HOW BENEFICIAL IS GROUNDNUT INVESTMENT ALONG VALUE CHAIN ACTORS. A CASE STUDY OF NIGERIA

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Abstract: *Groundnut (Arachis hypogea L.) is a major crop grown in Nigeria's arid and semi-arid zones. It is the leading oil crop produced and processed locally by most small-scale producers and artisanal processors in Nigeria. The research examined the return on investment (ROI) of groundnut value chain and sub-value chain actors in three agro-ecological zones of Nigeria. A multi-stage sampling procedure was employed to select 1302 producers, 316 processors, and 409 marketers. Primary data were obtained from the sampled groundnut value chain actors using structured questionnaire and interview schedule. The ROI shows that for every ₦1 invested, groundnut producers in Guinea Savannah earned ₦3.39 compared to the Sahel and Sudan producers with ROI of ₦3.16, and ₦2.47, respectively. The large-scale industrial processors realized a profit of ₦238,600 ($627.474) per tonne from the sale of groundnut oil and cake compared to the artisanal processors that earned ₦70,600 ($185.665) per tonne and ROI of 1.27 and 1.09, respectively. Seed marketer obtained ROI of 1.87 per tonne compared to the grain (1.37) and groundnut oil (1.29) marketers. The pooled results shows that the ROI of producers (4.001) has better and more beneficial investment opportunities compared to marketers (1.5) and processors (1.18). Hence, the study concluded that the major activities of production, processing, and marketing along the groundnut value chain were profitable ventures, and these have positive implications for investment opportunities. The study recommends that value chain actors should optimize their resource allocation to enhance their ROI which invariably impact on overall agricultural productivity and economic growth.*

Key words: *groundnut, value chain actors, return on investment, Nigeria.*

INTRODUCTION

Agricultural value chain development is a priority for many governments, non-government organisations (NGOs), and private actors for its potential to raise farmer incomes, improve food quality, and increase consumer choice. In many developing countries, agricultural value chains have undergone rapid transformation in the past few decades, in large part due to the modernisation of the retail sector [16].

Nigeria is the largest producer of peanuts (groundnuts) in Sub-Saharan Africa (SSA), and third globally with about 4.4 million metric tons as of 2019 [11]. It is an important ingredient for African broths, butter, confectioneries, cosmetics and personal care products. Groundnut (*Arachis hypogaea* L.) ranks as the sixth-most important oil seed crop, and it is a source of income and nutrition for many developing countries [16]. Groundnut has immense use in combating protein and energy malnutrition in developing countries as it contains 25–34% protein, 44–56% oil, and is a source of thiamine, riboflavin, and niacin, as well as calcium and iron [16]. Groundnut is used to make edible oil, and it is the second largest source of vegetable oils after soybeans; the oil can be used for cooking, confectionery formulation, and making peanut butter, and groundnut is consumed with bread or biscuits, included in cookies, sandwiches, candies, and also as frosting or icing; moreover, it in complementary foods for children, and groundnut can also be consumed daily in roasted form [16]. The groundnut cake can be used as a protein supplement in human nutrition [11]. Moreover, the haulm of groundnut is used as animal feed [12,14]. Groundnut fixes nitrogen in the soil and enriches soil fertility [12].

The groundnut sector in Nigeria has contributed to agro-industrial development and rural sector integration. However, its productivity remains low due to the limited availability of improved seeds and the low adoption of good agronomic practices in crop production. Increasing agricultural productivity and processing groundnut surpluses appropriately can reduce post-harvest losses and poverty levels in rural areas. There is a need for groundnut value chain analysis to enhance its production processing and marketing along the value chain. . The growth of sustainable and vibrant food and allied vegetable oil manufacturing industries to conserve and convert the enhanced agricultural output into maximized value-added products for global markets occupies a critical position [10,13].

