of 1.9% compared to the previous month (WFP, 2022). There was 1.4% decline in small-scale household incomes because of the declining revenues attributed to minimal participation in market channels for this hugely grown crop (SORUDEV, 2016; State Ministry of Agriculture, 2021; Independent Terminal Evaluation, 2022).

The main drivers for the decline of cash crop production, retail prices and exports values have been associated with socio-economic, liberalization of agriculture produce markets, climatic disruption (floods) and political instability (AMIS, 2017; FAO, 2023).

However, recent studies indicate that limited access to markets for the smallholders is a hindrance to production and understanding right marketing channels and factors that limit access to markets directly increases the incomes of smallholder farmers through

better prices (Matt, 2017; UNDP, 2013). While small scale producer market participation is influenced by; Socio-economic factors such as land size, access to transport information, distance to the nearest town, age and education of the household head, Processing capacities, Knowledge and type of market channels, Infrastructure, Prices and Transportation cost (Adam, 2018).

Presently, studies in South Sudan provide information drivers of declining production, prices and export values. But dearth information on factors influencing market participation of small-scale groundnut farmers.

Premised on the above, this study intends to assess the factors influencing market participation of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan.

1.3 Objectives of the study

The general objective of the study is to assess the factors influencing market participation and sales volume by smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan. The specific objectives were:

- i. To describe the existing market channels used for marketing of groundnut by smallholder farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan.
- ii. To determine the factors influencing market participation decision among smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan
- iii. To determine the factors influencing sales volume of groundnut among smallholder farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan

1.4 Research hypotheses

1. There are significant differences in the market participation among smallholder ground nut farmers in Aweil East County.
2. There are factors that significantly influence market participation decisions among smallholder groundnut farmers in Aweil East County.
3. There are factors that significantly influence sales volume of groundnut among smallholder groundnut farmers in Aweil East County.

1.5 Justification of the study

The small-scale groundnut producers in South Sudan including in Aweil East County are constrained on where to sell their produce, which led to decline in groundnuts production, for instance, production amounted to \$2bn estimated in export price in 2022 from production estimate at \$2.5 billion in 2020 (FAO, 2023).

Export price per kilogram of groundnuts from South Sudan over the last three years, have declined, for instance, 0.68 US \$ per kg in 2018. 0.02 US \$ per kg in 2019 and 0.01 US \$ per kg in 2020. (SORUDEV, 2016; Selina Wamucii, 2023). The average retail price of groundnut was SSP 14,531 per sack, which is a slight decrease of 1.9% compared to the previous month (WFP, 2022). There was 1.4% decline in small-scale household incomes because of the declining revenues attributed to minimal participation in market channels for this hugely grown crop (SORUDEV, 2016; State Ministry of Agriculture, 2021; Independent Terminal Evaluation, 2022). Premised on the above, this study intends to assess the factors influencing market participation of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan.

1.6 Significance of Study

Selection of appropriate market channels and determining factors influencing participation of smallholder farmers in market channels increased farmers' level of participations in markets resulting to increased sale volumes.

Farmers' Market participation and market access linkages for delivering farm products is not an easy task; The factors influencing Market participation of smallholder farmers are influenced by market knowledge, market networks, market information, price of the product, unfair profit share, inadequate formal education, extension services, farmers location from nearest market, production experience and duration at storage (Jerena, 2017). Therefore, the study intends to document the Factors Influencing Market Participation of smallholder farmers in Aweil East County and the findings was help farmers to improve on their probability of market participation and an informed choice of marketing channels and increased sale volumes. The information revealed by this research was possibly help to improve the extension approach and policy formulation by line ministries and organizations to support farmers accelerate farmer-market linkages and demand-supply driven production.

The smallholder farmers were also be made aware of the factors influencing market participation and this was enabled them improve their sale volume by mitigating the challenges in due time. The information in this research was used by policy decision makers, humanitarian organizations and state ministry of agriculture, to reinforce policies to support farmer extension system support and farmer market linkages to build the resilience and livelihoods of farmers and increased farmer incomes through effective groundnut marketing within the region.

1.7 Scope and limitation of the Study

The scope of this study covered Smallholder groundnut farmers (producers) in the small-scale groundnut producers in South Sudan including in Aweil East County. This study was assess the factors influencing market participation of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan and in doing so, the study was specifically characterize existing marketing channels, to determine the relationship between factors and market participation by smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan and assess the influence of market participation on the sale volume of smallholder groundnut farmers in Aweil East County of Northern Bahr El Ghazal State, South Sudan.

This research was conducted in Aweil East County. The county is located in the Eastern part of Northern Bahr el Ghazal state, in the Northern part of South Sudan, close to the border with the Republic of Sudan. It is bordered by South Darfur State to the North, Abyei Region to the Northeast, Twic County in Warrap State to the East, Gogrial West County, also in Warrap State, to the Southeast, Aweil South County to the South, Aweil West County to the southwest and Aweil North County to the northwest. It has eight administrative units that is to say; Payams; Baac, Yargot, Madhol, Malualbaai, Mangar tong, Mayomwel, Mangok and Wunlang. However, the study was conducted in Baac Payams; one of the administrative units in Aweil East County.

The research was conducted from November 2023 to April 2024 because this is the period when the researcher was conducting research's data collection, interpretation and analysis.

1.8 Theoretical Framework

The theoretical framework for Market participation is built on the theories of market participation. Market participation is a vital concept in agribusiness management. It is participation in any market related activity which encourages the sale of produce, such as the individual farming household's economic transactions with others in cash or kind or commercialization (Otekunrinetal, *et. al.*, 2019).

Market participation is also viewed as the integration of subsistence or semi-subsistence farmers into the inputs and output markets of agricultural products, with the aim of boosting their income level resulting in poverty reduction. The concept of market orientation, commercialization or participation refers to the percentage of marketed output from total farm production. Farmers' market access is a vital component of market participation. A smallholder farmer can access the market either by selling to a buyer at the farm gate or physically transporting the produce to the market (Otekunrin *et al.*, 2019). Another important theory is the Transaction Cost Theory.

The transaction cost theory hinged on the fundamental study of Coase who gave a distinction between the firm and a market. The theory opined that smallholder farmers would not be encouraged to participate actively in the market if the transaction costs

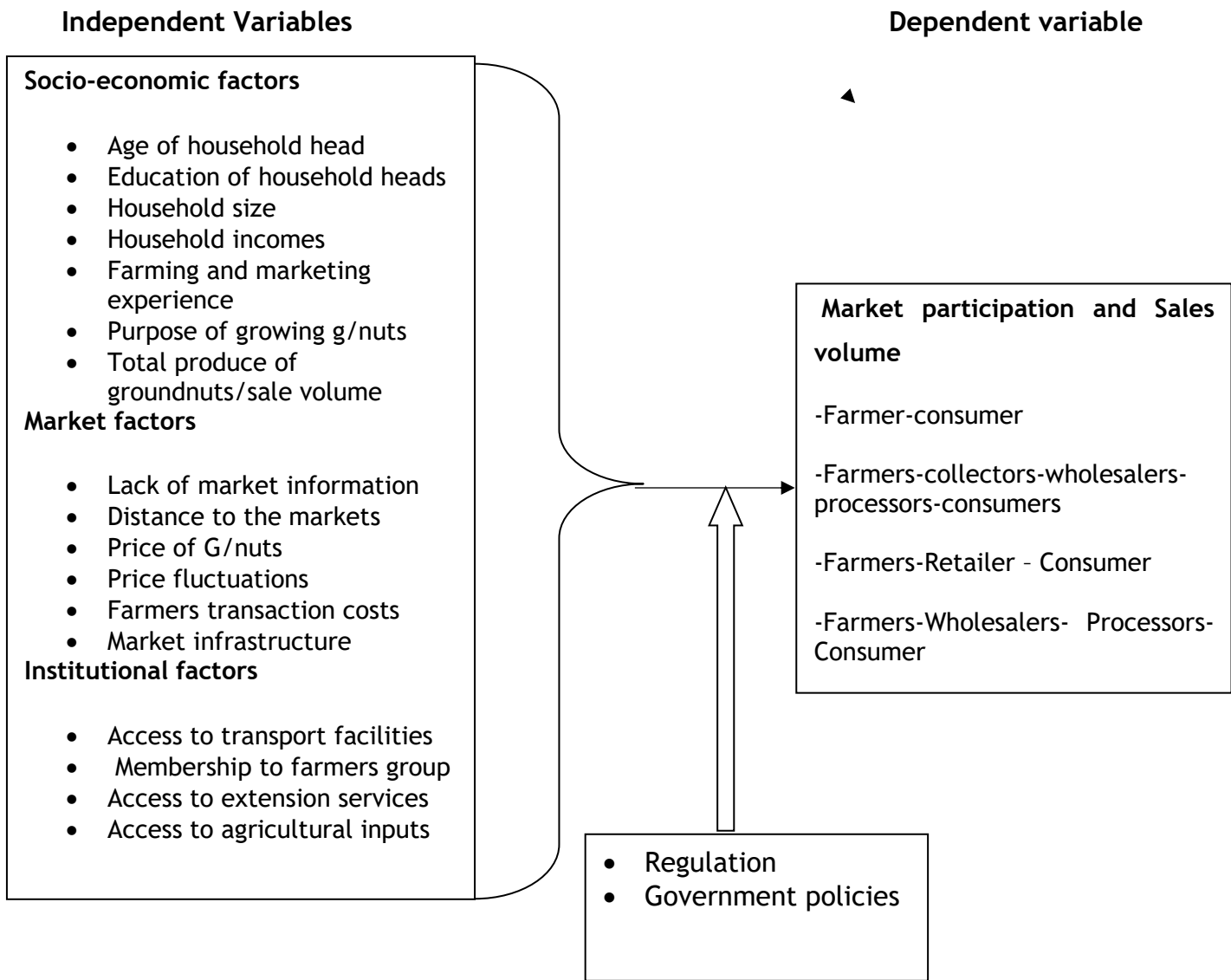
are not kept at the barest minimum level. According to the ‘New Institutional Economics’ approach which revealed that institutions possess transaction cost minimizing arrangements which may produce households in agricultural areas partly for sale and partly for own consumption. They also purchase some of their inputs (for instance fertilizer and labour) and provide some inputs from their own resources (for instance family labour). Any change in agricultural policy will therefore affect, not only production, but also consumption and labour supply.

Several empirical studies have established that the increase in transaction costs significantly lowers market participation among smallholders’ firms. Hence the decision whether to commercialize or not, for most firms, is also highly influenced by the transaction costs associated with market participation (Jagwe, 2010). Hence the market participation decision is not only influenced by price and other characteristics such as quantity produced, but also transaction costs. This is because most farmers dwell in the rural remote areas. Access to town centers is highly impaired for most of the rural farmers. This then significantly increases the total transaction costs to be incurred (Jagwe, 2011).

1.9 Conceptual Framework

Factors influencing market participations comprises of parameters of actors in marketing; age of household head, education level of household head, distance to the market, household size, small land size allocated, access to transport facilities and access to market information and the quantity of groundnuts sold through market participation (output), among others.

The dependent variable is either farmers participate or not participate in the marketing of groundnuts while the independent variables was market access constraints. However, there also exists intervening variables which affect smallholder farmers’ access to markets participations. Among them are government policies, regulation, and other environmental factors market dynamics. These constructs and their relationships are illustrated in the following Figure 1.



Source: Researcher’s Conceptualization (2023)

Figure 1: Conceptual Framework

1.10 Operational definitions

Marketing: Marketing is the science and art of discovering, producing, and distributing value to meet the demands of a target market while making a profit (Philip Kotler, 2011).

Market Participation: According to Mmbando (2014), market participation can be defined in relation to sales as a portion of the total production output, for the total of all agricultural production output. Market participation is also defined by using the home purchases and sales, whereby volume of farm produce traded are utilized in estimating market participation (Pienaar and Traub, 2015).

Market Channel: A marketing channel is a group of people, organizations, and actions that work together to move products from production to consumption. It includes the people, organizations, and activities that make goods and services available to consumers for their use and enjoyment (Kotler & Keller, 2016).

Smallholder farmer: A smallholder farmer is a producer who cultivates crops, rears livestock, and raises fish on a limited scale: In the developing world, a smallholder farm is a family-owned enterprise operating on up to 10 hectares, or 24 acres, with most smallholder farmers cultivating less than 2 hectares, or 5 acres, of land (IFAD, 2013).

CHAPTER TWO

LITERATURE REVIEW

2.1. Groundnut Marketing Channels

Identification and charactering of existing market channels and how they contribute to market participation of farmers equally contributes to identify issues related with production and sales; lead producers to gain maximum satisfaction through making decision over market channel selection, improve the extent of production produced; and the selected channel can significantly affect other market channels (Berry, 2010). Market channel choice enables farmers to make decision to sell, improve their income; it is prerequisite for gaining profit and has positive impact on household welfare (Panda, & Sreekumar, 2012).

Exploring available marketing channels and selecting the best rewarding is important as among production decision; increased number of intermediaries could decrease producer's share in consumer's price decreases and producers' net price was increased when they direct supply to the market channel they want (Jerena, 2017). According to Oliyad & Megersa (2022), there are several market channels used by smallholder farmers which include;

Channel I. Farmers-consumers: This is a market channel through which farmers directly sell their produce to the consumer which needs no intermediaries (Oliyad & Megersa, 2022).

Channel II: Farmers-collectors-wholesalers-processors-consumers: In this channel, the farmer sells to collectors, who later sale to the wholesalers. The wholesalers supply to processors and consumers buys from the processors (Gebremeskel, 2018). The groundnut producers always directly sell to local collectors among the total quantity supplied to the market. This channel is the second shortest channel in terms of the quantity of groundnut supplied to the market.

Channel III: Farmers-Retailer - Consumer: Since there are no well-organized cooperatives, both formal and informal retailers buy groundnut and store for a time

then sell it to other channels. Among the total groundnuts supplied to the markets, a percentage of it is supplied to cooperatives. This channel is the second-largest channel (Desta, 2019).