The value chain concept is widely used by development agencies to design market-driven rural development projects and strategies. Various types of research have demonstrated the potential benefits of such a market-driven perspective, both conceptually and empirically [2,5,6,8]

Market signals that influence manufacturing choices are passed from one actor in the chain to another or to markets. Consequently, once the value chain (VC) is established, it appears as a single market even though it appears to be made up of various marketplaces. Information sharing between participants and meeting their requests are essential to the survival of exploitation-exchange relationships in this single market. The ability of each market to meet the demands of the chain or adjust to it, therefore, determines its capacity to sustain the exploitation relations within itself. One player in the chain's demand is correlated with another actor's demand [8]. The power relations between the actor determine who gets a larger share from the chain. Because of the importance of these power relations in the chain, many studies in the VC literature [16] focus on concepts such as information flows and power relations between actors (firms), mostly ignoring the concept of exploitation. Some reserchers highlight these ideas in the chain's governance. These ideas are important for understanding how the VC operates because they clarify the relationships between the parties. Nevertheless, the chain analysis is lacking if the relationship between these ideas and the industrial linkages is disregarded. The exchange of commodities is how these relationships between actors develop. It is impossible for commodities to enter marketplaces on their own and exchange themselves. In order to pit commodities against one another, commodity owners are required. Commodity owners exchange the commodities they hold to establish the aforementioned relationships. Existing economic relations, or the capitalist relations of production, dictate the content of these ties.. In this context, relations between commodities and markets appear as relations between actors [9]. Therefore, interaction relations such as information flow and power relations in the VC cannot be considered independently of commodity, market, exchange, and exploitation relations. There is an important point to note regarding the actors involved in agricultural VCs. Actors may engage in more than one activity to maintain the continuity of exploitation, power, and dependency relations in the chain [3]. For example; (i) a merchant can buy the product from the farmer and at the same time provide inputs (such as seeds, fertilizers, and pesticides) on credit to the farmer, with the condition that the farmer sells the product to the merchant after the harvest; (ii) processors may operate within an intertwined network of relationships with merchants; (iii) in addition to buying and selling the product to realize surplus value, wholesalers and retailers can also play a role in standardizing agricultural production by communicating the product's quality standards toother actors in the chain (processor–merchant–farmer). Vertical relationships in the chain can thus enable the coordination, standardization, and control of a large number of small farmers by central actors such as productive capital,

It is also claimed that this approach can contribute to achieving development goals, such as ensuring food security, promoting sustainable growth, and reducing inequality and poverty through fair income distribution.

MATERIALS AND METHODS

The main objective of this research is to estimate the costs and returns of value chain activities among the actors along the groundnut value chain. The research presented in this analysis is based on comprehensive data obtained from both primary and secondary sources. Specifically, it utilizes datasets and insights provided by primary data that were collected through a field survey for the 2020 and 2021 agricultural seasons across the three agroecological zone to give a full representation of the northern part of Nigeria from different actors along the value chain. This was achieved with the aid of a structured questionnaire and interview schedule. The questionnaire was administered to the randomly selected different actors of groundnut value chain actors to generate cost and return information on production, processing, and marketing data. Secondary information was sought from relevant agricultural development programmes and non-governmental organizations (NGOs). Focus Group Discussion (FGD) was used to provide relevant historical meaningful data that will complement primary data significantly.

RESEARCH RESULTS

The results of the analysis in Table 1 reveal how profitable groundnut farming is in the three different ecological zones. Profitability is determined by how much money is earned compared to the costs of production. The costs include items such as seeds, agrochemicals, fertilizer, and labour.

In the Sahel zone, the average cost of seeds per hectare is about ₦11,418.8 ($30.029 United States Dollar, USD), which is about 23% of the total variable cost (TVC). The cost of agrochemicals per hectare is around ₦4,155.5 ($10.928)), accounting for about 8.53% of the TVC. Fertilizer costs about ₦4,681.50 ($12.311) per hectare, which is approximately 9.61% of the TVC. Labour costs ₦28,342.60 ($74.536) per hectare, making up roughly 58.18% of the total variable cost. Invariably, labour accounted for the highest cost among input utilized largely as a results of non-mechanized farming operations. The profitability analysis sheds light on market dynamics within the groundnut sector. It underscores the importance of factors such as market prices, input costs, and labour availability in influencing profitability. Market participants can use this information to develop strategies for market engagement, pricing decisions, and input procurement. The return on investment per hectare for groundnut farmers in the Sahel zone is ₦4.16. This means that for every ₦1 invested in groundnut production, ₦3.16 is realized as profit in the Sahel zone. Similarly, in the Sudan zone, the profitability is slightly lower. The result in Table 1 shows that the Sudan region producers have a gross margin of ₦130 089 ($342.109) per hectare. And the rate of return to be ₦3. 47. For every ₦1 invested, ₦2.47 is realized as profit in the Sudan zone. In the Guinea Savannah zone, the profitability is the highest among the three zones. The costs include seed cost ₦13,261.7 ($34.876), chemical cost ₦4,737.9 ($12.460), fertilizer cost ₦6,282 ($16.521), labour cost ₦34,080.3 ($89.625), and GR of ₦257,272.30 ($676.577) per hectare. For every ₦1 invested, ₦3.39 is realized as profit in the Guinea Savannah zone. Overall, the result in Table 1 shows that Sudan Savannah has a total variable cost (TVC) of about 7.96% and Guinea savannah (20%), as compared to that of Sahel, However the gross, margin is said to be higher in Guinea savannah by 52.18% and Sahel by (18.52%) when compared to Sudan Savanah and the ROI appeared in the same pattern. These scores highlight the economic viability of groundnut farming across different ecological zones, with higher profits observed in areas