Channel IV: Farmers-Wholesalers- Processors- Consumer: This channel is the largest and it involves wholesalers directly buying groundnut from farmers, cooperatives, and collectors. They buy the product with and without the involvement of brokers depending on the volume of the product and resale to processors (Adane, 2017).

2.1.2 Actors along the Agriculture market channel

Across agricultural value chains, a wide range of actors play essential roles in linking smallholder farmers to markets. These actors include farmers, local traders, wholesalers, retailers, transporters, processors, and consumers. In many developing countries, smallholder farmers typically sell their produce—whether groundnuts, maize, beans, cassava, or vegetables—either directly at local markets, to traveling traders, or through informal channels. Sales are often made in non-standard units such as buckets, basins, or bags, particularly in informal or rural markets where certified scales and measurement standards are absent (USAID, 2013). This lack of standardization often leads to price disputes or unintentional losses on the part of the farmers who may overfill units or accept underweight payments (Ben, 2017).

Farmers in many Sub-Saharan African contexts, such as South Sudan, Uganda, and Nigeria, engage in direct sales to traders or middlemen who visit farms or meet producers at local and weekly markets (Adepoju & Oduro, 2021). These traders typically organize transportation, negotiate prices, and handle logistics such as loading produce for shipment. In some cases, long-standing relationships exist between farmers and traders, promoting smoother transactions. In other situations, however, mistrust or lack of familiarity hinders effective negotiation and can lead to exploitation.

Retailers—many of whom are women—play a key role in distributing value-added agricultural goods, including shelled groundnuts, processed cereals, or packaged fruits and vegetables. These retailers often purchase unshelled or raw produce from farmers, perform additional processing (e.g., shelling, cleaning, packaging), and sell the finished

product in smaller quantities such as cups or half-buckets. In doing so, they earn a profit margin that reflects both value addition and labor input (USAID, 2013). However, limited access to capital often restricts these retailers from purchasing larger quantities, despite the demand. Retailers also face competition from farmers who bypass traders and sell directly to end consumers, particularly when local media or mobile platforms broadcast favorable prices (Mbatha et al., 2022; Nyangena & Kirui, 2023).

Buyers and traders further up the value chain, such as aggregators and wholesalers, play a critical role in consolidating produce for bulk sales, either for domestic distribution or export. Their role is particularly vital in fragmented smallholder-dominated sectors, where assembling sufficient volumes can be costly and logistically complex (Mwangi & Otieno, 2023). These actors often rely on trust-based relationships, informal credit arrangements, and flexible payment schedules to sustain supply chains. Studies from Ethiopia and Ghana have emphasized that strengthening such vertical linkages, including through farmer-based organizations (FBOs) and contract farming, can reduce transaction costs and stabilize market access (Ayele & Asfaw, 2022; Kamara & Diallo, 2021; Owusu & Boateng, 2020).

Development programs, such as the USAID Food, Agribusiness, and Rural Markets Project, have advocated for structured market linkages where traders are connected to FBOs and provided with credit support to purchase produce in bulk. This approach fosters transparency, strengthens trust, and enhances market coordination. Credit schemes can be designed with low interest rates and repayment schedules that match seasonal marketing cycles. In such systems, traders may submit simple business plans describing their locations and operations to qualify for credit—encouraging accountability and inclusion in formal value chains (Tesfaye & Gebremariam, 2022).

2.1.3 Market access constraints for smallholder farmers

Smallholder farmers across Sub-Saharan Africa face a wide array of market access constraints that cut across crops, regions, and market systems. Agriculture employs the

majority of the rural workforce, yet market participation remains limited due to both structural and institutional barriers. In countries like South Sudan, conflict and political instability have led to the displacement of farming populations, disruption of trade routes, and erosion of investor confidence—undermining both production and marketing capacity (Janine, 2022).

In many fragile states, natural disasters such as drought and flooding further constrain agricultural potential. The absence of improved drought- and flood-resistant crop varieties limits resilience and leads to inconsistent production. Additionally, post-harvest losses due to aflatoxin contamination, poor storage, and inadequate pest control severely reduce the quality and marketability of produce such as groundnuts, maize, and legumes. Yet these challenges are not unique to South Sudan; they are echoed in countries like Malawi, Nigeria, and Ethiopia, where investments in pre- and post-harvest handling technologies remain insufficient (Kumwenda & Modola, 2005; Mango et al., 2018).

In Malawi and other contexts, prices tend to spike near planting time and fall dramatically at harvest, discouraging farmers from selling when the supply is abundant (Kumwenda & Modola, 2005). Farmers who lack storage facilities are often forced to sell at low prices immediately after harvest. The absence of market price information systems compounds this problem, allowing urban-based middlemen to take advantage of rural producers by offering low farm-gate prices (United States African Development Foundation, 2021). Such practices are common in countries with weak regulatory oversight and poor rural connectivity.

Market volatility also discourages smallholder investment in commercial production. In areas with weak infrastructure, the margin between harvest-time and planting-time prices can double within months. Many farmers, particularly those without access to storage or timely market information, sell their produce prematurely—often while still in the field—at minimal prices to meet urgent cash needs (United States African Development Foundation, 2021).

A lack of institutional support, such as access to market advisory services and credit, further limits market participation. In Nigeria and Uganda, for example, farmers cite inadequate training in marketing strategies, limited exposure to high-value crops, and poor access to financial institutions as major obstacles to commercialization. Where support services exist, they are often underfunded, inaccessible, or irrelevant to the needs of smallholder farmers (Adepoju & Oduro, 2021).

Physical access to markets is constrained by poor road networks, especially in rural areas. In countries like Ethiopia, Ghana, and South Sudan, seasonal flooding and impassable roads make transporting produce to market centers expensive and unreliable. This leads to high transport costs, increased spoilage, and lower profit margins for farmers and traders alike. The small volumes produced by individual farmers also make it costly for traders to aggregate sufficient quantities, raising unit costs and discouraging formal buyer engagement (Mbatha et al., 2022).

To overcome infrastructure-related barriers, small traders often work with informal transport providers and operate in circuit markets. While these adaptive strategies help bridge some gaps, the traders themselves are constrained by limited capital, lack of storage facilities, and minimal bargaining power. Without the capacity to engage in inter-seasonal arbitrage or value addition, they remain locked into a cycle of subsistence-level trading, unable to scale their operations or drive inclusive market development (Owusu & Boateng, 2020).

In sum, the market access constraints faced by smallholder farmers across various countries and commodity systems reflect deep-seated issues in agricultural policy, infrastructure development, and institutional support. Addressing these challenges will require targeted investments in rural roads, information systems, producer organizations, and inclusive financial services to ensure that smallholder farmers can participate fully and profitably in local, regional, and international markets..

2.2 Market Participation of ground nut farmers

There are a number of diverse definitions of market participation suggested by various authors. According to Mmbando (2014), market participation can be defined in relation to sales as a portion of the total production output, for the total of all agricultural production output. Market participation is also defined by using the home purchases and sales, whereby volume of farm produce traded are utilized in estimating market participation (Pienaar and Traub, 2015). Market participation is similar to commercialization, which implies that market participation denotes evolution from subsistence farming to a market arrangement mode, such that steady use of markets is designed for the goal of trading products and services (Kisake-Lwayo and Obi, 2012).

Also, market participation refers to the involvement of individuals, companies, or entities in the buying and selling of goods, services, or financial instruments within a market economy. It encompasses the actions and decisions made by participants to engage in various economic activities, such as buying or selling products, investing in financial assets, or providing services.

Governments in sub-Saharan African nations have historically been vital in helping farmers market their agricultural products. Most of these nations liberalized their economies in the 1980s and 1990s to foster open market-led exchanges and accelerate economic growth (Dorward et al. 2005). While some nations have done away with government regulations, others continue to support farmers' marketing efforts by utilizing Marketing Boards.

In order to increase groundnut production and sales as well as farmers' incomes, which are derived from market participation, better market access is required. The output of grain legumes and their revenue could increase dramatically with improved market access. According to their comparative advantage, markets give farming households the chance to profit from trade by allowing them to sell their surpluses and buy the products and services they require (Boughton et al. 2007; Barret, 2008).

Market participation has been shown by IFAD (2003) and Omiti et al. (2009) to be a successful strategy for helping rural smallholder farmers escape extreme poverty and

generate more revenue through higher sales volumes. Research indicates that smallholder farmers in developing nations participate very little in the market, which has slowed down economic growth driven by agriculture and increased levels of poverty. Furthermore, since different marketing channels have different costs and benefits (profitability), selecting the right one is thought to be essential to the successful marketing of both agricultural and non-agricultural products.

According to Tsourgiannis, Errington, and Eddison (2008), the marketing channel used when selling the product has a bearing on the profit farmers may make. Therefore, marketing channel choice decisions are very important, especially in a liberalized market economy like South Sudan where sellers can choose from a range of market channels.

Additionally, market access through various marketing channels is crucial for taking advantage of market opportunities. In addition, marketing, engagement, and market participation are important factors that affect sales volume and production. Agriculture-based economic growth is dependent on these factors, and improving the income of rural farmers is particularly important (Adeoti, Issack, Oluwatayo, & Rahem, 2014). Farmers who have access to market-related information are better able to access the market and earn a living, and healthy markets present significant chances to enhance welfare, all of which contribute to sustainable growth.

Farmers face difficulties when deciding which market channel to use, how much to produce, and how to achieve the desired development outcomes. Choosing the best delivery channel for farm products is a difficult task that is influenced by a number of factors, including farmers' location in relation to the closest market, production experience, length of storage, price of the product, unfair profit share, and inadequate formal education and extension services (Jerena, 2017).

According to (Adam , 2018), groundnut marketing and market channel choice are constrained by limited numbers of traders and market agents, inadequate transportation network, the inadequacy of institutional services, low bargaining power of producers, price instability, inadequate well-organized and coordinated market

channel, inadequate storage facilities, poor-quality mechanism, domination of few market channels, absence of groundnut processors around the study area and weak market information all limits smallholder farmers to participate in the market.

Different kinds of traders like collectors, retailers, wholesalers, and consumers also buy groundnut from producers at different prices, and farmers are forced to sell to whom traders near to their farm due to different challenges of market channel choices. But, the presence of a fair and well-organized market which led farmers to be a central market actor brings further investment in production, marketing and attracts the attention of producers to produce more and supply for markets (Berry, 2010).

Increased use of quality, improved and well-adopted crop varieties seed enhances the production and productivity of agricultural product and market potentials (Akpo *et al.*, 2020). Incorporation of crop residues has a significant advantage in improving groundnut yield as weather condition might be unfavourable for the product (Mubarak *et al.*, 2007). Low levels of education among farmers clearly serve as impediments to agricultural growth and development (Victoria Boniface, 2016). Education enhances the farming skills and productive capabilities of the farmers (Weir, 1999). Farmers literacy and numeracy skills helps them to calculate the costs and benefits of adopting a particular farming technology and be able to record their sales income (Asadullah and Rahman 2009; Hojo 2004; Lockheed *et al.*, 1980; Narayanmoorthy 2000).

Experience indicates that farmers' complete inadequate market information, ignorance and negotiate attitude towards finding markets are key setbacks for farmer participation in the market. The provision and targeted delivery of agricultural information to small and marginal farmers remain a challenge in extension programs (Swanson 2008; Swanson and Rajalahti, 2010). As increases in productivity of smallholder agriculture crucially depend on their information related to production, processing, and markets, identifying their sources of information and search behaviour becomes important (IFPRI, December 2021).

In South Sudan, particularly in Northern Bahr el Ghazal State, the main actors in the groundnuts value chain are producers, local traders, urban traders and local consumers.

Most groundnut producers had limited access to agricultural inputs and reliable markets. Within the limited access, the youth had relatively higher access to agricultural inputs than the women and men. The main sources of inputs were fellow farmers, own saved seeds, village or local market, and Agro-input dealers and organizations working in the area. To a lesser extent, some producers obtained Agro-inputs through the support from the State Agriculture Department (USAID Food, Agribusiness and Rural Markets Project, 2013).

2.4 Market participation challenges encountered by smallholder farmers

The question of market participation among smallholders in developing countries has been a major theme in the literature from one perspective: transaction costs. As Mmbando (2014) states, transaction costs have the potential to limit market access and impose further burdens of restrictions that make it difficult for smallholders to enter agricultural markets. These transaction costs of moving goods to market include transportation, information asymmetries, and inefficiencies in negotiations. Smallholder farmers are often located in rural areas where infrastructure development is limited; thus, every cost from moving goods and accessing buyers increases transaction costs if it is not being dealt with directly. Mmbando, Wale, and Baiyegunhi (2015) argue that transaction costs are a sign of smallholder agriculture, and are a substantial contributing factor to the market failures seen in many developing economies.

Education plays a dual role in improving farmers' readiness to participate in formal markets (Harvey & Rakotebe, 2014). Mmbando (2014) noted that more educated farmers are generally better at adopting improved agricultural technologies, adding value to their products, and producing surplus for market, thereby increasing their market orientation subscriptions. Infrastructure, especially rural roads, has been regarded as one of the most serious constraints to market development and participation. The physical road networks in many developing countries are patchy and poorly maintained, furthering the cost for farmers to transport products and farm inputs. Poorly maintained road networks can significantly impede the commodity flow

to markets while increasing post-harvest losses hindering small farmers from participating in markets (Salami, Kamara and Brixiova 2010).

Beets (1990) also noted that investments in infrastructure tend to favor urban development, including city roads and administrative buildings as opposed to rural development such as storage, processing, and transportation. Consequently, most farmers have to rely on inefficient forms of transport, notably animals or bicycles, to reach markets that maybe be far off.