like the Guinea Savannah compared to the Sahel and Sudan zones. The profitability of groundnut farming varies across different ecological zones, with the Guinea Savannah zone demonstrating the highest profitability. This suggests that certain regions may have comparative advantages for groundnut cultivation due to factors like soil quality, climate conditions, and access to resources.

Table 1.

Profitability of groundnut producers along the Value Chain

Variables	Unit	Unit price (₦)	SAHEL		SUDAN		GUINEA	
			Quantity	Value (₦)	Quantity	Value (₦)	Quantity	Value (₦)
Seed	Kg	600	19.03	11,418	18.33	11,000	22.10	13,261
Pesticides	Litres	1,150	1.85	2,125	1.66	1,909	1.63	1,877
Herbicide	Litres	1150	1.77	2,030	1.19	1,369	2.49	2,860
SSP	Kg	200	0.47	94,0	0.58	115	0.88	176
Urea	Kg	150	1.10	165	0.88	131	0.79	118
NPK	Kg	110	0.72	79,7	0.87	95	1.15	126
Manure	*Mangala*	500	8.50	4,250	14.60	7300	10.66	5,330
Compost	*Mangala*	400	0.23	92	1.65	661	1.32	529
Bags	Number	20	6.02	120.4	4.65	92	5.41	108
Family labour	Man-day	800	11.95	9,560	13.33	10,664	15.30	12,240
Hired labour	Man-day	800	23.47	18,778	24.07	19,258	27.30	21,842
TVC				48,718		52,595		58,473
Total Revenue		180	1,127.26	202,907	1,014.91	182,685		257,272
Gross margin				154,189		130,089		198,799
ROI				**4.16**		**3.47**		**4.39**

Note: Mangala = OX-cart; ROI= Return on investment. $1.00 United State Dollar (USD) is equivalent to ₦380.2556 as at the time of the data collection in 2020/2021.

Cost benefit of groundnut marketers in the value chain

Table 2 shows the marketing costs incurred by groundnut seed suppliers (out-growers) encompassing production, labour (loading and offloading), and transportation expenses. A breakdown of variable costs and market margins is outlined. On average, a tonne of groundnut seed costs ₦960 ($2524.61), constituting 97.5% of the total purchasing cost. Loading and offloading expenses amount to ₦530 and ₦450 respectively, while transportation costs ₦1000 ($2.630), representing 1.3% of the total marketing cost. However, the revenue generated from marketing groundnut seed stands at ₦1,800,000 ($4,733.658) per tonne, yielding a marketing margin of ₦840,000 ($2209.040). The average rate of return on investment is 1.87, indicating a profit of 87 kobo for every ₦1 invested in groundnut seed marketing. The sustained demand for groundnut seed underscores its importance in various industries, particularly in groundnut oil production.

Groundnut grain marketing encompasses various costs including the cost of the grain itself, storage, potential losses due to damage, and expenses for empty bags, labour, and transportation. Table 2 shows on average, one tonne of groundnut grain costs ₦800,000 ($2209.040), and representing 98% of the total marketing expenses. Loading and offloading expenses amount to ₦1000 ($2.630) each, while transportation costs ₦1000 ($2.630), making up 1.3% of the total marketing cost. Additionally, packaging and storage costs stand at ₦30,000 ($78.894) and ₦2500 ($6.575), constituting 1.5% and 0.08% of the total cost respectively. Transportation costs for packaging materials amount to ₦15,000, comprising 0.13% of the total cost.