In East Africa, smallholders' access to markets is constrained by long distances to market centers, which is particularly challenging for women who shoulder the burdens of women farmers in the household and in farm work. Thamaga-Chitja and Morojele (2014) found that rural women farmers often walk long distances carrying their produce, which makes participation in a market both a physical and logistical issue. Additionally, gender norms restrict women's access to market information and their participation in high-value value chains.

Household characteristics also have a significant impact on market participation. Mmbando (2014) shows that household characteristics such as age, education level, gender, and household size are important market behaviour characteristics. Older farmers usually possess greater social networks and experience that can reduce their costs of obtaining information about markets and engaging with them. At the same time, they are likely to participate less in a market than younger farmers due to reduced energy-levels and productivity (Mitiku, 2014). Larger households may have more labour available to production and market activities, but they also have higher consumption, which may prevent them from generating a marketable surplus.

There are some further studies from Africa to provide additional evidence. Mango and Makate (2018) conducted a study on tobacco contract farming in Mozambique and found that educational status positively influences market participation, and better-educated households were more informed about pricing and were more likely to negotiate contracts with external access to the market. In Tanzania and Ethiopia, education (using years of schooling as a measure) was found to positively influence market entry

and production for surplus (Mango et al., 2018). These studies reinforce that improving literacy and business training for women will likely influence their participation in recorded income.

Limited agricultural support services, including extension and finance, continue to dissuade smallholder farmers from engaging with markets. Beets (1990) noted that with no support services, many farmers turned to off-farm activities to live; in the process, land gets dropped from production, and food production and marketable surpluses are reduced. Therefore, improving the delivery of extension services, access to affordable credit, and education and training remain important to improve market access for those smallholder farmers.

2.5 Effects of market participation on the sales volume

Different countries' empirical studies indicate that market participation has a substantial impact on smallholder farmers' volume sales. Researchers and development organizations have continually strived to deconstruct barriers to agricultural commercialization. Mango et al. (2018), Oduntan and Alade (2020) and Morton and Martey (2021) noted a range of factors, institutional and household level that inhibit or enhance the degree of market participation among smallholder farmers, and the volume of produce sold. For example, in Ethiopia, Anderagie (2021) noted that gender, number of extension contacts, off-farm income, use of improved seed and fertilizer and perceptions of land quality all enhanced or limited market participation and volumes sold. Some factors influence market participation and others determine the engagement intensity, that is, the volume of produce marketed. Gender and education were salient, with higher sales volume reported by the heads of households that were male and educated.

In Ghana, Asuming-Brempong (2013) was another comprehensive accounting of smallholder tomato and pineapple producers development in terms of their commercialization. He identified labour and land productivity as the main determinants of commercialization. Amongst pineapple farmers, he noted savings and access to

productive land as especially influential. In a similar study, Beyene (2020), identified land size, labour, inputs used (seeds and fertilizer), and ownership of livestock as significantly influencing haricot bean production and sales. Beyene's findings provide evidence that commercialization is not merely a question of access to the market, but also the farmer's productive capacity.

In Nigeria, Oduntan and Alade (2020) examined the commercialization of plantains and revealed that the amount harvested, farm size, age of farmer, experience, and distance to market had a significant impact on the volume of sales. Despite such a high rate of market participation at the aggregate level (64.6%), the authors argue that the volume of commercialisation observed was viewed as insufficient to generate significant rural income growth, thereby necessitating policy intervention to raise productivity.

Demographic and institutional variables have also been found to influence the levels of commercialization elsewhere in other studies. Megerssa (2020) in vegetables farmers identified age, education of household head, household size, labor availability and market information were among the factor which significantly affected the level of market participation. Using a Tobit model, Olanrewaju (2016) reported that commercialization indices for yam, cassava, and maize in Southwest Nigeria were large (81%, 88%, and 77%, respectively) but were significantly influenced (positively) by access to credit, extension services, input use, and farmer group membership. Abu et al. (2014) in a research among maize farmers in the Upper East Region of Ghana, that public and private asset, as well as transaction costs, were major factors affecting the decision to commercialize and the volume of produce commercialized.

Institutional support and market information also matter. Morton and Martey (2021) discovered that exposure of farmers to market information and extension services greatly increased the likelihood of farmers selling maize and the level sold. More experienced farmers and improved infrastructure farmers also attained greater commercialization. These results illustrate that participation in markets is not a zero-sum option but a continuous choice determined by several interrelated factors.

Among annuals, Hagos et al. (2020) found resource and asset ownership such as the quantity of productive trees, size of land holding, and seedlings provided to be significant predictors of mango volume of sales. Lu et al. (2010) further observed that effective buyer-seller relationships, compliance with quality, and contract farming schemes enhance volumes of sales by ensuring access to markets and increased buyers' and farmers' trust.

Typically, socio-demographic variables, production variables, institution variables, and market infrastructure determine smallholder farmer volume of sales, according to literature reviewed. Crop type and location will certainly dictate specific variables involved, although the general experience is that enhanced smallholder commercialization necessitates a comprehensive strategy that targets both supply-side and demand-side constraints..

2.6 Review of Methodological Approaches in Similar Studies

Empirical research of market drivers among smallholder farmers has been extremely active in the recent past years. Empirical research since 2015 has been characterized by diverse methodological designs, each with its strengths and weaknesses. This review identifies the methods applied, their strengths and weaknesses, and their appropriateness to studying market participation among smallholder groundnut farmers in Aweil East County, Northern Bahr El Ghazal State, South Sudan.

Econometric modeling continues to be a prevalent means of market participation research. Later research by Ouma et al. (2016) and Abro et al. (2017) has also utilized econometric techniques such as probit and double-hurdle regressions in researching the determinants of market participation by smallholder farmers. These regressions are particularly appreciated for their ability to give exact, quantifiable data on market determinants. For example, Ouma et al. (2016) used probit regression to estimate market participation choices in Kenya and found strong relationships between household attributes and access to the market. In the same way, Abro et al. (2017) applied a double-hurdle model to study the empirical decision of market participation and intensity of participation among Ethiopian farmers.

The strongest point of econometric analysis is that it can measure the influence of different determinants on market participation in terms that are understandable and evidence-based (Ouma et al., 2016). The models demand high-quality, large data, which is difficult to achieve in poor-resource environments such as South Sudan. Secondly, econometric models tend to make linear assumptions about variable relations, which can downplay the subtle nature of market dynamics and discount the nuanced interactions (Abro et al., 2017). Moreover, identification of causality and not just correlation is challenging, especially in observational studies where controlled experiments are a no-go (Ouma et al., 2016).

Over recent years, qualitative approaches have increased in prominence in analysis of contextual determinants driving market participation. Maponya and Mpandeli (2016) and Sebatta et al. (2015) have applied focus group discussions, key informant interviews, and case studies to procure in-depth understanding on social, cultural, and institutional determinants of smallholder farmers. They are effective in capturing nuances and context-sensitive truths of market participation that may be missed using quantitative techniques. They produce rich, qualitative data that can reveal hidden motivation for participation decisions (Sebatta et al., 2015).

Qualitative approaches are emergent and interactive, enabling researchers to track emergent themes and react to new data as it comes to light (Maponya & Mpandeli, 2016). They do possess their considerable limitations, though. Information collected can be extremely subjective and bearing the mark of participant and researcher bias, generating bias (Sebatta et al., 2015). Besides, qualitative research findings tend to be case- or context-oriented and therefore can be of limited use in other communities or regions (Maponya & Mpandeli, 2016). Additionally, qualitative research can be resource and time-consuming and could be problematic where resources need to be conserved (Sebatta et al., 2015).

Mixed-methods studies, which combine both quantitative and qualitative approaches, have been more popular in recent years for their potential to give a deep insight into

market participation. For instance, Wossen et al. (2017) utilized the mixed-methods strategy in the study of smallholder farmers in Ethiopia by integrating econometric analysis with participatory rural appraisals. Thus, there is the potential to base quantitative evidence on qualitative information, resulting in greater qualitative understanding of market participation phenomena.

The greatest advantage of mixed-methods research is that it can encapsulate the strength of both quantitative and qualitative approaches and give a holistic view of the determinants driving market participation (Wossen et al., 2017). It also places the quantitative statistics in context through the use of qualitative observations, thereby giving stronger results. However, mixed-methods studies are complex and time-consuming, necessitating both methodological skills and skilled bringing together of the data (Wossen et al., 2017). Bringing together qualitative and quantitative data, and dealing with large datasets, can be taxing (Wossen et al., 2017).

The research method on the participation of smallholder farmers in markets has to be commensurate with the research goals and environment in which it is being pursued. While econometric approaches provide precision and quantifiable answers, they do tend to reduce rich interactions to oversimplification and data limitation. Qualitative methods provide depth and context but are prone to subjectivity and limited generalizability. Mixed-methods designs provide an overall picture through the amalgamation of the strengths of the two and are resource- and expert-demanding. In the study of the determinants of groundnut farmer market participation in Aweil East County, using a mixed-methods design would be very helpful as it would supply both overall knowledge as well as qualitative knowledge of the local setting.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

Data were collected from Aweil East County in Northern Bahr el Ghazal in South Sudan, close to the border with the Republic of Sudan. It borders South Darfur State in the North, Abyei Region in the Northeast, Twic County of Warrap State in the East, Gogrial West County of Warrap State in the Southeast, Aweil South County to the South, Aweil West County to the Southwest and Aweil North County to the Northwest. It has eight administrative Payams namely; Baac, Yargot, Madhol, Malualbaai, Mangar tong, Mayomwel, Mangok and Wunlang. According to the WFP & FAO, (2020) special report, Aweil East County had a population of 536,825 households of which 78,814 were farming households. The respondents' sample size was drawn from the groundnut producers' farming households in Aweil East County of Northern Bahr el Ghazel State.

3.2 Research Design

For this study, a cross sectional descriptive research design was used.

3.3 Sample size estimation

The sample size was determined from the use of Taro Yamane correlation formula as edited by Bartlett *et al*, 2000.

$$n = \frac{N}{1 + N(e)^2}$$

Were;

n is the desired sample size

N is the population of the study

e, is the required precision of the study

It therefore followed that

$$= 78814 / 1 + 78814(0.05)^2$$

$$= 398 \text{ farmer households}$$

Therefore, a sample of 398 farmer households was selected as a representative of the whole population.

3.4 Sampling procedures and techniques

The study used a simple random sampling technique for selecting participants to be part of the study. All smallholder ground nut farmers in Aweil East were listed to make a sampling frame and a total of 398 respondents were then selected at random using a randomizer tool (www.randomizer.com). Though, during data collected 396 farmers were interviewed.

3.5 Data collection procedure

Survey method was used for data collection where the researcher collected information from a targeted group of people about their opinions, behaviour, or knowledge on the subject matter. The data collected was both qualitative and quantitative. Questionnaires was designed as study instrument to collect data through respondents' interviews.

3.6 Questionnaires method

The quantitative data for this study was gathered using pre-tested structured questionnaires. The structured questionnaire was developed with the aid of suggested guidelines by Sekeran (2009). The first section of the instrument was probe for background and demographic data, while the subsequent section focuses on respondents' insights about the study parameters including socioeconomic, market and institutional factors. The questionnaire was refined during the piloting of the instrument. A total of 398 questionnaires were administered to respondents by research assistants.

3.7 Data Analysis

All data collected from the field was first checked to ascertain completeness, legibility, comprehensibility, consistency, and uniformity in responses. After editing, the data was coded and entered into Microsoft Excel for preliminary organization. The organized data was then exported to Stata (StataCorp, 2015) for descriptive and inferential analyses.

Objective one used a combination of descriptive and cross-tabulation analyses. Descriptive analysis was used for continuous and categorical variables to generate descriptive statistics, including frequencies, percentages, mean values and prevalence of each market channel while, cross-tabulation was used for the existence of any statistical differences among farmers participated in market channel usage and counter parts. The descriptive analysis, the following formula was used to calculate the percentage of farmers using each market channel:

$$\text{Percentage of Farmers} = \left(\frac{\text{Number of Farmers Using a Specific Channel}}{\text{Total Number of Farmers Surveyed}} \right) \times 100$$

The second objective focused on identifying the factors determining market participation decisions among smallholder groundnut farmers. Market participation was conceptualized as a binary outcome, where farmers either participated in the market or did not.

Market participation was defined as the act of selling groundnuts produced by the farmer. It was measured as a binary variable (1 for “Yes” and 0 for “No”). This got from farmers who had participated and those who did not participate in marketing their groundnuts. The independent variables included socio-economic factors (e.g., age, education, farm size) and institutional factors (e.g., access to credit, distance to market, and extension services).

We used a Binary Logistic Regression model to assess for factors influencing market participation. This model is suitable because the dependent variable (market participation) is categorical, allowing for the estimation of the probability that a farmer participates in the market based on the covariates.

The logistic regression model is specified as follows:

$$\log \left(\frac{P}{1-P} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where:

- P is the probability of market participation.
- β_0 is the intercept.

- $\beta_1, \beta_2, \dots, \beta_n$ are the coefficients for the independent variables

Forward stepwise analysis was used to fit the independent variables. The results from the logistic regression will highlight which factors with high likelihood (odds ratio) to influence farmer's decision to participate in the market. Variables with a p-value ≤ 0.05 will be considered statistically significant.

The third objective is to assess the factors influencing the volume of groundnut sales by smallholder farmers in Aweil East County. In this context, the intensity of market participation was measured by the total quantity of groundnut sold by each farmer, measured in kilograms which is also influenced by factors. This continuous outcome variable represents the intensity of market engagement, as the dependent variable. Independent variables included socio-economic factors (such as age, education level, farm size, and household income) and institutional factors (like access to credit, distance to market, availability of extension services, and market infrastructure).

Generalized Linear Model (GLM) with Gamma Distribution and Log Link Function: Given the nature of the outcome variable (sales volume), which is continuous and positively skewed, a Generalized Linear Model (GLM) with a Gamma distribution and a log link function was chosen for the analysis. The Gamma distribution is appropriate for modelling positively skewed continuous data, and the log link function allows for the interpretation of the model coefficients in multiplicative terms, making it suitable for analysing proportional changes in the outcome variable.

The GLM for the Gamma family with a log link function can be specified as follows:

$$\log(\mu_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where:

- μ_i represents the expected mean sales volume for the i^{th} farmer.
- β_0 is the intercept.
- $\beta_1, \beta_2, \dots, \beta_n$ are the coefficients for the independent variables X_1, X_2, \dots, X_n .

- The link function $\log(\mu_i)$ transforms the expected value of the dependent variable into a linear combination of the independent variables.

The GLM was employed to examine the impact of the predictors on sales volume of groundnuts. The model estimated the impact of each factor on sales volume, and coefficients were interpreted to denote the multiplier impact on sales volume expected for an increase in the predictor variable.

For the log link function, the exponentiated coefficients ($\exp\beta$) would interpret as proportionate increase in the expected volume of sales with a unit increase in the predictor variable. For instance, an $\exp\beta$ greater than 1 implies a positive effect, i.e., with an increase in the predictor, the volume of sales increases by some percentage point. An $\exp\beta$ less than 1 implies a negative effect.

Variables with a P-value of less or equal 0.05 at bivariable level and those that were identified to be associated with sales volume from other studies were included in the multivariable analysis. The analysis was expected to identify significant factors influencing the volume of groundnut sales, providing insights into the drivers of market engagement among smallholder farmers. Variables with a p-value ≤ 0.05 were considered statistically significant and were interpreted as key determinants of market participation intensity.

Specified Models for Data Analysis

1. Logistic Regression Model (For Objective 2):

To determine the factors influencing farmers' decision to participate in the market (Yes = 1, No = 0), the following model was specified and estimated:

The logistic regression model is specified as follows:

$$\log\left(\frac{P}{1-p}\right) = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Gender}_i + \beta_3 \text{Education}_i + \beta_4 \text{LandSize}_i + \beta_5 \text{Experience}_i + \beta_6 \text{Transport}_i + \beta_7 \text{VSLA}_i + \beta_8 \text{InputAccess}_i + \epsilon_i$$

Where:

- P_i = Probability of market participation by farmer i
- B_0 = Constant
- B_n = Coefficients to be estimated
- ϵ_i = Error term

2. Generalized Linear Model (GLM) (For Objective 3):

To determine the factors influencing sales volume (in kilograms), the following GLM with Gamma distribution and log link was specified:

$$\log(\mu_i) = \alpha_0 + \alpha_1 \text{Age}_i + \alpha_2 \text{Gender}_i + \alpha_3 \text{LandSize}_i + \alpha_4 \text{HouseholdSize}_i + \alpha_5 \text{Transport}_i + \alpha_6 \text{Consumption}_i + \alpha_7 \text{VSLA}_i + \alpha_8 \text{InputAccess}_i + v_i$$

Where:

- μ_i = Expected groundnut sales volume for farmer i
- α_0 = Constant
- α_n = Coefficients to be estimated
- v_i = Error term

Description of variables used in the models

Variable Name	Description	Unit of Measure
Age	Age of the farmer	Years
Gender	Sex of the farmer (Male = 1, Female = 0)	Binary
Education	Highest level of education (None, Cert., etc.)	Categorical (ordinal)
LandSize	Size of land used for cultivation	Acres
Experience	Years of experience in groundnut farming	Years
Transport	Ownership of transport means (Yes = 1, No = 0)	Binary
VSLA	Membership in Village Savings and Loan group	Binary
InputAccess	Access to agricultural inputs	Binary

Consumption	Quantity of groundnuts consumed at home	Kilograms
HouseholdSize	Number of household members	Number of persons
SalesVolume	Groundnut quantity sold in last season	Kilograms
MarketParticipation	Whether farmer sold any groundnuts	Binary (Yes = 1, No = 0)

3.8 Ethical considerations

The researcher ensured that the study is ethically sound by meeting international standards for the protection of human participants, while considering cross-ethical issues, informed consent shall be obtained from all participants who was agree to be interviewed (Mill & Ogilvie, 2002). The researcher was explaining the purpose of the study to the participants and the findings of the study was published. Ethical concerns were seen in areas of publishing original work generated from the study. Administrative clearance was obtained from the relevant authorities. Written informed consent sought for each participant. Privacy and confidentiality were ensured by the use of unique identity numbers on the questionnaires without linking to participants’ personally identifiable data.

Due to the current COVID-19 pandemic, the researcher observed the standard operating procedures put up by the Ministry of Health to minimize the chances of spreading or contracting the virus. This was through wearing a face mask before visiting the various households, moving with the hand sanitizer to sanitize the respondents, washing hands regularly with soap and ensuring social distancing between the respondent and the researcher.

Referring to the ethical requirements, the researcher wrote letters to the various respondents asking for permission to be allowed to conduct research in their county. The researcher also got an introductory letter from the University asking for permission to allow him conduct research in the county. It is important to have the permission of the involving party before carrying out an investigation; hence the researcher came to a consensual agreement with the targeted stakeholders to ensure that there were no

complications. Also, the researcher distributed questionnaires only during break time as interrupting the subjects during work hours were inappropriate and may affect responses. Furthermore, the researcher made sure no violation of confidentiality (of personal information and responses) shall arise. The researcher was ensuring no revelation of identity or other personal information was enquired when preparing questionnaires. There was also be issues of trust from the respondents; however, confidentiality was guaranteed to avoid unnecessary issues.

CHAPTER FOUR

RESULTS

4.1 Social demographic characteristics of the farmers

A majority (67.2%) of farmers were female and most (99.5%) of them were married. The farmers had a mean age of 33.1 years and most (69.4%) of them had no formal agricultural training. Largely (85.1%) the primary source of income for these farmers was selling groundnuts and most (78.0%) of them had over 5 years' experience in ground nut farming (Table 1&2):

Table 1: Socio demographic characteristics of farmers

Variable	Mean	SD	Median	Min	Max
Age in years	33.1	5.9	33	21	52
Household size	7.3	1.3	7	3	11
Ground nuts sales last season in Kgs	323.3	584	190	80	4550
Experience in agriculture farming in years	6.8	2.2	7	1	14
Size of land for cultivation in acres	10.3	3.1	10	1	23

Table 2: Social demographic characteristics of farmers

Parameters	Frequency	Percentage
Gender		
Male	130	32.8
Female	266	67.2
Marital status		
Not married	2	0.5
Married	394	99.5
Highest level of Agric. Education		
No formal education	275	69.4
Certificate	81	20.5
Diploma	17	4.3
Degree	23	5.8
Source of household income		
Selling Groundnuts	337	85.1
Other small businesses	59	14.9
Main purpose of growing g/nuts		

Own consumption	384	97.2
Mainly marketing	11	2.8
Quantity of g/nuts harvested in last season		
less_than_100kgs	34	8.6
More_than_100kgs	361	91.4
Quantity of consumed at home		
less_than_100kgs	304	76.8
More_than_100kgs	92	23.2

4.2 Categorization of market channel used by groundnut farmers to sell groundnuts

The study revealed that most commonly used channel by farmers to sell their groundnut was farmers to wholesalers, represented at 53.5%. The least used market channel was farmer to consumer at 17.4% as shown in Figure 1 below:

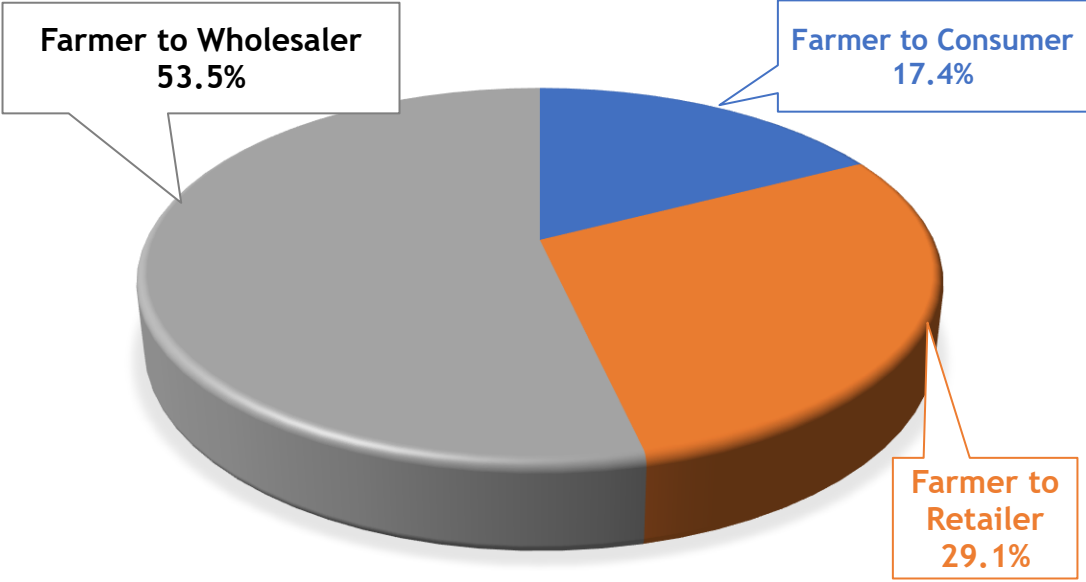


Figure 2: Categorization of market channel used by groundnut farmers for selling produce

4.3 Groundnut farmer participation in the different market channel

The overall 93 (23.5%) ground nut farmers were market participants and 303(76.5%) of farmers non-market participants. The findings also revealed that groundnut farmers participated in different market channels with high participation in farmer to consumer at 42% and Farmer to wholesale at 37.7% in Wunlang. Moderate ground nut farmer participation was in registered in Baac with 20.3%. 23.5% and 25.5% for Farmer to consumer, Farmer to retail and Farmer to wholesale respectively (Figure 1).

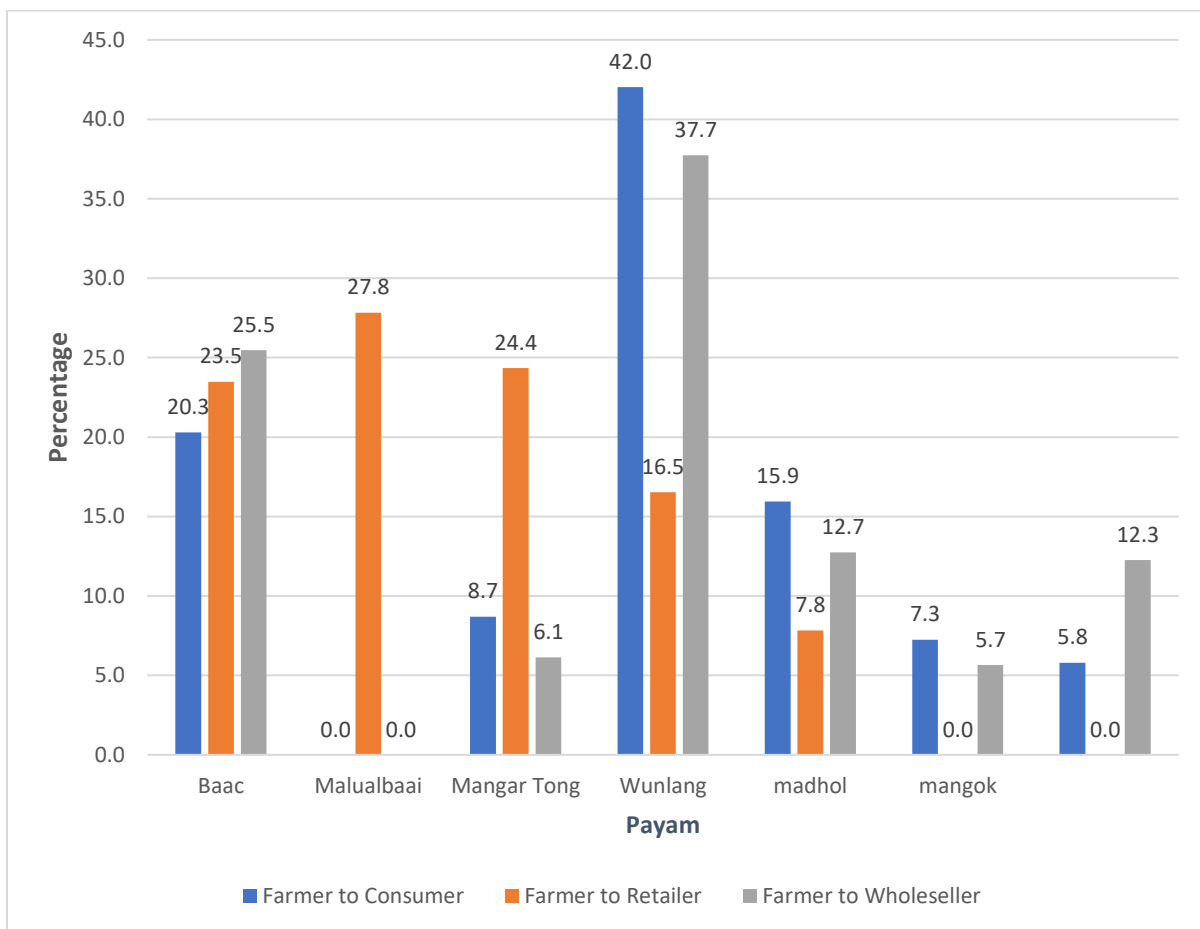


Figure 3: Percentage of farmers that participate in the different market channel by Payam

4. The characteristics of ground nut farmers associated with participation in the different market channel

Among the farmers that participated in marketing their ground nuts in the different market channels, majority (69.9%) were female. More than half (69.9%) of those who had engaged in marketing their ground nuts had never attained any form of formal education in agriculture and only 3.2% had attained a diploma and above in agricultural education. The study also revealed that there exist significant differences in market channel usage between market participants and non-market participants. For instance, difference occurs for farmers among farmers with varied level of agricultural education ($p=0.028$), size of land for cultivation of ground nuts ($p=0.014$) and the farmers experience in ground nut cultivation over years ($p=0.033$) as illustrated in Table 3 below:

Table 3: The characteristics of ground famers associated with market participations.