Table 2 shows the total revenue generated from groundnut seed marketing is ₦1,120,000 ($2945.387) per tonne, resulting in a marketing margin of ₦285,000 ($749.496). The average rate of return on investment is 1.34, indicating a profit of 34 kobo for every ₦1 invested in groundnut seed marketing. However, despite the positive margin observed in groundnut seed marketing, the results suggest that groundnut seed marketing is more profitable compared to groundnut grain marketing. Understanding the breakdown of marketing costs is essential for stakeholders to optimize their operations and improve profitability. These findings underscore the importance of assessing the dynamics of different segments within the groundnut value chain to make informed business decisions.
Table 2 reveals the costs associated with marketing groundnut oil including the purchase cost of the oil itself, packaging expenses, and transportation costs. On average, the cost of one thousand litres of groundnut oil amounts to ₦1,009,600 ($2655.056). The total revenue generated from marketing one hundred litres of groundnut oil is ₦1,300,000 ($3418.753). Consequently, the marketing margin is ₦290,400 ($763.697), with an average rate of return on investment of 1.29. This indicates that for every ₦1 invested in marketing one hundred litres of groundnut oil in Nigeria, a profit of 29 kobo is realized. The positive marketing margin and rate of return on investment suggest that groundnut oil marketing can be a profitable venture. The profitability of groundnut oil marketing underscores the importance of analyzing market trends and consumer demand to capitalize on opportunities within the groundnut value chain. These results may prompt stakeholders to allocate resources and develop strategies to enhance their presence and competitiveness in the groundnut oil market.

Table 2.

Cost and benefits of groundnut marketing in the value chain

Variables	Seed/tonne (₦);1000	% cost	Grain/ tonne (₦);1000	% cost	Oil/1000litres (₦);1000	% cost
Grain/seed	960	99.79	800	95.69	-	-
Loading	0.53	0.05	1	0.12	-	-
Off loading	0.45	0.04	1	0.12	-	-
Bagging	-	-	30	3.59	-	-
Storage	-	-	2.5	0.30	30	2.74
Transportation	1	0.10	1.5	0.18	1	0.91
Packaging- bottles	-	-	-		56	5.11
Oil	-	-	-		100	91.24
Total cost	0.961	100	836	100	1,009.6	100
Total revenue	1,800	-	1,120	-	1,300	-
Marketing margin	0.838	-	284	-	290.4	-
ROI	**1.87**	**-**	**1.34**	**-**	**1.29**	**-**

ROI= Return on investment; $1.00 United State Dollar (USD) is equivalent to ₦380.2556 as at the time of the data collection in 2020/2021

Industrial groundnut processors

The results shown in Table 3 shed light on the financial dynamics of industrial groundnut processing in the study area. The study reveals that these industrial processors spent ₦876,400 ($2304.766) per tonne in total expenses. This cost included several elements, such as the price of intermediate consumption, which includes buying shelled groundnuts, hiring temporary help, purchasing packing materials, utilities like water and chemical additives, and fuel costs, which include gasoline, diesel, and lubricants. It also included salary for permanent staff, tax expenses, and general maintenance costs such as fuel, electricity, spare parts, and engine oil.

From a revenue perspective, these large-scale industrial processors has total revenue of ₦1,115,000 ($2932.238) per tonne from the sale of groundnut oil and cake. After subtracting all costs, this income stream produced a net profit of ₦238,600 ($627.473) per tonne. It suggests that extensive industrial groundnut processing businesses in the research region were profitable and produced favourable results. It's clear that even with the high processing costs of groundnuts, the profits made from selling groundnut oil and cake more than offset these costs, making the industrial processors successful. This profitability shows how financially viable and long-lasting large-scale groundnut processing projects are in the research region. This suggests that to assure profitability, effective cost management techniques are crucial in industrial groundnut processing activities. The profitable nature of industrial groundnut processing on a wide scale underscores its potential as a profitable venture for investors and entrepreneurs. It suggests that the groundnut processing industry is a viable means of generating income and fostering economic expansion, which might draw in more capital and encourage industry growth and denotes the potential for agricultural commodities like groundnuts to add value, resulting in higher earnings, the creation of jobs, and general socioeconomic development in the studied area and beyond.