Variable	Total N=396()	Market participation		P- Value
		No n=303(%)	Yes n=93(%)	
Gender				0.523
Male	130 (32.8)	102 (33.7)	28 (30.1)	
Female	266 (67.2)	201 (66.3)	65 (69.9)	
Age				0.558
20-29	95 (24.0)	75 (24.8)	20 (21.5)	
30-39	241 (60.9)	180 (59.4)	61 (65.6)	
>40	60 (15.2)	48 (15.8)	12 (12.9)	
Marital status				0.375
Not married	2 (0.5)	1 (0.3)	1 (1.1)	
Married	394 (99.5)	302 (99.7)	92 (98.9)	
Highest level of Agric. Education				0.028
No formal education	275 (69.4)	210 (69.3)	65 (69.9)	
Certificate	81 (20.5)	56 (18.5)	25 (26.9)	
Diploma and above	40 (11.1)	37 (12.2)	3 (3.2)	
Household size				0.114
<5	14 (3.5)	8 (2.6)	6 (6.5)	
5-8	94 (23.7)	68 (22.4)	26 (28.0)	
7-8	225 (56.8)	174 (57.4)	51 (54.8)	
>9	63 (15.9)	53 (17.5)	10 (10.8)	
Source of household income				0.537

Selling ground nuts	337 (85.1)	256 (84.5)	81 (87.1)	
Other small businesses	59 (14.9)	47 (15.5)	12 (12.9)	
Size of land for cultivation				0.014
<=10 acres	263 (66.4)	211 (69.6)	52 (55.9)	
>10 acres	133 (33.6)	92 (30.4)	41 (44.1)	
Experience in groundnut cultivation (Years)				0.033
<=5	87 (22.0)	74 (24.4)	13 (14.0)	
>5	309 (78.0)	229 (75.6)	80 (86.0)	
Main purpose of growing g/nuts				0.062
Own consumption	11 (2.8)	11 (3.6)	0 (0.0)	
Mainly marketing	384 (97.2)	291 (96.4)	93 (100.0)	
Quantity of consumed at home				0.397
less_than_100kgs	361 (91.4)	274 (90.7)	87 (93.5)	
More_than_100kgs	34 (8.6)	28 (9.3)	6 (6.5)	

4.5 Marketing and institutional factors associated with market participation

Furthermore, results indicated that the farmers that participated in marketing their ground nuts, most (52.7%) of them reporting that the main results for the price fluctuation of the ground nuts is because of the raise in the United States Dollar (USD) raising against the South Sudan Pound (SSP). Majority (70.9%) of the farmers that participated in marketing their ground nuts were from VSLA framers' group.

More than half (61.3%) of the farmers that participated in marking of their ground nuts used Raksha and donkey to transport their ground nuts to the marketing places and only 2.2% of the farmers used vehicles for transporting their ground nuts to the market for selling. Further the study found out that farmers reasons for price fluctuation of the ground nuts ($p=0.004$), farmer's group ($p<0.001$), means of transporting the ground nuts to the market ($p<0.001$), Setbacks for farmer participation in the market ($p<0.001$), Impacts agricultural inputs and reliable markets ($p<0.001$) were statistically significant with market participation (Table 4).

Table 4: Marketing and institutional factors associated with market participation

Variable	Total N=396()	Market participation		p- Value
		No n=303(%)	Yes n=93(%)	
Distance to nearest agricultural produce market				0.692
<=5 km	82 (20.8)	60 (19.9)	22 (23.7)	
6-10km	274 (69.4)	211 (69.9)	63 (67.7)	
>10km	39 (9.9)	31 (10.3)	8 (8.6)	
Reasons for the price fluctuation				0.004
Due the rise of USD against SSP	224 (56.6)	175 (57.8)	49 (52.7)	
Loss of value of local currency against pounds	24 (6.1)	24 (7.9)	0 (0.0)	
high dollar rate against pounds	148 (37.4)	104 (34.3)	44 (47.3)	
Price fluctuation affect sell of g/nuts				0.252
Yes	384 (97.2)	292 (96.7)	92 (98.9)	
No	11 (2.8)	10 (3.3)	1 (1.1)	
Source of market information				0.402
Farmers Association	164 (41.4)	122 (40.3)	42 (45.2)	
NGOs	232 (58.6)	181 (59.7)	51 (54.8)	
Farmer's group				<0.001
Baai VSLA women groups	67 (16.9)	51 (16.8)	16 (17.2)	
VSLA groups	260 (68.4)	204 (67.4)	66 (70.9)	
Wunkuel VSLA groups	31 (7.8)	27 (8.9)	4 (4.3)	
Manger Tong groups	28 (7.1)	21 (6.9)	7 (7.5)	
Transport facility for marketing				<0.001
Raksha and donkey	312 (78.8)	255 (84.2)	57 (61.3)	
Motorbike and Bicycle	69 (17.4)	35 (11.6)	34 (36.6)	
Vehicles	15 (3.8)	13 (4.3)	2 (2.2)	
Distance to the nearest access road (KM)				0.019
<=5 km	53 (13.4)	34 (11.2)	19 (20.4)	
6-10 km	306 (77.3)	244 (80.5)	62 (66.7)	
>10 km	37 (9.3)	25 (8.3)	12 (12.9)	
Setback for farmer participation in the market				<0.001
Low price of selling g/nuts	74 (18.7)	54 (17.8)	20 (21.5)	
Low yields	137 (34.6)	121 (39.9)	16 (17.2)	
lack of well-organized market	185 (46.7)	128 (42.2)	57 (61.3)	
Impacts agricultural inputs and reliable markets				<0.001
No impact	60(15.2)	29(9.6)	31(36.6)	
Leads to high production and more sales	147 (37.1)	67 (22.2)	34 (36.2)	

Increased Market participation	172 (43.4)	146 (48.2)	26 (28.0)	
Farmers was getting more motivated	17 (4.3)	15 (5.0)	2 (2.2)	
Farmers' failure to access information				0.066
Less profits due to low sales	44 (75.9)	40 (80.0)	4 (50.0)	
lack information where to sell g/nuts	14 (24.1)	10 (20.0)	4 (50.0)	
Farmers' transaction cost				0.721
Delay of g/nuts to the market	119 (30.7)	95 (31.7)	24 (27.6)	
cost of packing affects the level of sales	114 (29.5)	86 (28.7)	28 (32.2)	
lead to more demand in g/nuts and price increases	154 (39.8)	119 (39.7)	35 (40.2)	

4.6 Factors influencing market participation among smallholder farmers in Aweil

The results indicate that Farmers who were members of the Wunkuel VSLA groups significantly ($p < 0.022$) influence market participation decision. Particularly this group was 3.3 times ($OR = 3.3$) more likely to participate in the marketing of the ground nuts compared to those in the Baai VSLA women groups. Additionally, the type of transport facility used by farmers significantly ($p < 0.001$) influenced their market participation. Those who used motorbikes and bicycles were 6.3 times ($OR = 6.3$) more likely to engage in marketing of the ground nuts compared to those who used Raksha and donkeys.

Another important factor was the experience of setbacks in the market. Farmers who reported that low yields were 0.3 times ($OR = 0.3$) less likely to participate in the marketing of the ground nuts compared to those who cited low prices for selling groundnuts. Thus, Low yield significantly ($p < 0.012$) influences farmers market participation decision. Finally, the impact of agricultural inputs and access to reliable markets also played a significant role in market participation. Farmers who reported that these factors led to increased market participation were 4.4 times ($OR = 4.4$) more likely to engage in the marketing of the ground nuts compared to those who reported no impact (Table 5).

Table 5: Factors influencing market participation among smallholder farmers in Aweil

Variable	COR (95%: CI)	P ¹	Odds Ratio (OR) (95%: CI)	P ²
Highest level of Agric. Education				
No formal education	1		1	
Certificate	1.4(0.834 - 2.493)	0.19	1(0.484 - 2.211)	0.929
Diploma and above	0.3(0.078 - 0.878)	0.03	0.5(0.128 - 1.836)	0.287
Size of land for cultivation				
<=10 acres	1		1	
>10 acres	1.8(1.122 - 2.914)	0.015	1.3(0.611 - 2.643)	0.52
Experience in groundnut cultivation (Years)				
<=5	1		1	
>5	2(1.046 - 3.779)	0.036	1(0.446 - 2.092)	0.929
Farmer's group				
Baai VSLA women groups	1		1	
VSLA groups	2.6(1.338 - 5.138)	0.005	0.8(0.284 - 2.213)	0.657
Wunkuel VSLA groups	1.3(1.155 - 7.731)	0.006	3.3(3.129 - 5.856)	0.022
Manger Tong groups	1.1(0.382 - 2.956)	0.908	1.3(0.387 - 4.613)	0.646
Transport facility for marketing				
Raksha and donkey	1		1	
Motorbike and Bicycle	4.3(2.501 - 7.551)	<0.001	6.3(2.391 - 16.649)	<0.001
Vehicles	0.7(0.151 - 3.135)	0.629	3.2(0.515 - 19.923)	0.212
Distance to the nearest access road				
<=5 km	1		1	
6-10 km	0.5(0.243 - 0.851)	0.014	0.6(0.281 - 1.278)	0.185
>10 km	0.9(0.353 - 2.088)	0.737	0.6(0.222 - 1.816)	0.397
Setback for farmer participation in the market				
Low price of selling g/nuts	1		1	
Low yields	0.4(0.234 - 0.648)	<0.001	0.3(0.137 - 0.785)	0.012
lack of well-organized market	0.3(0.065 - 1.311)	0.108	0.3(0.053 - 1.533)	0.144
Impacts agricultural inputs and reliable markets				
No impact	1		1	
Leads to high production and more sales	1.5(0.144 - 1.854)	0.217	2.2(0.049 - 5.203)	0.563
Increased Market participation	1.4(1.172 - 3.742)	0.006	4.4(3.16 - 7.835)	0.017
Farmers was getting more motivated	1.2(0.66 - 2.192)	0.548	0.9(0.428 - 1.744)	0.683

P¹- chi-squared, p-value<0.05(significant); p²- Logistic regression p-value, OR =odds ratio

4.7 Factors influencing the sales volume of groundnut among smallholder farmers

The results revealed that the farmers who harvested more than 100kgs of groundnuts last season sold more volume compared to those that harvested less than 100kgs of groundnuts (Adjusted Coef. = 0.419). Farmers who reported having more than 100kgs of groundnuts for home consumption significantly ($p < 0.001$) influenced sale volumes, a lower volume of groundnuts was sold compared to the farmers who reported having less than 100kgs of groundnuts for home consumption (Adjusted Coef. = 0.751). Additionally, farmers belonging to the Wunkuel VSLA farmers' group significantly ($p < 0.016$) influenced sale volumes, VSLA groups sold more groundnuts than farmers belonging to the Baai VSLA women's groups (Adjusted Coef. = -0.635). Very importantly ($p < 0.001$) Farmers that used motorbike and bicycle for transporting the produce to the market sold lower ground volumes compared to farmers that used vehicles for transporting their produce to the market (Adjusted Coef. = -0.735) as shown in Table 8 below.

Table 6: Factors influencing the sales volume of groundnut smallholder farmer

Variable	Crude Coef. [95% Conf. Interval]	P ¹	Adj. Coef. [95% Conf. Interval]	P ²
Highest level of Agric. education				
No formal education	1		1	
Certificate	-0.695 [-1.081, -0.309]	0.001	-0.124[-0.438, 0.191]	0.441
Diploma	1.082 [0.319, 1.845]	0.005	0.572[-0.069, 1.214]	0.08
Degree	-0.644 [-1.306, 0.019]	0.057	-0.227[-0.721, 0.267]	0.368
Source of household income				
Selling G/nuts	1		1	
Other small businesses	-0.681 [-1.144, -0.218]	0.004	-0.066[-0.422, 0.291]	0.718
Size of land for cultivation	0.491 [0.134, 0.849]	0.007	0.285[-0.027, 0.597]	0.073
Quantity of g/nuts harvested in last season				
less_than_100kgs	1		1	
More_than_100kgs	0.696 [0.088, 1.305]	0.025	0.419[0.004, 0.835]	0.048
Quantity of consumed at home				
less_than_100kgs	1		1	
More_than_100kgs	-1.353 [-1.052, 1.654]	0.001	-0.751[-0.356, -0.945]	0.001
Source of market information				
Farmers Association	1		1	
NGOs	-0.986 [-1.262, -0.709]	0.001	0.351[-0.176, 0.879]	0.192
Farmer's group				
Baai VSLA women groups	1		1	

VSLA groups	-1.161 [-1.532, -0.789]	0.001	-0.444[-1.008, 0.119]	0.122
Wunkuel VSLA groups	0.857 [0.334, 1.38]	0.001	0.635[0.137, 0.893]	0.016
Manger Tong groups	-0.112 [-0.654, 0.43]	0.685	-0.046[-0.566, 0.474]	0.862
Transport means to the market				
Raksha and donkey	1		1	
Motorbike and Bicycle	-0.191 [-0.658, 0.276]	0.422	0.735[-0.158, -0.911]	0.001
Vehicles	1.61 [-1.537, 0.317]	0.197	1.25[-0.884, 0.384]	0.44
Distance to the nearest access road (KM)				
	-0.22 [-0.667, 0.226]	0.334	0.014[-0.271, 0.299]	0.925
Setback for farmer participation in the market				
Low price of selling g/nuts	1		1	
Low market participation	0.875 [0.579 - 1.172]	0.001	-0.013[-0.342, 0.317]	0.939
lack of well-organized market	1.003 [0.277 - 1.728]	0.007	0.599[-0.029, 1.226]	0.061
Farmers' transaction cost				
Delay of g/nuts to the market	1		1	
cost of packing affects the level of sales	0.615 [0.197, 1.034]	0.004	0.088[-0.215, 0.39]	0.571
lead to more demand in g/nuts and price increases	0.673 [0.283, 1.063]	0.001	0.247[-0.023, 0.516]	0.072

P¹- chi-squared, p-value<0.05(significant); p²- General Linear model p-value

CHAPTER FIVE

DISCUSSION

Groundnut is among the most important crops for smallholder farmers in South Sudan, providing both food and income for households. Currently, the smallholder groundnut farmers are constrained to access market which has limited their level of participation in both local and international markets. In turn has resulted into a decline in groundnuts production. Farmers' Market participation and market access linkages for delivering farm products is instrumental for increased house hold incomes and increased productivity. The study was conducted to document the Factors Influencing Market Participation of smallholder ground farmers in Aweil East County.

This present study has established that three market channels used by farmers; Farmer to wholesaler, Farmer to retailer and Farmer to consumer with overall low ground nut farmer market participation and high non-market participation. However, the study revealed a very significant ($p < 0.001$) association between farmers market participation and sales, particularly farmer to retailer channel had a positive relationship with sales. The farmers that participated in the farmer to retailer market channel sold more ground nuts compared to those who sold directly to the consumers. The study also indicated that most of participants were female and youth with majority of the farmers lacking formal education. This finding suggests that a substantial portion of groundnut farmers in Aweil East County engages in bulk sales to consumers probably attracts more profits. This is supported by Wolf *et al.* (2015), who observed that direct sales to consumers offer farmers the potential for higher profit margins by eliminating intermediary costs and capturing value-added opportunities. Equally, the findings agree with the fact that collapse of the marketing board resulted into poorly organized marketing system characterized by middle men, informal channels, private dealers, agro dealers in distant or local towns, or through other informal channels such as the road side (USAID, 2013). In another study by FAO (2023), observed that the small-scale groundnut producers in in Aweil East County are constrained on where to sell their produce, which led to decline in groundnuts production, for instance, production amounted to \$2bn estimated in export price in 2022 from production estimate at \$2.5 billion in 2020.

Similarly, the patterns of farmer-to-wholesaler transactions have been documented in other agricultural contexts, highlighting the importance of wholesale markets as primary outlets for smallholder farmers (Lee *et al.*, 2020). Interestingly, the study not utilization of intermediaries who then distribute the produce to retailers. This was in agreement with other studies by Ikeda & Natawidjaja, (2022) and Oberholtzer *et al.* (2014) such intermediary roles play a crucial role in connecting farmers to broader market networks and facilitating the distribution of agricultural commodities to urban centres and consumer markets. The distribution channel pattern among groundnut farmers is a reflection of diversified marketing conditions with multiple pathways to the sale of produce. Such marketing diversity is a reflection of flexibility and adaptability among smallholder farmers in responding to changing market conditions as well as in selling their chances to the fullest.

The research also revealed that women were significant respondent to market participation. This concurs with general patterns of agricultural production in much of Sub-Saharan Africa, where women are the focal point of food security and crop production (FAO, 2011). In the same way, this is grounded on research into the pivotal role of women in farming production and marketing within sub-Saharan Africa (Quisumbing *et al.*, 2013). Market participation by youth was also observed in the study. This is consistent with population trends experienced in rural developing country areas, where young adults are often a large part of farm labor (World Bank, 2016). Formal agricultural training was absent to many respondents. This implies a possible gap in domestic agricultural extension services and training programs for smallholder farmers that might inhibit the uptake of emerging agri-practices and technology (Swinnen *et al.*, 2020).

Furthermore, the research established that groundnut enterprise was the major source of income for the respondent and highlights the economic importance of groundnut production as a lifestyle among rural farmers in the study region. This agrees with the findings of similar studies conducted by Jayne *et al.* (2018). With regard to farming operations, most of the participants cultivated land of less than or equal to 10 acres, indicating predominantly small-scale farming businesses. This is in line with the

prevalence of smallholder production systems across the majority of developing countries, where farm size is usually limited by land fragmentation and population (Deininger & Byerlee, 2011). Moreover, the farmers possessed a moderate level of experience in groundnut farming. This indicates close attachment to agricultural work and highlights the significance of farming as a source of livelihood to rural societies in the research area (Barrett et al., 2012).

Notably, it also emerged that farmers who transact with wholesalers, most of them were women which are indicative of the extensive involvement of women in bulk deals in the groundnut value chain. Although, the high number of participants who never engaged in formal education among wholesaler-dealing farmers is indicative of the significance of accessibility to markets as well as information products designed with the needs of marginalized and less-educated farmers in mind (Davis et al., 2010).

The low market participation may be due to a number of factors. One of the major factors may be restricted market access, and this is commonly a rural county problem like in Aweil East County. Inadequate infrastructure in the forms of road and transport facilities may discourage farmers from accessing the markets, hence they are unable to sell their products. In addition, the limited scale of groundnut production in the area could lead to small volumes of production that would be economically not viable with the cost of production and transportation in selling groundnuts in the market. Unfavorable market prices could also deter farmers as they can be below their costs of production and transportation.

This is consistent with past research in the rest of Sub-Saharan Africa, where limited access to market by smallholder farmers has been established. For example, a Kenyan research by Omiti et al. (2009) found that only 30% of the smallholder farmers were engaged in markets, selling primarily at farm gates or to neighborhood middlemen. The study, which employed a cross-sectional survey conducted in rural Kenya, reported the same market participation barriers such as poor transportation infrastructure, transaction costs, and low levels of production (Omiti et al., 2009). The fact that the

Kenyan study and this study have similarities implies that the challenges are widespread in other parts of Sub-Saharan Africa.

Conversely, Mather et al. (2013) conducted a study in Mozambique that revealed increased market participation by smallholder farmers, where approximately 40% of the farmers marketed their produce through markets. In the study, based on a nationally representative survey, it was discovered that exposure to extension services and farmer cooperatives was influential in market participation. The outcome gap between this study and the Mozambique study can be due to improved access to farmer groups and agricultural support facilities in Mozambique that may not be common in Aweil East County. Greater market participation in Mozambique can also be due to larger farm sizes and improved infrastructure, through which market accessibility is easy (Mather et al., 2013).

Another piece of research in Madagascar by Barrett (2008) discovered that involvement in the market was significantly related to household assets, including land and livestock, and market information access. In mixed-method research, it was discovered that wealthier households with greater assets were more likely to be involved more in markets due to better access to information as well as transport. Empirical evidence in Madagascar confirms that the degree of participation in the market is mainly explained by a set of household conditions and exogenous variables, including infrastructure as well as market access (Barrett, 2008). This may be the reason why there is low market participation in Aweil East County, in which the households lack adequate assets as compared to resources with which they can participate in the market.

Determinants of the farmers' decision to participate in the market were; Wunkuel Village Savings and Loan Association (VSLA) membership group having a higher probability of going into the market than those belonging to the Baai VSLA women groups. This might be due to the financial and social support networks in the Wunkuel VSLA that probably had improved information, resource, and market contact access. Increased social solidarity and common goals among the Wunkuel members would have allowed for increased entrepreneurship, which in turn would have resulted in increased

market involvement. Baai VSLA women groups, however, might have been constrained by the possibilities of decreased credit availability or decreased group solidarity and thereby their reduced market involvement. Abebe et al. (2016) studied another study on how farmer groups affect market participation and concluded that farmers in well-organized groups had greater access to markets and greater market participation. It was also explained in detail that membership in a group enabled the collective action, which minimized the costs of transaction and enhanced market access. These are also supported by our research, establishing the assumption that the structure and functionality of farmer groups are central in driving market participation. Abebe et al. (2016) attribute the reason for their similarity as a result of similar social dynamics as well as the use of group-based programs in both zones (Abebe et al. 2016).

The second determinant was the transport facility mode used by farmers. Farmers who used motorbikes and bicycles were more likely to participate in the marketing of groundnuts than those using Raksha and donkeys. The most notable strength of motorbikes and bicycles is that they are convenient, fast, and cover long distances at ease as opposed to Raksha and donkeys. These characteristics most probably compelled the farmers to visit markets more often and in a more efficient manner, lessening travelling time and energy.

The use of slower and less effective modes of transport, e.g., Raksha and donkeys, can restrain market participation because travelling time is longer, transport costs are higher, and travelling to market is less frequent. This concurs with the study of Ouma et al. (2017), which was carried out in Uganda to analyze the effects of transport modes on market participation among small-scale banana farmers. The research was undertaken within the Eastern region using the mixed-methods approach and concluded that farmers who used motorized transport were significantly more engaged in market activities compared to farmers who used conventional transport. The researchers attributed this to improved efficiency and lower post-harvest losses that came with quicker modes of transport.

Consistency of such findings with our study points towards the importance of transport infrastructure to market participation in diversified contexts. The amount produced (yield) was another important factor influencing farmers' decision on market participation.

Farmers of low yield were less likely to participate in the sale of groundnuts than farmers who grumbled about low prices for selling groundnuts. This is because low yields have a direct effect on the amount of produce one can sell. Low yields are usually the outcome of poor farm management, poor access to quality seeds, and adverse climatic conditions, and these by themselves or together decrease marketable surplus. Therefore, subsistence farmers will shift their focus to intra-household consumption at the expense of market sales or consider the amount too small to warrant the effort and expense of participation in the labor market.

This result is conclusive of the economic supply theory that any fall in output will naturally decrease the supply in the market, thereby limiting market participation. Besides this, it is evidenced by Muriithi et al. (2019) who carried out research on the market participation determinants of smallholder farmers. The research had a cross-sectional study and involved smallholder maize farmers in Kenya's Central region and established that low yields were of high magnitude in impeding market participation. Poor-yielding farmers were less likely to sell their produce in the market, either consuming it at the local level or selling it at a loss to middlemen. Our results are therefore consistent with theirs because both of us conclude that poor agricultural productivity is a significant deterrent to market participation.

Additionally, the effect of farm inputs and access to favorable markets on market participation was also another significant factor found in our research. Farmers whose responses indicated these factors to contribute to higher market participation were most likely to enjoy a better opportunity to take part in marketing groundnuts than those with no effect. This discovery underscores the value of having access to good quality farm inputs like fertilizers and improved seeds that enhance productivity and consequently marketable surplus. Secondly, access to assured markets eliminates the

risk involved in selling produce by guaranteeing that farmers can sell their produce at good prices without unnecessary delays and losses. This was echoed by results from a Tanzania-based study by Kilima et al. (2016), whose focus was on the determinants of participation in the market among vegetable farmers whose nature is smallholder. The mixed-methods study on vegetable farmers in the Dodoma and Morogoro regions identified agriculture inputs availability and market reliability as robust determinants of participation in the market. Farmers with more input and market access were likely to experience a surplus and actively participate in market exchange. The replicability of the results between the Tanzanian study and our study assures the generalizability of these factors towards stimulating market participation for smallholder farmers in diverse agricultural settings.

On sales volume determinants among market actors, the research established that farmers who harvested over 100 kilograms of groundnuts in the previous season sold more groundnuts than farmers who harvested less than 100 kilograms.

This outcome is predictable because an increased harvest naturally retains more volume for sale. The positive relationship between harvest size and volume sold illustrates the significance of productivity in defining market success. Those who produce larger harvests have more room for accommodating market demand, thus turning to more volumes sold. This result aligned with the research by Ali and Erenstein (2017) in Nigeria, where there were higher levels of production strongly associated with improved market sales among small farmers. In their research, employing a cross-sectional survey of smallholder maize farmers, it was evident that enhanced production improved household food security as well as market participation and sales quantity. The integration of results across Nigerian and South Sudanese contexts reaffirm the global applicability of farming productivity in optimizing marketplace outcomes.

Interestingly enough, however, the research revealed that farmers who indicated that they had more than 100 kilograms of groundnuts set aside for home consumption sold fewer volumes of groundnuts than farmers who had less than 100 kilograms of groundnuts set aside for home consumption. This can be explained by the household consumption vs. market sales trade-off. Farmers who gave more importance to home consumption would end up with fewer products to sell, and thus end up selling lower volumes. This aligns with that of Njuki et al. (2011) in Malawi, where they found that the households that experienced more serious food insecurity issues had a higher percentage of their output retained for consumption at home, thereby avoiding market sales. Malawian studies, involving smallholder maize and legume producers, employed a mixed-methods research design and concluded that concerns for food security were frequently more salient than market stimuli, especially for poverty-stricken nations. The prevalence of the findings indicates that household food security versus market participation is a frequent dilemma facing Sub-Saharan African smallholder farmers.

Another significant factor found was membership in the farmer groups. Farmers in the Wunkuel VSLA groups marketed more groundnuts than the Baai VSLA women's group members. This can be attributed to the varying levels of social and financial capital within these groups. Wunkuel VSLA members can achieve more credit access, market information, and overall negotiating power, which can make their members more capable of selling more fruits. This finding is consistent with research conducted by Bernard et al. (2014) in Ethiopia, where group membership of more active groups with better resources increased the volume of sales for smallholder farmers considerably. This longitudinal investigation was concerned with understanding group dynamics and social networks' contributions to market access and sales performance. These results of these two studies indicate that productivity of the farmer group in its facilitation of market participation is greatly contingent on resources and support structures within the group.

In addition, the mode of transport used by farmers in delivering the produce to the market also played a significant role in determining the volume of sales. Motorbike-using farmers sold more groundnuts than bicycle- and Raksha (a handcart commonly

utilized locally)-using farmers. This is due to the speed and effectiveness of motorbikes, which enable farmers to move more products over distances to markets within a lesser amount of time. The role of transport in market contribution was also emphasized in a study in Zimbabwe by Moyo et al. (2020). The research, performed on smallholder horticulture farmers, indicated that market sales were highly affected by access to effective and efficient transport. Motorized farmers had access to far-off and more remunerative markets, with increased volumes of sales (Moyo et al., 2020). Both of these results thus highlight the important role played by transport infrastructure in improving the extent of market access and sales by smallholder farmers.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Three major market channels employed by the groundnut farmers were identified by the study; Farmer to consumer, farmer-to-retailer and farmers to wholesalers. The results revealed low market participants and high non-market participants of the ground nut farmers.