Traditional processors

The outcome in Table 3 showed that the overall costs associated with using this processing method came to ₦84,650 ($222.613) for every 1000kg of groundnuts that had been shelled. These charges covered a range of items, such as the cost of intermediate consumption, which included expenses for grinding, stirring, and transporting in addition to purchases of shelled groundnuts, calabash spoons, wood, water, salt, sugar, and/or pepper. Furthermore, ₦175,000.00 ($460.217) was stated as the price of raw groundnuts for every 1000 kg of shelled groundnuts. On the other hand, for every 100 kg of shelled groundnut, traditional processors in the Study area made ₦92,250 ($242.600) in total revenue from the sale of groundnut oil and cake. As a result, for every 1000 kg of shelled groundnuts, there was a net profit or profitability of ₦7,600 ($19.987) and a ₦1.09K return on investment. According to these numbers, traditional groundnut processing in the area was profitable, with each naira invested in traditional processing producing a 9k profit. This demonstrated that traditional groundnut processing techniques are economically viable in the studied area. The money made from the sale of groundnut oil and cake exceeded the expenditures incurred by raw materials, intermediate consumption, and processing operations, providing a good return on investment.

Table 3.

Cost and benefits of groundnut processors in the value chain

Industrial Processing (1 tonne)					**Traditional Processing (1000 kg)**			
Groundnut	**Unit**	**Quantity**	**Price (₦)**	**Value((₦); 1000**	**Groundnut**	**Quantity**	**Price (₦)**	**Value((₦); 1000**
Cost of Inputs					**Cost of Inputs**			
groundnut	Kg	1,000	800	800	RGP	1,000	750	75,000
labour	Man/day	1	20,000	20	Wood	10	250	2,500
Water	Litres	3.2	2,000	6.4	Water	30	50	1,500
Electricity	Kw	1	5,000	5	Salt, sugar, and/or pepper	5	100	500
packaging materials	Numbers	30	1,500	45	Calabash spoon	12	100	1,200
TVC				876.4	Labour:			0
Revenue					Grinding	5	200	1,000
Groundnut oil	Litres	450	2,200	990	Stirring	5	350	1,750
Groundnut cake	Kg	600	200	120	Transportation	1	1200	1,200
Slush (Residue)	Kg	100	50	5	TVC	650		84,650
					Groundnut oil sales	300	180	54,000
					Groundnut cake sales	450	85	38,250
Total Revenue				**1,115**				**92,250**
Gross Margin				**238.6**				**7,600**
ROI				**1.27**				**1.09**
				6.245				
				3.789**				

Note: ROI= Return on investment; RGP= Raw groundnut purchase

Additionally, the profitability of traditional groundnut processing as reported is similar to earlier research findings by [4], and Aliyu [1], suggesting a pattern that is consistent across several investigations. This shows that conventional processing techniques have lasting economic worth and are still applicable to modern farming systems. Additionally, traditional groundnut processing's good return on investment highlights how important it is to the processors in the study area as a means of generating revenue and improving their standard of living. It demonstrated how traditional processing industries help rural economies, create jobs, and promote socio-economic development at the grassroots level.

CONCLUSIONS

The study identified the different actors and sub actors in the groundnut commodity value chain. The major activities of production, processing, and marketing along the groundnut value chains were profitable and these have positive implications for investment opportunities. The profitability of groundnut farming shows the economic viability of groundnut farming across different ecological zones, with higher profits observed in the Guinea Savannah compared to the Sahel and Sudan zone, while the positive marketing margin and rate of return on investment suggest that groundnut oil marketing can be a profitable venture, however it is pertinent to note that the ROI is higher than that of marketers and processors as a result of the volume of goods and the number of times

activities is carried out This study shows that both traditional and industrial groundnut processing techniques are economically viable in the studied area. The study recommend farmers, policymakers, and investors can optimize resource allocation by focusing on zones with higher profitability potential, thereby enhancing overall agricultural productivity and economic growth and stakeholders can work together to address challenges, explore opportunities, and develop innovative solutions to enhance the efficiency, competitiveness, and sustainability of groundnut production and marketing activities.

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