The research confirmed that statistically significant differences in market participation did exist among smallholder groundnut farmers according to chosen socio-demographic attributes. Such variables as level of agricultural education, farm size, and years with farming experience were all significantly related to whether the farmer was involved in the market or not. Farmers therefore reject the null hypothesis and conclude that socio-demographic difference is a primary measure of market participation.

In addition, the analysis showed that a number of institutional and infrastructural variables played a major role in determining farmers' involvement in groundnut markets. Access to transport, agricultural inputs, farmer group membership (VSLA), and yield were strong determinants of market participation. Such evidence compels us to reject the null hypothesis and state that market participation is influenced by levels of access to supportive services and production capabilities.

In examining determinants of quantity of sales, the outcome found that farm household consumption level of groundnuts, transport to market, and membership in farmer groups had a significant effect on amount sold. The sign and magnitude of such relationships were statistically relevant, and the outcome uncovered that household decision and logistics are determinants of the degree of participation in the market. Hence, we reject the null hypothesis and conclude that sales volume of smallholder farmers is significantly determined by economic behavior at the household level and by access to market-enabling infrastructure.

6.2 Recommendations

I would like to recommend the following;

1. Create market infrastructure to facilitate easier access for smallholder farmers.
2. Promote the formation and strengthening of farmer groups and cooperatives, such as the Wunkuel VSLA groups, to enhance collective bargaining power, resource sharing, and market access. Providing financial and technical support to these groups can further improve their effectiveness. Smallholder farmers should actively participate in organized farmer groups or cooperatives. Membership in groups like the Wunkuel VSLA has been shown to increase market participation, and these groups can provide valuable resources and support for marketing efforts.
3. Deliberate efforts for farmers to invest in more efficient modes of transportation and or transport facilities. Efficient transport can reduce costs and increase the volume of produce that can be marketed.
4. Farmers should carefully manage the balance between produce for home consumption and market sales. Selling more of the harvested groundnuts rather than reserving large quantities for home consumption can help increase market participation and revenue.
5. Deliberate efforts to promote agricultural technologies diffusion among farmers can increase yields and overall production. Higher production volumes can enhance market participation and profitability

REFERENCES

- Abady, S., & Shimelis, H. (2019). Farmers' perceived constraints to groundnut production, their variety choice and preferred traits in eastern Ethiopia: implications for drought-tolerance breeding. *Journal of Crop Improvements*.
- Abdulai, A., & Ma, W. (2017). The Economic Impacts of Agricultural Cooperatives on Smallholder Farmers in Rural China. *Agribusiness*, 33, 537-551.
- Abdullah, R. F., & Ahamad, R. (2019). Determinants of commercialization and its impact on the welfare of smallholder rice farmers by using Heckman's two-stage approach. *J. Saudi Soc. Agricult. Sci.*, 18:224-233.
- Abebe, G.K., Bijman, J., Kemp, R., Omta, O., and Tsegaye, A. (2016). The Role of Farmers' Organizations in Enhancing Market Participation: A Case Study of Smallholder Wheat Farmers in Ethiopia. *Food Policy*, 61, 100-110.
- Acedo, C. (2014). *Case Studies in Secondary Education Reform*. Washington, D.C: Improving Educational Quality (IEQ) Project and USAID.
- Adam, A. A. (2018). *The Economics of Groundnut Production and Marketing: A Case Study of the Farmers of Nyala Province, South Darfour State*. Khartoum: University of Khartoum.
- Adeoti, A., Issack, I., Oluwatayo, B., & Rahem, O. S. (2014). Determinants of market participation among maize producers in oyo state, Nigeria. *Journal of Economics, Management and Trade*, pp. 1115-1127.
- Adinya, I. B. (2010). Exploring profitability potentials in groundnut (*Arachis Hypogaea*) production through agroforestry practices: A case study in Nigeria. *Journal of Animal and Plant Sciences*, 20(2), 123-131.
- AGRA. (2020). *Evaluation of the market access program*. Nairobi: AGRA.
- Agricultural Market Information System (AMIS). (2017). *Building Agricultural Market Information Systems: A literature review*. Rome: FAO.
- Ali, A., & Erenstein, O. (2017). Assessing the Impact of Agricultural Productivity on Market Participation among Smallholder Farmers in Nigeria. *Agricultural Economics*, 48(6), 689-702.
- Asuming-Brempong, S. (2013). Determinants of commercialization of smallholder tomato and pineapple farms in Ghana. *American Journal of Experimental Agriculture*, 606-630.
- Augustine, L. (2020). *Smallholder Farmers' Access to Inputs and Finance in Africa*. Nairobi: International Finance Corporation.

- Babbie, R. E. (2010). *The Practice of Social Research*. Belmont CA: Wadsworth Cengage.
- Baffour, B., & Valente, P. (2012). Measuring census quality. *Statistical Journal of the International*, 1-15.
- Barrett, C. B. (2008). Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa. *Food Policy*, 33(4), 299-317.
- Barrett, C. B., Reardon, T., & Webb, P. (2012). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. *Food Policy*, 37(3), 263-274.
- Ben, M. E. (2017). *Understanding the socio-economic challenges facing smallholder farmers in Gondokoro, Central Equatorial estate (South Sudan)*. Juba: University of Juba.
- Berhanu, K., Beyene, F., & Abate, T. (2014). Does membership in agricultural cooperatives enhance household food security? Evidence from South Wollo, Ethiopia. *Journal of Agricultural and Applied Economics*, 46(3), 311-326.
- Bernard, S. (2022). *Groundnut Forum*. SA: SAGIS.
- Bernard, T., Taffesse, A. S., & Gabre-Madhin, E. (2014). Impact of Cooperatives on Smallholders' Commercialization Behavior: Evidence from Ethiopia. *Agricultural Economics*, 39(2), 147-161.
- Bernard, T., Taffesse, A. S., & Gabre-Madhin, E. (2014). Impact of Cooperatives on Smallholders' Commercialization Behavior: Evidence from Ethiopia. *Agricultural Economics*, 39(2), 147-161.
- Berry, T. (2010). *Channel Marketing Moves Goods from Producer to Consumer*.
- Biggam, J. (2011). *Succeeding With your Masters Dissertation: A step-by-step handbook*. New York, USA: Open University Press and McGraw Hill.
- Cooper, C. R., & Schindler, P. S. (2014). *Business research methods*. Boston, MA: McGraw-Hill.
- Creswell, J. W. (2007). *Qualitative Inquiry & Research Design*. Thousand Oaks, CA: Sage.
- Darren, E. (2013). *The Impact of Groundnut Production and Marketing Decisions upon Household Food Security among Smallholder Farmers in Sub-Saharan Africa: Does Gender Matter?* Virginia: Virginia Polytechnic Institute and State University.

- Davis, K., Nkonya, E., Kato, E., Mekonnen, D. A., Odendo, M., Miiro, R., & Mwangi, W. (2010). Impact of farmer field schools on agricultural productivity and poverty in East Africa. *World Development*, 38(3), 414-426.
- Deininger, K., & Byerlee, D. (2011). *Rising global interest in farmland: Can it yield sustainable and equitable benefits?* World Bank Publications.
- Dolan, C., Humphrey, J., & Harris-Pascal, C. (2019). Horticultural value chains in Tanzania: Policy issues and challenges for the future. *The Journal of Development Studies*, 55(12), 2501-2522.
- Doss, C. R. (2018). Women and agricultural productivity: Reframing the issues. *Development Policy Review*, 36(S2), 0513-0534.
- Fan, S., Gulati, A., & Thorat, S. (2016). Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics*, 47(3), 355-365.
- FAO & WFP. (2022). *Special Report: FAO/WFP Crop and Food Security Assessment Mission to South Sudan*. Rome: FAO & WFP.
- FAO. (2011). *the state of food and agriculture 2010-11: Women in agriculture: Closing the gender gap for development*. Food and Agriculture Organization of the United Nations.
- FAO. (2023). *Special Report-2022 FAO/WFP Crop and Food Security Assessment Mission (CFSAM) to the Republic of*. Rome: FAO/WFP.
- Food and Agriculture Organization (FAO). (2011). *the state of food and agriculture 2010-2011: Women in agriculture*. FAO.
- Harvey, C. A., & Rakotebe, Z. L. (2014). Extreme Vulnerability of Smallholder Farmers to Agricultural Risks and Climate Change in Madagascar. *Journal of Biological Sciences*, 22-31.
- Ikeda, S., & Natawidjaja, R. S. (2022). The Sustainability of contract farming with specialized suppliers to modern retailers: Insights from vegetable marketing in Indonesia. *Agriculture*, 12(3), 380.
- IndexBox. (2022). *World Groundnut Market Analysis, Forecast, Size, Trends and Insights Update: COVID-19 Impact*. United Kingdom: Index Box.
- Janila, P., Ephrem, H., & Gupka, S. (2022). *Millet and groundnut can avert the looming food and edible oil crisis in Africa*. India: ICRISAT.
- Janine, R. (2022). *Groundnut production in South Sudan*. Juba: Farmer's weekly.

- Jayne, T. S., Chamberlin, J., & Headey, D. D. (2018). Land pressures, the evolution of farming systems, and development strategies in Africa: A synthesis. *Food Policy*, 73, 204-218.
- Jerena, J. (2017). Major red beans marketing channels in halaba special district, Ethiopia. *International Journal of Research Studies in Agricultural Sciences (IJRSAS)*, pp. 8-17.
- John, & Rule. (2011). *succeeding with your masters' dissertation: A step- by- step handbook*. New York: McGraw-Hill.
- Kilima, F.T.M., Kenkel, P., Mbiha, E.R., and Mvena, Z.S.K. (2016). Market Access and the Impact of Inputs on Market Participation among Smallholder Vegetable Farmers in Tanzania. *Journal of Agribusiness in Developing and Emerging Economies*, 6(2), 94-106.
- Knoema. (2022). *Groundnut production in South Sudan*. Juba: Knoema Data Hub Catalog.
- Kombo, D., & Tromp, D. (2006). *Proposal and Thesis Writing: An Introduction (1st Edition)*. Nairobi: Paulines Publications Africa.
- Kothari, C. (2008). *Research Methodology: Methods and Techniques. (2nd Edition)*. New Delhi: New Age International Publishers.
- Lee, B., Liu, J.Y. and Chang, H.H., 2020. The choice of marketing channel and farm profitability: Empirical evidence from small farmers. *Agribusiness*, 36(3), pp.402-421.
- Liverpool-Tasie, L. S., Reardon, T., Bellemare, M. F., & Nkegbe, P. K. (2017). Factors affecting the effectiveness of maize yield-improving technologies among smallholders in sub-Saharan Africa. *Food Policy*, 67, 41-52.
- Lupai. (2014). *South Sudan: Issues in Perspective*. Kampala: Associated Information and Service Agency Ltd.
- Mangasini, K. (2014). *Socio-economic factors limiting smallholder groundnut production in Tabora Region*. Dodoma: Research on Poverty Alleviation (REPOA).
- Mango, & Makate, C. (2018). Determinants of Market Participation and Marketing Channels in Smallholder Groundnut Farming: A Case of Mudzi District, Zimbabwe. *African Journal of Science, Technology, Innovation and Development*, 311-321.
- Mather, D., Boughton, D., & Jayne, T. S. (2013). Explaining Smallholder Maize Marketing in Southern and Eastern Africa: The Roles of Market Access, Technology, and Household Assets. *Food Policy*, 39, 285-297.

- Matt, R. (2017). *Improving market access for smallholder farmers: What works in out-grower schemes - evidence from Timor-Leste?* Washington DC: International Labour Organisation.
- Meinzen-Dick, R., Quisumbing, A. R., Behrman, J. A., Biermayr-Jenzano, P., Wilde, V., Noordeloos, M., & Ragasa, C. (2019). Engendering agricultural systems. *World Development*, 122, 561-572.
- Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: CA: Jossey-Bass.
- Mill, J. E., & Ogilvie, L. D. (2002). Ethical decision-making in international nursing research. *Qualitative Health Research*, 12, 807-815. .
- Minten, B., Dereje, M., Engida, E., & Kuma, T. (2019). Ethiopia's evolving dairy value chain: Evidence from urban and peri-urban production systems in the central highlands. *Food Policy*, 83, 318-327.
- Minten, B., Koru, B., & Stifel, D. (2018). The last mile(s) in modern input distribution: Pricing, profitability, and adoption. *American Journal of Agricultural Economics*, 100(2), 448-472.
- Mitiku, A. (2014). Impact of Smallholder Farmers Agricultural Commercialization on Rural Households' Poverty. *The International Journal of Applied Economics and Finance*, 51-61.
- Mmbando, F. E. (2014). *Market Participation, Channel Choice and Impacts on Household Welfare: The Case of Smallholder Farmers in Tanzania*. Pietermaritzburg: University of KwaZulu-Natal.
- Morton, G., & Martey, E. (2021). Market information and maize commercialization in the Savannah and Northern regions of Ghana. *Scientific African*, 13.
- Moyo, S., Mudzengerere, F. H., & Nyandoro, Z. (2020). Determinants of Market Participation among Smallholder Horticultural Farmers in Zimbabwe: Evidence from Bubi District. *Journal of Agricultural Economics and Development*, 9(3), 56-65.
- Moyo, S., Mudzengerere, F. H., & Nyandoro, Z. (2020). Determinants of Market Participation among Smallholder Horticultural Farmers in Zimbabwe: Evidence from Bubi District. *Journal of Agricultural Economics and Development*, 9(3), 56-65.
- Mugenda, O. M., & Mugenda, A. G. (2013). *Research Methods: Quantitative and Qualitative Approaches*, Nairobi: Acts press 2003.

- Muriithi, B.W., Matz, J.A., and Wambugu, S.K. (2019). The Role of Agricultural Productivity in Promoting Market Participation among Smallholder Farmers in Kenya. *Food Security*, 11(4), 877-888.
- Mzyece, A. (2011). *Factors influencing cowpea producers' choice of marketing channels in Zambia*. Lusaka: University of Zambia.
- Nakazi, F., Omamo, S. W., & Bell, A. (2020). Intermediation, transaction costs, and choice of market channels for smallholder farmers in eastern and western Kenya. *World Development*, 128, 104857.
- Njuki, J., Kaaria, S., Chamunorwa, A., & Chiuri, W. (2011). Linking Smallholder Farmers to Markets, Gender, and Intra-Household Dynamics: Does the Choice of Commodity Matter? *The European Journal of Development Research*, 23(3), 426-443.
- Njuki, J., Kaaria, S., Chamunorwa, A., & Chiuri, W. (2011). Linking Smallholder Farmers to Markets, Gender, and Intra-Household Dynamics: Does the Choice of Commodity Matter? *The European Journal of Development Research*, 23(3), 426-443.
- Oberholtzer, L., Dimitri, C., & Jaenicke, E. C. (2014). Examining US food retailers' decisions to procure local and organic produce from farmer direct-to-retail supply chains. *Journal of Food Products Marketing*, 20 (4), 345-361.
- Oduntan, O., & Alade, B. B. (2020). Determinants of market participation by plantain farmers in ifedore local government area, Ondo State, Nigeria. *The Pacific Journal of Science and Technology*, 21.
- Oliyad, S., & Megersa, A. (2022). Determinants of groundnut producers' market channel choice in Western Oromia region, Ethiopia. *Journal of Agriculture and Food Research*, 1-10.
- Omiti, J., Otieno, D., Nyanamba, T., & McCullough, E. (2009). Factors Influencing the Intensity of Market Participation by Smallholder Farmers: A Case Study of Rural and Peri-Urban Areas of Kenya. *African Journal of Agricultural and Resource Economics*, 3(1), 57-82.
- Ouma, E., Jagwe, J., Obare, G.A., and Abele, S. (2017). Determinants of Smallholder Farmers' Participation in Banana Markets in Central Africa: The Role of Transaction Costs. *Agricultural Economics*, 35(2), 165-177.
- Panda, R. K., & Sreekumar. (2012). marketing channel choice and marketing efficiency assessment in agribusiness. *Journal of International Food & Agribusiness Marketing*, pp. 213-230.

- Pearson. (2010). *Descriptive Research*. Http: // www. Wps. ablougman. Com.
- Quisumbing, A. R., Rubin, D., Manfre, C., Waithanji, E., van den Bold, M., Olney, D. & Meinzen-Dick, R. (2013). Gender, assets, and market-oriented agriculture: Learning from high-value crop and livestock projects in Africa and Asia. *Agriculture and Human Values*, 30(3), 335-345.
- Reardon, T., Berdegue, J., & Barrett, C. B. (2009). Agrifood industry transformation and small farmers in developing countries. *World Development*, 37(11), 1717-1727.
- Reardon, T., Minten, B., & Chen, K. (2017). The quiet revolution in agri-food value chains in Asia: Understanding the fast-emerging super markets, supermarkets, and informal modern retail in its entire supply chain context. *Journal of Agribusiness in Developing and Emerging Economies*, 7(2), 182-210.
- Reardon, T., Tschirley, D., Dolislager, M., Snyder, J., Hu, C., & White, S. (2018). Urbanization, diet change, and transformation of food supply chains in Asia. Michigan State University, Department of Agricultural, Food, and Resource Economics.
- Report Linker. (2022). *South Sudan Peanut Industry Outlook 2022 - 2026*. ReportLinker.
- Salami, A., Kamara, A. B., & Brixiova. (2010). *Smallholder agriculture in East Africa: Trends, constraints and opportunities*. Tunis: African Development Bank.
- Selina Wamucii. (2023). *South Sudan Groundnuts (Peanuts) Prices*. Juba: Selina Wamucii Publications.
- Sorrense, R. (2014). Five years of subsurface drip irrigation on Peanut. *UGA/CPES Research and Extension Bulletin*, 8-15.
- SORUDEV. (2016). *South Sudan Crop Production- Farmer and Extension Guide*. Juba: South Sudan Rural Development Program (SORUDEV).
- Swinnen, J., Vandeplas, A., & Maertens, M. (2020). Technology and the future of food and nutrition security. IFPRI Discussion Paper 1943, Washington, DC: International Food Policy Research Institute (IFPRI).
- Taru, V. B., & Kyagya, I. Z. (2010). Profitability of groundnut production in Michika Local Government Area of Adamawa State, Nigeria. *Journal of Agricultural Science*, 1(1), 25-29.
- Thamaga-Chitja, M. J., & Morojele. (2014). The Context of Smallholder Farming in South Africa: Towards A Livelihood Asset Building Framework. *J. Hum Ecol*, 147-155.

- UNDP. (2013). *Africa Economic Outlook 3*. United Nations.
- United States African Development Foundation. (2021). *Dominating the Peanut Oil Market in South Sudan to Increase Smallholder Farmers' Incomes*. Washington DC: USADF.
- UNMISS. (2021). *Thai engineers support displaced communities in South Sudan by training them on sustainable farming practices*. Juba: UNMISS.
- USAID Food, Agribusiness and Rural Markets Project. (2013). *the Groundnut Value Chain and Value Addition*. Bethesda: Abt Associates Inc.
- Wang, Q., & Zheng, L. (2016). *Peanut By-Products Utilization Technology*. China: Peanuts: Processing Technology and Product Development.
- WFP. (2022). *WFP Market Monitor - Sudan*. Juba: World Food Program.
- Wolf, M. M., Spittler, A., & Ahern, J. (2015). A profile of farmers' market consumers and the perceived advantages of produce sold at farmers' markets. *Journal of food distribution research*, 36(1), 192-201
- World Bank. (2012). *Gender in agriculture sourcebook*. World Bank Publications.
- World Bank. (2016). *World development report 2016: Digital dividends*. World Bank Publications.
- World Bank. (2017). *Youth employment in Sub-Saharan Africa (No. 116569)*. The World Bank.
- World Food Program. (2015). *South Sudanese Farmers Progress Despite Conflict*. Juba: WFP.
- Ali, A., & Erenstein, O. (2017). Assessing the Impact of Agricultural Productivity on Market Participation among Smallholder Farmers in Nigeria. *Agricultural Economics*, 48(6), 689-702.

APPENDIX I: RESEARCH QUESTIONNAIRE TOOL

Dear respondent,

My name is **ALIER AREM DENG**, a student of Uganda Christian University- Mukono undertaking a Masters' Degree in Agriculture and Rural Development. I am conducting a research study on **FACTORS INFLUENCING MARKET PARTICIPATION OF SMALLHOLDER GROUNDNUT FARMERS IN AWEIL EAST COUNTY OF NORTHERN BAHR EI GHAZAL STATE, SOUTH SUDAN** as part of the requirements for a ward of Masters' Degree. You have been identified as key respondent in this interview, and all the answers will be handled with utmost confidentiality. I therefore humbly request that you complete this questionnaire correctly in the spaces provided or options given. (Please, tick the appropriate answers where options are given).

Part A: Socio-demographic factors of farmers

1. Geographical location of respondent

County _____

Payam: _____

Boma: _____

Village: _____

2. Gender of the respondent

Male Female

3. What is age of the respondent?
.....

4. Marital status?

Married Not marriage

5. What is the highest level of education of the respondent?

Agriculture Certificate Diploma

Degree

Others (specify).....

6. What is the number of members in your household?

.....

7. What is the main source of your household income?

.....

8. What was the total land cultivated for g/nut growing in the last season in your household (acres)?

.....

9. How long have you been practicing g/nut growing?

.....

10. What is the main purpose of growing g/nuts?

- i. Only for own consumption
- ii. Mainly for own consumption with some for market
- iii. Only for marketing
- iv. Mainly marketing and some for consumption

11. What was the quantity of g/nuts harvested in last season?

- i. Kilograms/tins (less than 50kg)
- ii. Sacks (50kg)
- iii. Sacks(100kg)
- iv. Sacks(120kgs)
- v. Tonnes

12. What was the quantity consumed at home?

- i. Kilograms/tins (less than 50kg)
- ii. Sacks(50kg)
- iii. Sacks(100kg)
- iv. Sacks(120kgs)

Part B: Marketing and Marketing channels used by smallholder groundnut farmers

13. Do you participate in marketing (sell) of your g/nut?

Yes No

14. If yes, which market channel do you sell g/nuts?

- i. Farmer-consumer
- ii. Farmers-collectors-wholesalers-processors-consumers
- iii. Farmers-Retailer - Consumer
- iv. Farmers-Wholesalers- Processors- Consumer
- v. Other (specify)

.....

15. What was your average sales in that market channel last season?

.....

16. What was the average price?

.....

17. What's the reason for the use of the above market channel?

.....

18. In your opinion, are the market channels well-organized and coordinated?

Yes No

19. If no, how has it affected your selling of groundnut?

20. What are the benefits of well-organized and coordinated market channels?

.....

.....

.....

Part C: Market Access Constraints by smallholder groundnut farmers

C1: Market Challenges by smallholder groundnut farmers

21. Do you have access to agricultural produce markets? Yes No

22. If yes, what is the distance (km) to your nearest agricultural produce market?

.....

23. Are the prices fixed in these agricultural produce markets? Yes No

24. If no, what could be reasons for the price fluctuation?

.....

25. Does the price fluctuation for groundnuts in these produce markets hinder you from selling your g/nuts? Yes No

26. If yes, how do you cope up with price fluctuation for g/nuts in these markets?

.....

.....

27. Do you normally receive market information on groundnut in your area?

Yes No

28. If yes, what is the type and source of market information?

.....

	Sources of market information				
Types of market information transferred to g/nut farmers	Government	NGOs	Farmers associations	Private providers	Others...

.....

C2: Institutional Challenges by smallholder groundnut farmers

29. Are you a member of any farmer group? Yes No

.....

 30. If yes, specify the farmer group that you belong to?

31. Did you have access to agricultural inputs or technologies for g/nut growing in the last season? Yes No

32. If yes, specify the agricultural input or technologies that you accessed and from which agency?

Type of technologies	Source of the agricultural technologies/input			
	Government	NGOs	Farmers associations	Others
Improved seeds				
Fertilizers				
Knapsack sprayers				
Weeders				
Others(specify)				

33. Do you have access to extension services?

Yes No

34. If yes, what is the type and source of the extension services?

Type of extension services	Source of extension services				
	Government	Private providers	NGOs	Cooperatives	Others
Soil and water conservation					

Pest and diseases					
Soil fertility					
Post-harvest handling					
Marketing					
Value addition					
Others (specify)					

35. What is the commonly accessed transport facility for marketing your g/nuts?

.....

36. What is the distance (km) to the nearest access road?

.....

Thank you for your cooperation.

APPENDIX I1: RESEARCH DATA COLLECTION PHOTOS



(Focus Group Discussion (FGD) with Madhol Farmers in Aweil East County)



(Focus Group Discussion (FGD) with VSLA group in Wunkuel Boma)



(Agriculture Extension Agent (AEA) demonstrating groundnut row planting to farmers in Aweil East)



(Farmers in Madhol preparing their groundnut farm ahead of Rainy Season in Aweil East County)

APPENDIX I11: REC CLEARANCE LETTER



UG-REC-026 Approval Version 4.0

12th January, 2024

12th January, 2024

Deng Alier
Uganda Christian University
Email: dengarem1983@gmail.com
+211914334356

UG-REC-026 APPROVAL NOTICE

To: Deng Alier, Principal Investigator

Re: UCU-REC Application titled: Factors Influencing Market Participation of Smallholder Groundnut Farmers in Aweil East County of Northern Bahr el Ghazal State, South Sudan

Application Number: UCUREC-2024-752

Version: 4.0

Type: Initial Review
 Protocol Amendment
 Letter of Amendment (LOA)
 Continuing Review
 Material Transfer Agreement
 Other, Specify:



I am pleased to inform you that the **UG-REC-026**; UCUREC approved the above referenced application.

Approval of the research is for the period from **12th January, 2024**, to **12th January, 2025**

This research is considered minimal risk category.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and additions to the protocol or the consent form must be submitted to the REC for re-review and approval prior to the activation of the changes. The REC application number assigned to the research should be cited in any correspondence.
3. Reports of unanticipated problems involving risks to participants or other must be submitted to the REC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for REC review.

1 of 2

A Centre of Excellence in the Heart of Africa

P.O. Box 4, Mukono, Uganda (East Africa), Plot 67-173, Bishop Tucker Road, Mukono Hill, Tel: +256 (0) 31 235 0800, www.ucu.ac.ug
Ugandachristianuniversity @UCUniversity, Founded by the Province of Church of Uganda, Chartered by the Government of Uganda.

4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Regulations require review of an approved study not less than once per 12-month period. Therefore, a continuing review application must be submitted to the REC eight weeks prior to the above expiration date of 12th January, 2025 in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. Your research details have been shared with the Executive secretary of Uganda National Council for Science and Technology (UNCST) and you are not required to get clearance since you are a Masters Degree research. Refer to UNCST Research registration and clearance Policy and guidelines (July 2016) in Uganda section 6(e).

The following is the list of all documents approved in this application by UG-REC _026:

	Document Title	Language	Version	Version Date
1.	Protocol	English	1.0	2023-12-15
2.	Data collection tools	English	1.0	2023-12-15
3.	Informed Consent Form	English	1.0	2023-12-15

Signed and Stamped



Prof. Peter Waiswa.
UCUREC Chairperson,
pwaiswa@musph.ac.ug

